

***Sediment Site Characterization  
Evaluation of Bellingham Bay  
Creosote Piling and Structure  
Removal, Cornwall Avenue Landfill  
Mapping, Boulevard Park Overwater  
Walkway Feasibility, and Dioxin  
Background Sampling and Analysis  
Bellingham, Washington***

***Prepared for  
Washington State  
Department of Ecology***

***June 26, 2009  
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REMOVAL, CORNWALL AVENUE LANDFILL MAPPING, BOULEVARD PARK  
OVERWATER WALKWAY FEASIBILITY, AND DIOXIN BACKGROUND  
SAMPLING AND ANALYSIS  
BELLINGHAM, WASHINGTON**

**EXECUTIVE SUMMARY**

Bellingham Bay is undergoing cleanup and environmental restoration as part of the Bellingham Bay Demonstration Pilot - a collaborative effort by representatives from local, state, federal and tribal governments to cleanup Bellingham Bay, control pollution sources, and restore habitat. Part of the cleanup work includes removal of creosote-treated pilings and structures to reduce sources of potential pollution to the bay and biota. The R.G. Haley and Bellingham Bay Piling Study areas were sampled and analyzed to assess conditions associated with creosote-treated structures. Sediment investigations were conducted at the Cornwall Avenue Landfill site to assess the extent of municipal refuse and wood debris, and bay-wide sampling and analysis were performed to evaluate bay-wide background surface sediment dioxin conditions in Bellingham Bay.

Bellingham Bay background dioxin concentrations are comparable to those reported in the Bellingham Bay dredged material disposal site and higher than unimpacted Puget Sound background locations. Overall, surface sediment dioxin concentrations in Bellingham Bay have decreased by a factor of about 10 or more compared to concentrations reported in 2000. This decrease in surface sediment concentrations is most likely due to high rates of sediment deposition of cleaner material from the Nooksack River, which has mixed with and buried contaminated surface sediment.

R.G. Haley sediment chemical concentrations were below screening criteria for surface sediment samples, but there were exceedances in subsurface sediment samples. The sediments adjacent to a derelict pier structure showed exceedances of criteria for semivolatile organic compounds (SVOCs) at most locations sampled. Sediment larval bioassay testing results indicated biological impacts in surface sediment even though chemical concentrations were less than screening criteria. Sediment chemical concentrations at the R.G. Haley site generally tend to increase with depth suggesting that sediment deposition may be burying historical contaminated sediment or degradation or redistribution/mixing of sediments may be occurring in this area. Diesel- and heavy oil-range hydrocarbons, pentachlorophenol, polycyclic aromatic hydrocarbons (PAHs), and dioxins detected in surface sediment samples at the

R.G. Haley site may be a result of migration from the upland or seepage upward through the sediment.

Sediment profiling imaging (SPI) and plan view images collected at the Cornwall Avenue Landfill site did not identify significant amounts of municipal refuse or wood waste (sawdust/woodchips) on the surface. Core samples generally identified less than 5 percent of municipal refuse at depths varying from 1 to 5 feet below the surface. Wood waste, in the form of sawdust, woodchips, or pieces of bark, was observed in layers at depths varying from the surface to the bottom of the cores. Sedimentation rates near the landfill appear to be relatively high based on the presence of greater than 1 foot of clean overlying sediment in more than half of the core samples.

Chemical concentrations in surface sediment samples collected from the Pilings Area between Boulevard Park and the Cornwall Avenue Landfill were below applicable screening criteria while subsurface sediment samples had only minor exceedances of screening criteria. Surface sediment passed both chronic and acute biological toxicity tests. Due to the gravelly substrate, sample locations had to be moved 10 to 25 feet offshore from the pilings and, therefore, results may not accurately reflect sediment conditions adjacent to the pilings.

## 1.0 INTRODUCTION

This report presents the results of several sediment investigations performed for the Washington State Department of Ecology (Ecology) in Bellingham Bay, Washington (Figure 1). Bellingham Bay is undergoing cleanup and environmental restoration as part of the Bellingham Bay Demonstration Pilot - a collaborative effort by representatives from local, state, federal, and tribal governments to cleanup Bellingham Bay, control pollution sources, and restore habitat. Part of the cleanup work includes removal of creosote-treated pilings and structures to reduce sources of potential pollution to the bay and biota. The R.G. Haley and Bellingham Bay Piling Study areas were sampled and analyzed as part of the current sediment investigation to assess conditions associated with creosote-treated structures. Additional sediment investigations were conducted at the Cornwall Avenue Landfill site, along the alignment of a proposed overwater walkway between Boulevard Park and Cornwall Avenue Landfill, and an evaluation of bay-wide background dioxin conditions in Bellingham Bay. These areas are shown on Figure 2, except the bay-wide sample locations, which are shown on Figures 3 and 4.

The shoreline area between Boulevard Park and the Cornwall Avenue Landfill site connects two known listed sites under the Model Toxics Control Act (MTCA; Chapter 173-340 WAC). The City is currently conducting a feasibility study at the Boulevard Park site to evaluate shoreline redevelopment and a proposed overwater walkway from Boulevard Park to the Cornwall Avenue Landfill. Boulevard Park was also the location of a coal gasification plant from 1900 to 1950. Ecology is currently negotiating an Agreed Order with the City of Bellingham (City) to conduct a remedial investigation/feasibility study (RI/FS) to evaluate potential environmental effects from the historical plant and to evaluate potential cleanup alternatives. Draft RI/FSs have been completed at the Cornwall Avenue Landfill (Landau 2007) and R.G Haley (GeoEngineers 2007) sites. These documents are currently under Ecology review prior to finalization for public review. .

The specific objectives of this multiple site study were to:

- Characterize the sediment quality near creosote-treated pilings and derelict dock structures at the R.G. Haley site;
- Characterize the sediment quality near creosote-treated pilings between Boulevard Park and the Cornwall Avenue Landfill (Bellingham Bay Piling Study area);



- Map the extent and depth of municipal refuse in sediments at the Cornwall Avenue Landfill site; and
- Collect and analyze sediment samples for a dioxin background study in Bellingham Bay.

Additional tasks requested by Ecology during the course of investigation included:

- Characterize the extent, thickness, and depth of wood waste at the Cornwall Avenue Landfill site;
- Collect and analyze three additional subsurface sediment core samples at the R.G. Haley site;
- Assess the general physical condition and stability of the sheet pile wall at the R.G. Haley site. Evaluation of the sheet pile wall was documented under separate cover in a letter report submitted to Ecology (Hart Crowser 2009); and
- Collect and analyze sediment samples along the proposed overwater walkway between Boulevard Park and Cornwall Avenue Landfill. Ecology through a cost-sharing agreement with the City collected and tested sediment samples for this study. Sediment sample testing results are presented under separate cover (Herrenkohl 2009)..

Data collected from these investigations provide information to evaluate potential removal of creosote-treated structures, and adds to existing data for individual cleanup sites as well as the bay at large.

The sediment characterization program was performed in accordance with the Ecology-approved Sampling and Analysis Plan (SAP) prepared for this project (Hart Crowser 2008). Sediment sampling, handling, and analysis were conducted in general accordance with the protocols established by the Puget Sound Estuary Program (PSEP 1997a, 1997b, and 1997c), and Ecology's Sediment Sampling and Analysis Plan Appendix (SAPA; Ecology 2008).

Sample analytical results were compared to Ecology Sediment Management Standards (SMS; Chapter 173-204 WAC) criteria for both chemistry and biological toxicity testing analyses.

Following summary discussions of sediment collection, analysis, and data quality, results for each of the four study areas are presented in subsequent sections of

this report. The additional tasks regarding wood waste at the Cornwall Avenue Landfill and additional sediment cores for the R. G. Haley site are included in this report.

## **2.0 SEDIMENT ASSESSMENT**

Sediment sampling, collection, handling, and analysis were performed in general accordance with the Ecology-approved SAP. With the exception of several vibracore samples discussed below, samples met acceptance criteria. The samples collected were acceptable for chemical, physical, and bioassay analyses.

The number and type of samples collected from each area are summarized in Table 1.

Vessel support for sediment coring, surface sediment grab sampling, and sediment profile imaging (SPI) were performed by Gravity Environmental and BioMarine Enterprises under subcontract to Hart Crowser.

### **2.1 Deviations from SAP**

Deviations from the Ecology-approved SAP are summarized below and are discussed in more detail in the applicable report sections.

#### **R.G. Haley Investigation**

- Vibracore recovery for location RGH-SC-07 was below the SAP criteria of 75 percent despite multiple coring attempts.
- Due to low grab sampler recovery, multiple sediment surface grabs were collected at each location to provide sufficient sediment volume from the 0- to 12-cm-depth interval for chemistry analysis and bioassays.

#### **Cornwall Avenue Landfill Investigation**

- Several proposed sample locations along multiple transects could not be accessed due to shallow water.
- Little municipal refuse was identified in the SPI and plan view photos of surface sediment so vibracore locations were selected by following the outer boundary of surface refuse based on a draft RI/FS prepared by Landau rather than selecting locations based on SPI images.

## **Bellingham Bay Pilings Study Area**

- Sample locations were shifted 10 to 25 feet bayward due to gravelly substrate, large rocks, and eelgrass adjacent to the pilings, which prevented adequate sample recovery and, therefore, results may not accurately reflect sediment conditions adjacent to the pilings.
- Due to low recovery, sediment cores BBP-SC-01 and BBP-SC-02 were not sectioned into 2-foot-depth intervals as planned. Rather, each core was composited and homogenized over its entire length for chemical analysis and, therefore, chemical concentration changes with depth cannot be evaluated.
- No sample was collected at coring location BBP-SC-03, due to refusal and poor recovery after each of the four sampling attempts at this location.
- Due to low grab sampler recovery, multiple sediment surface grabs were collected at each location to provide sufficient sediment volume from the 0- to 12-cm-depth interval for chemistry analysis and bioassays.

### ***2.2 Sample and Survey Location Control***

A differential global positioning system (DGPS) was used onboard the sampling vessels in conjunction with visual triangulation methods for location positioning. The DGPS receiver was placed on the sampling device deployment boom or A-frame to accurately record the sampling location position within 1 to 2 meters. Once the sampler was deployed, the actual position was recorded when the sampler was on the bottom and the deployment cable was in a vertical position. State Plane (Northing and Easting) coordinates for sampling locations are presented in Table A-1 (Appendix A).

### ***2.3 Sediment Core Samples***

Sediment core samples were collected using a vibracore sampling device. The vibracore device uses a vibration source to drive a core tube or sample barrel into unconsolidated water-saturated sediments. The core tube was constructed of 4-inch-diameter Lexan (clear polycarbonate) in which the sediment sample was recovered. A Lexan core catcher attached to the end of the barrel was used to hold the undisturbed sediment inside the barrel when withdrawn from the seafloor sediments.

During sampling, a core tube was driven below the sediment surface with the vibracore device until the desired penetration was achieved. Upon retrieval of

the core, the acceptability was assessed relative to the criteria established in the SAP. Vibracore samples could not be collected at several proposed locations due to refusal (e.g., gravel, wood bark). In general, core locations were moved slightly and repeated attempts were made until recovery was achieved. In addition, a number of vibracore samples did not meet core recovery acceptance criteria. In these cases, core locations were moved slightly and repeated attempts were made until recovery was achieved. In a few instances, recovery was still below acceptance criteria, primarily due to the presence of gravel and cobbles, wood debris (e.g., wood chips, dust, bark), and very soft sediments.

After sample collection, the outside surface of the core tube was cleaned with saltwater and visually examined. Cores collected from the Cornwall Avenue Landfill were photographed and examined to determine the depth and thickness of refuse and wood debris. Cores collected from the R.G. Haley site and Bellingham Bay Piling Study areas were divided into 2-foot sections for possible sediment testing. Each sediment section was visually examined in general accordance with ASTM Standard Practice D 2488, the Standard Practice for the Classification of Soils (Visual-Manual Procedure). A photograph was also taken of each section. Selected, representative photographs are presented in Appendix F. Sample descriptions were documented on core logs (Appendix A). Selected depth interval sections were then homogenized, placed in designated containers, and submitted for chemical analyses.

## **2.4 Surface Sediment Grab Samples**

Sediment surface samples were collected using either a 0.1 m<sup>2</sup> power grab or a double 0.1 m<sup>2</sup> van Veen grab sampler. Upon retrieval of the surface sediment grab samples, the acceptability of each grab was assessed relative to the criteria established in the SAP. Samples from each surface grab location were collected from the 0- to 12-cm-depth interval and homogenized and submitted for chemical and bioassay laboratory testing. The 0- to 12-cm depth represents the assumed biologically active zone of the sediments in Bellingham Bay based on previous work for the Whatcom Waterway site (Anchor and Hart Crowser 2000). Descriptions for sediment grab samples are presented in Table A-2 (Appendix A).

Wet sieving was performed in the field for surface grab samples using a 63-micron (No. 230) sieve and a graduated cylinder to estimate the fine and coarse fraction of the sediments following PSEP protocols. Wet sieving was completed to obtain equivalent grain size distribution between Bellingham Bay site samples and Samish Bay reference sediment samples for bioassay testing.



A Samish Bay reference sample (Samish Bay Ref 1) was collected using a double 0.1 m<sup>2</sup> van Veen grab sampler by BioMarine Enterprises after site samples were collected and field wet sieving was performed. Reference sample coordinates and description are presented in Tables A-1 and A-2 (Appendix A).

### **3.0 SEDIMENT ANALYSES AND DATA QUALITY**

#### **3.1 Chemical Analysis**

Samples for analysis of conventional parameters and SMS chemicals were submitted to Analytical Resources, Inc. (ARI) of Tukwila, WA. Samples were analyzed for semivolatile organic compounds (SVOCs) following EPA Method 8270D. Analyses for conventional chemicals included total organic carbon (TOC) following Plumb (1981), ammonia by EPA Method 350.1 modified, sulfide by EPA Method 376.2, and total solids and total preserved solids by EPA Method 160.3 modified. Selected samples for mercury were prepared and analyzed by EPA Method 7471A, while samples for other SMS metals were analyzed following EPA Method 6010B. Diesel- and motor oil-range petroleum hydrocarbons were analyzed following the Northwest diesel- and heavy oil-range petroleum hydrocarbon method (NWTPH-Dx). Polychlorinated biphenyls (PCBs) were analyzed following EPA Method 8082. Samples for dioxin/furan analysis were subcontracted to TestAmerica – Sacramento, CA for analysis following EPA Method 1613. Sample analyses are summarized in Table 2.

Sediment results for non-ionizable SVOCs and PCBs were organic carbon-normalized when TOC concentrations were between 0.5 to 3.5 percent per current Ecology guidance (personal communication with Dr. Pete Adolphson of Ecology dated January 20, 2009). Results of the sediment chemical analysis of organic carbon-normalized data were compared to SMS marine criteria, including sediment quality standards (SQS) and cleanup screening levels (CSL) as described in WAC 173-204-320. Samples with TOC concentrations outside the 0.5 to 3.5 percent range were compared to Apparent Effects Threshold (AET) values including Lowest Apparent Effects Threshold (LAET) and Second Lowest Apparent Effects Threshold (2LAET) in accordance with SMS protocols. Laboratory method detection limits (MDLs) and practical quantitation limits (PQLs) are compared to sediment screening criteria in Table 3.

The marine SQS and LAET numerical chemical concentration criteria define the degree of sediment quality that is expected to cause no adverse effects to biological resources in Puget Sound marine sediments. The CSL and 2LAET represent concentrations above which adverse biological effects are considered to be significant.

In addition to chemical analysis, laboratory physical parameter testing (grain size and specific gravity) were performed for selected samples collected from R.G. Haley site and the Bellingham Bay Pilings Study area.

Overall, the Data Quality Objectives (DQOs), as set forth in the SAP, were achieved, and the data for this project are acceptable for use, as qualified. No results were rejected as a result of the QA/QC review; therefore, data for this project are 100 percent complete. Results for several analytes were qualified as estimated concentrations based on minor exceedances of quality control criteria. A detailed chemical data quality review and chemical laboratory certificates of analysis are presented in Appendix B.

Analytical results for samples collected from each site within Bellingham Bay are described separately in subsequent sections of this report.

### **3.2 Bioassay Testing**

Surface grab samples for bioassay toxicity testing were submitted to Northwestern Aquatic Sciences of Newport, OR. Both chronic and acute bioassay tests were performed as described in the SAP. The tests conducted were the 10-day amphipod survival test using *Eohaustorius estuarius*, the 20-day polychaete growth test using *Neanthes arenaceodentata*, and the 10-day larval sediment test using *Mytilus galloprovincialis*.

Three reference samples with grain size spanning the range for samples from Bellingham Bay were collected from Samish Bay for statistical comparison of bioassay test results. Sample locations are shown on Figure 5. Due to the similar percent fines of sediment samples submitted for bioassay analysis, only one reference, Samish Bay Ref 1, was used for statistical comparison. Biological endpoint data for each test were compared against those in the reference and control sediment. Data interpretation was conducted based on guidelines in Ecology's SAPA (Ecology 2008). These criteria are based on both statistical significance (a statistical comparison) and the degree of biological response (a numerical comparison). The SMS criteria are derived from Chapter 173-204 WAC and the Ecology SAPA. Two numerical comparisons are made under SMS—the SQS and the CSL. The SQS is more stringent than the CSL, allowing for a smaller biological response in the test treatments.

Reference and control sediment results were acceptable. Reference toxicant results were within control limits for the three test species. Control charts for the reference toxicants are included in laboratory reports presented in Attachment C-1. Overall, the DQOs were met, and the data are acceptable for use. No

results were rejected as a result of the QA/QC review; therefore, data for this project are 100 percent complete.

Bioassay test results are described separately for each site within Bellingham Bay in subsequent sections of this report. Bioassay laboratory reports are presented in Appendix C.

### **Amphipod Test Criteria**

Under the SMS program, a test treatment fails SQS if the mean mortality is statistically significantly higher than that of the reference treatment, and the mean mortality in the test sediment is greater than 25 percent. Tests fail the CSL if the test treatment mortality is both statistically significantly higher and 30 percent greater than the reference sediment.

### **Juvenile Polychaete Test Criteria**

Suitability determinations for the juvenile polychaete test are based on mean individual growth (MIG) rates. A test fails SQS if the MIG is statistically different in the test sediment than in the reference and the MIG in the test sediment is less than 70 percent of the reference. The treatments fail CSL if MIG is statistically different from the reference sediment and is less than 50 percent of the reference.

### **Larval Test Criteria**

For the larval test, sediment fails SQS if the number of normal larvae in the test treatment is significantly less than that of the reference, and is less than 85 percent of the reference sediment. Tests fail CSL if the number of normal larvae is significantly less than the reference sediment, and is less than 70 percent of the reference sediment.

## ***3.3 Sediment Profile Imaging (SPI) Testing***

SPI testing was performed at 141 locations at the Cornwall Avenue Landfill by Science Applications International Corporation (SAIC) of Bothell, WA under a subcontract to Hart Crowser. Three SPI images up to 20 cm (~8 inches) depth were collected at each location. In addition, plan view (surface) photographic images were collected at each location. Images from each location were evaluated for the presence of municipal refuse and wood waste (sawdust/woodchips). The SPI results are discussed in Section 6.0, and the subcontractor report and SPI/plan view data are provided in Appendix D.

## 4.0 BELLINGHAM BAY-WIDE DIOXIN BACKGROUND INVESTIGATION

Historical dioxin sampling and analyses in Bellingham Bay have focused on specific potential point sources and sufficient data have not been available to compare results to bay-wide background concentrations. Recently the Puget Sound Dredged Material Management Program (DMMP) agencies collected 70 surface sediment samples at locations throughout Puget Sound to provide information on dioxin and furan congener concentrations (USACE 2008). However, the DMMP agencies study was designed to obtain background concentrations that have not been impacted by potential known or likely sources of dioxins and furans and, therefore, they did not collect samples from Bellingham Bay.

Surface sediment samples were collected and analyzed for dioxins/furans as part of this Ecology study to determine overall background concentrations in Bellingham Bay.

### 4.1 Sample Locations

Six surface sediment grab samples were collected from subtidal locations in Bellingham Bay (Figure 3). Sample locations were selected to be:

- Collocated with one location (BBDx-SS-04; Georgia-Pacific wastewater treatment outfall) with previously reported (Anchor and Hart Crowser 2000) dioxin results to evaluate temporal trends;
- Locations where other contractors plan to obtain complete SMS chemical analyses (BBDx-SS-01 and BBDx-SS-02); and
- General, bay-wide background locations (BBDx-SS-03, BBDx-SS-05, and BBDx-SS-06).

The surface sediment samples were collected from 0 to 12 cm for chemical analysis of dioxins/furans. State Plane coordinates for the sampling locations are presented in Table A-1. Sediment descriptions are presented in Table A-2.

### 4.2 Analytical Results

Analytical results for dioxins/furans expressed as 2,3,7,8-TCDD toxic equivalents (TEQs) are presented in Table 5 and on Figure 3. TEQs were calculated using the World Health Organization (WHO) 2005 toxic equivalency factors (TEFs) for mammals. Non-detected results were assigned a concentration of one-half the laboratory reporting limit.



Analytical results are also compared to previously acquired dioxin/furan data from part of the Whatcom Waterway preremedial design investigation (Anchor 2009) on Figure 3. Historical dioxin/furan data from Bellingham Bay (Anchor and Hart Crowser 2000; SAIC 2008) are shown on Figure 4.

TEQ concentrations ranged from 1.5 to 14.3 ng/kg, with an average of 8.52 ng/kg. The highest TEQ concentration was detected at location BBDx-SS-03 located offshore of the Cornwall Avenue Landfill and R.G. Haley sites.

Sample BBDx-SS-04, located near the former Georgia-Pacific wastewater treatment outfall, had a dioxin TEQ concentration of 12.7 ng/kg, much lower than reported historical concentrations of 136.9 and 127.9 ng/kg.

Sample BBDx-SS-02, located outside the I & J Waterway by the former Georgia-Pacific wastewater treatment plant, had a dioxin TEQ concentration of 3.2 ng/kg, lower than reported historical concentrations of 22 to 32.8 ng/kg.

Dioxin TEQ concentrations for the samples collected from the six background locations are within the range reported (mean of 6.9 ng/kg and maximum of 12.2 ng/kg) by the US Army Corps of Engineers (USACE) Dredged Material Management Office (DMMO) for the Bellingham Bay dredged material disposal site.

TEQ concentrations are greater than reported in the DMMP's 2008 Puget Sound Background Study. TEQ concentrations in the Puget Sound study ranged from 0.24 to 11.63 ng/kg with a lognormal mean of 1.35 and a median of 1.0 ng/kg. The relative congener ratios in samples collected from Bellingham Bay were similar to those presented in the DMMP study (Figure 6). The octachlorodibenzodioxin (OCDD) relative ratio is excluded from Figure 4 because the OCDD congener is typically present at much higher concentrations than other congeners, regardless of dioxin source, and dominates the relative fraction.

### **4.3 Summary and Conclusions**

Based on results discussed above, while dioxin TEQ concentrations are greater than unimpacted Puget Sound background, concentrations are comparable to those reported in the Bellingham Bay dredged material disposal site.

Overall, surface sediment dioxin concentrations in Bellingham Bay have decreased by a factor of about 10 or more compared to previously reported concentrations (Anchor and Hart Crowser 2000). This decrease in surface sediment concentrations is most likely due to high rates of sediment deposition

of cleaner material from the Nooksack River, which has mixed with and buried contaminated surface sediment.

## **5.0 R.G. HALEY SITE SEDIMENT INVESTIGATION**

This investigation was performed to evaluate surface and subsurface sediment quality adjacent to creosote-treated pilings and structures near the R.G. Haley site and to add to the site data set. As part of source control and habitat restoration efforts in Bellingham Bay, the Washington State Department of Natural Resources plans to remove creosote-treated pilings and structures near the R.G. Haley site. Results of this investigation will provide baseline sediment conditions and provide information on potential sediment impacts from structure and piling removal. In addition, the investigation provides information on the extent of surface and subsurface sediment impacts from the R.G. Haley site.

The R.G. Haley site is located at 500 Cornwall Avenue and borders Bellingham Bay. Previous activities on the upland area of the site included wood treatment processes until 1985. The property was purchased by Douglas Management Co. in 1990. The site reportedly has been inactive since 1985.

In 2001, an oil seep was observed discharging into Bellingham Bay from the shoreline, and investigations revealed that portions of the site were contaminated with wood treatment chemicals at concentrations exceeding state regulatory cleanup levels. A draft RI/FS has been completed and is currently under review by Ecology prior to issuance for public review.

### **5.1 Sample Locations**

Six vibracore samples (RGH-SC-01 through RGH-SC-06) and three sediment grab samples (RGH-SS-01 through RGH-SS-03) were collected from subtidal locations adjacent to a derelict wood structure offshore from the R.G. Haley site. Three additional vibracore samples (RGH-SC-07 through RGH-SC-09) were collected between the structure and Cornwall Avenue Landfill site (Figure 7). Sample location numbers and coordinates are presented in Table A-1 (Appendix A).

### **5.2 Sediment Sampling and Observations**

#### **Vibracore Samples**

Sediment cores were collected to a depth of up to 6 feet below the sediment-water interface. Sediment from cores RGH-SC-01 through RGH-SC-06 were extruded and processed on the vessel. Cores RGH-SC-07 through RGH-SC-09

were transported to a nearby warehouse operated by the Port where the sediment was extruded and processed. Sediment cores were sectioned into 2-foot-depth intervals (0 to 2, 2 to 4, and 4 to 6 feet) and each section was homogenized for chemical analysis. Selected sediment samples from the nine cores were submitted for chemical analysis.

### **Sediment Grab Samples**

Surface sediment samples (0 to 12 cm) were collected from locations RGH-SS-01, RGH-SS-02, and RGH-SS-03 (Figure 7). Multiple grabs were collected at each location to provide sufficient sediment volume for chemical analysis and bioassays. Sample descriptions are presented in Table A-2 (Appendix A). Sediment from the three surface samples was submitted for chemical analysis.

### **5.3 Sediment Physical Characteristics**

Visual sample descriptions of sediment cores and surface sediment grabs are presented in Appendix A. Surface grab samples (RGH-SS-01, RGH-SS-02, and RGH-SS-03) collected adjacent to the wooden structure closest to shore contained abundant fine refuse, primarily glass and brick fragments. There is little evidence for recent sedimentation in these samples since the surface layer contains cobbles and gravel (Table 4). The upper 3 to 6 inches of core samples collected from these locations also contain cobbles and gravel.

Core samples typically contained large amounts of wood debris, primarily sawdust and wood chips. Cores collected further offshore (RGH-SC-04, RGH-SC-5, and RGH-SC-06) and closer to the Cornwall Avenue landfill (RGH-SC-07, RGH-SC-08, and RGH-SC-09) generally contained silt or sand in the upper 3 to 12 inches though, in most cases, wood debris was mixed throughout this layer. An oily sheen was observed at the surface of cores collected from locations RGH-SC-04 and RGH-SC-05.

### **5.4 Chemical Analysis**

Analytical results for the R.G. Haley sediment samples as compared to the AET dry-weight sediment quality criteria are presented in Table 6. Analytical results compared to the SMS sediment quality criteria are presented in Table 7. Compounds exceeding applicable SMS or AET screening criteria are shown on Figure 7. Analytical results for dioxins/furans expressed as 2,3,7,8-TCDD TEQs are presented in Table 8 and on Figure 8.

## **Conventional Sediment Analyses**

TOC concentrations ranged from 1.47 to 38.6 percent for all samples collected and analyzed from the R.G. Haley site. TOC concentrations in the three sediment surface samples ranged from 2.2 to 4.13 percent. TOC concentrations in the nine vibrocore samples ranged from 1.47 to 38.6 percent. The maximum TOC concentration was reported in sample RGH-SC-07-2-4'. The highest TOC concentrations were present in the 2- to 4- and 4- to 6-foot-depth intervals and are likely associated with large amounts of wood debris observed (refer to Appendix A) in the core samples.

Total solids concentrations ranged from 29.3 to 84.7 percent in the vibrocore samples. Total solids concentrations ranged from 67.4 to 81.5 percent in the surface sediment samples.

Total sulfide concentrations in the three surface sediment samples were relatively high, ranging from 503 to 1,420 mg/kg with the highest concentration detected in sample RGH-SS-01. Sulfide is indicative of organic-rich, anaerobic sediment and may be associated with low oxygen due to degradation of wood waste observed in these samples.

Ammonia concentrations in the three surface sediment samples ranged from 3.39 to 6.34 mg/kg with the highest concentration detected in RGH-SS-03.

## **Diesel- and Motor Oil-Range Petroleum Hydrocarbons**

Diesel-range petroleum hydrocarbons concentrations ranged from 8.8 U to 670 mg/kg, with the highest detection in sample RGH-SC-08-4-5.5'. Heavy oil-range petroleum hydrocarbons concentrations ranged from 18 U to 950 mg/kg, with the highest detection in sample RGH-SC-09-4-5.5'.

The depth of maximum TPH concentration varies by location. The maximum TPH concentrations for locations RGH-SC-02, RGH-SC-04, and RGH-SC-05 were detected in the uppermost (0- to 2-foot-depth) interval. As noted earlier, petroleum sheen was observed in the samples RGH-SC-04-0-2' and RGH-SC-05-0-2'. For locations RGH-SC-01, RGH-SC-06, and RGH-SC-07, the maximum TPH concentration was detected in the deepest interval sampled (about 4 to 6 feet deep). The highest TPH concentrations span a wider depth range for locations RGH-SC-03, RGH-SC-08, and RGH-SC-09 with similar concentrations in both the 2- to 4- and 4- to 6-foot-depth intervals. Overall, the maximum TPH concentrations (greater than 800 mg/kg) were detected in subsurface samples at locations RGH-07, RGH-08, and RGH-09, located in the southern portion of the site nearer the Cornwall Avenue Landfill.

No sediment criteria have been established for TPH though Ecology has determined that impacts may occur at concentrations greater than 200 mg/kg (personal communication with Dr. Pete Adolpson, Ecology, on June 2, 2009); Total TPH concentrations are below the MTCA Method A screening criterion of 2,000 mg/kg for upland soil.

## **Mercury**

Mercury was detected at concentrations above CSL at core locations RGH-03, RGH-06, RGH-08, and RGH-09 (Figure 7) with the highest concentration (11.3 mg/kg) in sample RGH-SC-08-4-5.5'. None of the surface (0 to 12 cm) sediment samples tested (locations RGH-SS-01, RGH-SS-02, and RGH-SS-03) exceeded SQS. Mercury concentrations increase with depth with highest concentrations in the 4- to 6-foot-depth interval suggesting a historical source that is being attenuated with more recent sediment deposition.

## **Non-Polar Semivolatile Organic Compounds**

Except for six samples collected from the R.G. Haley site, the samples contained greater than 3.5 percent organic carbon likely due to petroleum hydrocarbons and wood debris in the samples and, therefore, sample results for most non-polar organics were compared to AET criteria rather than the organic carbon-normalized SMS.

TOC in the following samples was within the 0.5 to 3.5 percent range for organic carbon normalization and results for these samples were compared to SMS: RGH-SS-02; RGH-SS-03; RGH-SC-01-0-2'; RGH-SC-02-2-4'; RGH-SC-04-4-6'; and RGH-SC-05-2-4'. Non-polar organic compound results for other samples were compared to AET criteria.

## **PAHs**

PAHs were the most prevalent compounds detected that exceeded sediment screening criteria (Figure 7). PAHs are usually associated with creosote, coal tar, oil, and incomplete combustion of organic matter. PAHs are a component of creosote, a wood preservative, and are likely associated with former creosote wood treating at the R.G. Haley facility or treated pilings and structures along the shoreline.

The depth of maximum PAH concentration varies by location. The highest total PAH concentrations and the greatest number of LAET and 2LAET exceedances were detected in the 2- to 4-foot-depth interval at location RGH-03 and the 4- to 6-foot-depth interval at location RGH-06. These sample locations are at the

western end of the derelict wooden structure immediately offshore of the R.G. Haley site (Figure 7) and may reflect either an upland source or historical in-water disposal of creosote. Locations RGH-08 and RGH-09, located between the derelict structure and the Cornwall Avenue Landfill, also had maximum total PAH concentrations in the deepest interval sampled (4 to 5.5 feet) though only fluoranthene in sample RGH-08-4-5.5' exceeded the LAET.

For locations RGH-02, RGH-04, and RGH-05, the highest total PAH concentrations were detected in the 0- to 2-foot-depth interval though there were exceedances of AET criteria only in sample RGH-04-0-2'. Phenanthrene and fluoranthene exceeded their respective LAET in sample RGH-04-0-2'. For samples RGH-SC-04-0-2' and RGH-SC-05-0-2', PAHs are likely associated with the petroleum sheen that was observed in the cores.

None of the surface (0 to 12 cm) sediment samples tested (locations RGH-SS-01, RGH-SS-02, and RGH-SS-03) exceeded sediment screening criteria.

### ***Phthalates***

Phthalates are ubiquitous in the environment. They are used in a wide range of products, primarily as plasticizers and coatings, and are also common in wastewater and stormwater discharges.

Dimethylphthalate and butylbenzylphthalate exceeded sediment screening criteria in four samples (Figure 7). Core locations RGH-07 and RGH-08, between the derelict wooden structure and the Cornwall Avenue Landfill, exceeded AET criteria in the 0- to 2-foot-depth interval possibly suggesting either surface water runoff or the Cornwall Avenue Landfill as potential sources. Sample RGH-07-0-2' exceeded the 2LAET for dimethylphthalate while sample RGH-08-0-2' exceeded the LAET for butylbenzylphthalate. The LAET for dimethylphthalate was also exceeded in the 4- to 5.5-foot-depth interval at location RGH-08 indicating historical deposition.

Locations RGH-02 and RGH-03 exceeded the 2LAET for dimethylphthalate and LAET for butylbenzylphthalate, respectively, in the 4- to 6-foot-depth interval, suggesting older deposition.

None of the surface (0 to 12 cm) sediment samples tested (locations RGH-SS-01, RGH-SS-02, and RGH-SS-03) exceeded sediment screening criteria.

## Phenols

The compound 2,4-dimethylphenol, often associated with wood waste as well as creosote and coal tar, exceeded the sediment CSL in the 2- to 4-foot-depth interval sample collected from RGH-SC-07. However, this compound was only detected in one other sample, the 2- to 4-foot-depth interval from location RGH-SC-06 but below SQS. Other phenols (e.g., phenol, 2-methylphenol, 4-methylphenol), also often associated with wood waste, creosote, and coal tar, were detected in a number of samples but the concentrations were below their respective SQS.

Pentachlorophenol is the only other polar compound detected that exceeded SQS and CSL. Pentachlorophenol is a wood preservative and is likely associated with former wood treating activities at the R.G. Haley facility.

With the exception of locations RGH-05, RGH-06, and RGH-07, pentachlorophenol was detected in the other surface samples and core samples collected and analyzed though most concentrations were less than the SQS. The highest pentachlorophenol concentrations do not appear to be associated with locations of highest PAH concentrations.

The highest pentachlorophenol concentrations were typically in the intermediate (2- to 4-foot-depth) and deepest (4- to 6-foot-depth) core samples though pentachlorophenol was also detected in surface samples and shallow cores (0- to 2-foot) with the exception of the three locations listed earlier. Pentachlorophenol concentrations increase with depth in cores collected from locations RGH-08 and RGH-09, located between the derelict wooden structure and the Cornwall Avenue Landfill. Pentachlorophenol concentrations at RGH-08 in the 0- to 2-, 2- to 4-, and 4- to 5.5-foot-depth intervals are 150, 450, and 4,100 µg/kg, respectively, compared to its SQS and CSL of 360 and 690 µg/kg, respectively. Pentachlorophenol concentrations at RGH-09 in the 0- to 2-, 2- to 4-, and 4- to 5.5-foot-depth intervals are 91, 260, and 420 µg/kg, respectively.

Pentachlorophenol concentrations in samples collected from RGH-01 exceed its SQS in the 0- to 2- and 4- to 6-foot-depth intervals with the highest concentration in the deepest sample. The only other pentachlorophenol exceedance was in RGH-03-2-4' (720 µg/kg), which exceeded its CSL of 690 µg/kg.

In two locations, RGH-02 and RGH-04, the highest pentachlorophenol concentrations were detected in the 0- to 2-foot-depth interval though concentrations were below the SQS. The presence of highest pentachlorophenol concentrations vary by location in shallow and deep sediment samples suggests both historical and potential on-going releases.

## Dioxins/Furans

Dioxin in the vicinity of the R.G. Haley site is likely associated with pentachlorophenol use and/or releases. Dioxin is known to be contaminant produced in the manufacturing of pentachlorophenol and dioxins are also formed during combustion of pentachlorophenol or pentachlorophenol-treated wood. Dioxins are also produced during chlorine bleaching of wood pulp.

Samples from six locations (Figure 8) were submitted for dioxin analysis. The total TEQ concentrations, based on the non-detects equaling one half the reporting limit, range from 1.55 to 557 ng/kg (Table 8), with the highest concentration reported in sample RGH-SC-03-0-2'. Sample concentrations are within the range or somewhat higher than the range of 52 to 200.8 ng/kg (Figure 4) previously reported (Anchor and Hart Crowser 2000).

TEQ concentrations in three surface (0 to 12 cm) sediment samples (RGH-01, RGH-02, and RGH-03) collected adjacent to the derelict structure closest to shore range from 80.9 to 167 ng/kg. These concentrations are significantly higher than the average Bellingham Bay background concentration of 8.52 ng/kg (See Section 4.0), the Puget Sound average background concentration of 1.35 ng/kg, and the range reported (mean of 6.9 ng/kg and maximum of 12.2 ng/kg) by the DMMO for the Bellingham Bay dredged material disposal site.

Samples from multiple depth intervals were analyzed for dioxin at only three locations (RGH-01, RGH-02, and RGH-06). Dioxin concentrations generally increase with depth and tend to be correlated with pentachlorophenol but too few core samples were analyzed to establish a trend. Additional dioxin analysis of core samples would be required to definitively determine whether dioxins are associated with pentachlorophenol.

### **5.5 Sediment Bioassay Testing Results**

Bioassay testing was performed on two surface sediment samples and one reference sample (Samish Bay Ref 1). Sample RGH-SS-02 was not submitted for bioassay testing, as insufficient volume was collected for both chemistry and bioassay testing after eight sediment grab attempts. The reference location was selected to match the grain size distribution of the sediment samples.

Suitability determinations are based on a comparison of responses observed in the test treatments versus those in the reference treatment. Based on similarity in grain size, sample Samish Bay Ref 1 was used for comparison of test treatments RGH-SS-01 and RGH-SS-03.



The laboratory results and sediment bioassay summary are presented in Appendix C. Bioassay results are present graphically on Figure 9.

### **Amphipod Test Results**

No significant differences were observed for samples RGH-SS-01 or RGH-SS-03 relative to the Samish Bay reference sediment. Both sediment samples also met the SQS and CSL; thus passing overall.

### **Juvenile Polychaete Test Results**

There were no significant decreases in MIG in any of the test treatments relative to the reference sediment (Appendix C). In addition, there was adequate growth in each of the test treatments to meet both the SQS and CSL.

### **Larval Test Results**

Statistically significant decreases in normal survivors were observed in samples RGH-SS-01 and RGH-SS-03, relative to the Samish Bay reference. The number of normal larvae in test sediment RGH-SS-01 was 68.9 percent compared to the reference sediment. Test sediment RGH-SS-01 failed the SQS of 85 percent, and also failed the CSL of 70 percent. The number of normal larvae in test sediment RGH-SS-03 was 77.6 percent compared to the reference sediment. Test sediment RGH-SS-03 failed the SQS, but passed the CSL (Appendix C).

## ***5.6 Summary and Conclusions***

Chemical concentrations, and most SQS and AET exceedances, generally, though not definitively, tend to increase with depth suggesting natural attenuation due to sediment deposition may be occurring. The maximum TPH concentrations were detected in subsurface samples collected from the southern portion of the site nearer the Cornwall Avenue Landfill.

Sediment analytical data for the R.H. Haley site show that the concentrations of SMS chemicals of concern were below their respective SQS for the three surface sediment samples collected from 0 to 12 cm but there were exceedances of SMS or AET criteria for subsurface sediment samples. Sulfide concentrations in the three surface sediment samples were high, indicating organic-rich, anaerobic sediment, possibly due to degradation of wood waste observed in these samples.

The sediments adjacent to the derelict structure showed exceedances for the SMS and AET criteria for SVOCs at most locations sampled (RGH-01, RGH-02,

RGH-03, RGH-04, and RGH-06). The largest number and highest concentrations of chemicals detected offshore from the R.G. Haley site were detected at locations RGH-03 and RGH-06, located closest to the site. There were no exceedances of sediment criteria in samples collected from RGH-05.

Sediment larval testing results indicated biological impacts to sediment at locations RGH-01 and RGH-03 even though chemical concentrations were less than SMS and AET criteria. RGH-SS-01 failed both the SQS and the CSL for normal larval development. RGH-SS-03 also failed the SQS for the larval development bioassay. Biological impacts may be due to high concentrations of sulfide in the samples.

## **6.0 CORNWALL AVENUE LANDFILL SITE**

The Cornwall Avenue Landfill site is located at the south end of Cornwall Avenue, south of R.G. Haley, and adjacent to Bellingham Bay. Most of the site was originally tideflats and sub-tidal areas. From 1888 to 1946, the site was used for sawmill operations, including log storage and wood disposal. The site was used for municipal waste disposal from approximately 1953 until 1965. The site is owned by the City, the Port and the State of Washington. A draft RI/FS has been completed and is currently under review by Ecology prior to issuance for public review.

### **6.1 Sample Locations**

#### **SPI/Plan View Images Sample Locations**

SPI data were collected from 141 subtidal locations offshore of the Cornwall Avenue Landfill (Figure 10). Samples were collected along multiple transects. Several proposed locations could not be accessed due to shallow water or locations which plotted on land. State Plane coordinates for the sampling locations are presented in Appendix D.

The SPI report and SPI data are provided in Appendix D, and the Cornwall Avenue Landfill sediment vibracore locations, descriptions, and vibracore logs are provided in Appendix E.

#### **Sediment Coring Sample Locations**

Vibracore samples were collected from 44 subtidal locations adjacent to Cornwall Avenue Landfill site. SPI data were to be used to determine subsequent sediment core sampling locations. However, as so little municipal

refuse was identified in the SPI and plan view photos of surface sediment, apparently due to high sedimentation rates, vibracore locations were selected by following the outer boundary of surface refuse based on a draft RI/FS prepared by Landau (2007). Core locations were selected on each side of the refuse boundary line (Figure 10). Additional core locations were selected both inside and outside the refuse boundary line to provide additional information on the extent of refuse and wood debris. Two locations (CW-139 and CW-136) were not collocated with a SPI site. Additionally, two coring locations (BLVD-09 and RGH-07) sampled in conjunction with neighboring investigations, were located within the Cornwall Avenue Landfill site and are also included on Figure 10. State Plane coordinates for the core sampling locations are presented in Table E-1.

Sediment cores were collected to a depth of up to 8.5 feet (penetration) below the sediment-water interface. Sediment was extruded aboard the vessel into a wooden trough where it was visually examined to determine the presence of municipal refuse and wood waste (sawdust/woodchips). Representative photographs are presented in Appendix E. Since the objective was to map the extent and depth of refuse and wood debris, no samples were collected for chemistry or bioassay analyses.

## ***6.2 Distribution of Municipal Refuse and Wood Waste***

A summary of the SPI observations and interpretation relative to the presence of municipal refuse and wood waste is presented in SAIC'S SPI Survey Report in Appendix D. Identification of sawdust and woodchips in SPI images is based on visual interpretation of photographs and is subjective.

Images and cores from each location were evaluated for the presence of municipal refuse and wood debris (sawdust/woodchips). A summary of the core observations and interpretation relative to the presence of municipal refuse and wood waste is presented in Table E-2.

### **Locations with Discernable Wood Waste or Municipal Refuse**

Locations with any discernable amount of municipal refuse or wood debris (sawdust/woodchips) on the sediment surface or within the sediment core is presented on Figure 11. Only municipal refuse was identified in 16 of the 141 subtidal locations (approximately 11 percent) while only wood waste (sawdust and/or woodchips) was identified in 21 of the 141 subtidal locations (approximately 15 percent). Both municipal refuse and wood waste are present in 26 locations (approximately 18 percent). In many cases, sawdust is present only on the surface in small amounts and identification is subjective. In cases

where small amounts of apparent sawdust were observed in SPI images, it was generally present as very thin layers (typically less than 0.5 cm) on the surface.

As shown on Figure 11, no discrete areas of municipal refuse were evident though general trends were observed. The outer boundary of municipal refuse (both surface and core samples) corresponds with the outer boundary of surface refuse determined in the draft Cornwall Avenue Landfill RI/FS (Landau 2007). The draft RI/FS also established a boundary of significant municipal refuse (greater than 50 percent surface refuse) closer to shore (Figure 11). Significant areas of surface municipal refuse were not identified in SPI and plan view images or in sediment cores during the current investigation. Most samples in this investigation contained less than 5 percent municipal refuse and, in many cases, only one piece of refuse was present. In addition, it is unknown whether surface refuse observed in SPI and plan view images is of recent origin or is from historical landfill operations. The lack of refuse observed in surface sediments during this investigation is likely a result of recent sediment deposition over materials observed during the previous surveys in 1996 and 2002 (Landau 2007).

There is also no clear pattern for the distribution of wood waste though there is a small cluster of locations on the southwestern edge of the Cornwall Avenue Landfill, outside the municipal refuse boundary, where only wood waste was observed (Figure 11).

In general, both wood waste and municipal refuse were identified along the entire length of the former landfill though observable municipal refuse concentrations were lower than those reported in the draft Cornwall Avenue Landfill RI/FS.

### **Locations with Wood Waste and/or Municipal Refuse and Less than 1 foot of Recent Sedimentation**

Figure 12 shows locations with greater than 1 foot of accumulated wood waste containing greater than 50 percent sawdust and/or woodchips or any discernable municipal refuse with less than 1 foot of recent overlying sediment. Figure 12 incorporates information from both SPI and plan view images (Appendix D) and sediment core samples (Table E-1 and Figure 10).

Locations with greater than 1 foot of accumulated wood containing greater than 50 percent sawdust and/or woodchips with less than 1 foot of recent overlying sediment are primarily in the southernmost portion of the landfill (CW-02, CW-03, CW-108, and CW-120).

Samples with any discernable municipal refuse and less than 1 foot of recent overlying sediment are primarily located in the southwestern portion of the landfill within the significant municipal refuse boundary as presented in the draft Cornwall Avenue Landfill RI/FS. There are also a small number of locations with municipal refuse in the northern part of the landfill that are covered with less than 1 foot of overlying sediment.

The only location that contained both wood waste and municipal refuse is CW-53, located near the middle of the landfill area.

### **6.3 Summary and Conclusions**

SPI and plan view images did not identify significant amounts of municipal refuse or wood waste (sawdust/woodchips) on the surface of the Cornwall Avenue Landfill site. Core samples indicated minimal amounts (generally less than 5 percent) of municipal refuse, primarily degraded plastic, at depths varying from 1 to 5 feet below the surface. Wood waste, in the form of sawdust, woodchips, or pieces of bark, was observed in layers at depths varying from the surface to the bottom of the cores.

Surface refuse was only observed in four of the SPI and surface plan view images, likely due to burial of refuse by surface sediment deposition. A surface sediment layer of greater than 1 foot was observed at approximately 55 percent of the coring locations. The average thickness of this overlying sediment layer was approximately 1.4 feet.

Locations with discernable municipal refuse or significant sawdust and/or woodchips with less than 1 foot of overlying sediment were primarily in the south and southwest areas of the landfill.

Sedimentation rates near the landfill appear to be relatively high based on the presence of greater than 1 foot of clean overlying sediment in more than half of the core samples (Figures 10 and 12).

## **7.0 BELLINGHAM BAY PILING STUDY AREA**

The Bellingham Piling Study area is located between Boulevard Park and the Cornwall Avenue Landfill site and includes numerous derelict pilings that were once part of a historical railroad trestle adjacent to the existing shoreline. Surface sediment grab samples and cores were collected to evaluate sediment quality adjacent to the pilings before removal by the Department of Natural Resources.

## **7.1 Sample Locations**

Two vibracore samples (BBP-SC-01 and BBP-SC-02) and three surface sediment grab samples (BBP-SS-01 through BBP-SS-03) were collected from subtidal locations adjacent to three sets of derelict pilings between the Cornwall Avenue Landfill site and Boulevard Park (Figure 13). Attempts were made to collect samples at the proposed coordinates, but due to gravelly substrate, large rocks, and eelgrass, sample locations were shifted progressively bayward (approximately 10 to 25 feet) until sediment samples could be collected. As a result of this shifting, sample results may not be indicative of the sediment quality close to the pilings. In addition, chemical concentration changes with depth could not be determined since the entire core lengths were homogenized and composited due to poor recovery in multiple coring attempts. No sample was collected at coring location BBP-SC-03, due to refusal and poor recovery after each of four sampling attempts at this location.

## **7.2 Sediment Sampling and Observations**

### **Vibracore Samples**

Sediment cores were collected at two (BBP-SC-01 and BBP-SC-02) of the three proposed coring locations. The two successful cores were driven to a depth of 4 to 5 feet below the sediment-water interface before refusal due to coarse-grained sediments. Recovery of the two cores was below the SAP criteria of 75 percent. However, after multiple attempts and subsequent shifting of the core locations, it was decided to collect sediments for chemical analysis from the cores with the highest recoveries even if acceptance criteria were not met. This field decision was made based on the concept that although moving further away from the pilings would provide better recovery, the chemical results would be less representative of sediment adjacent to the pilings.

Sediment from each core was extruded and processed on the vessel. The sediment cores were photographed and visual observations and sediment descriptions were documented on core logs (Appendix A). Due to the low recovery, the sediment cores were not sectioned into 2-foot-depth intervals as planned. Rather, each core was composited and homogenized over its entire length for chemical analysis and, therefore, chemical concentration changes with depth cannot be evaluated.

### **Sediment Grab Samples**

Sediment surface samples (BBP-SS-01 through BBP-SS-03) were collected using a power grab sampler at three locations (Figure 13). The original proposed sample

locations were shifted due to the presence of eelgrass, cobbles, and wood waste preventing closure of the grab sampler. Multiple sediment surface grabs were collected at each location to provide sufficient sediment volume from the 0- to 12-cm-depth interval for chemistry and bioassays (Table 2).

### **7.3 Sediment Physical Characteristics**

Surface sediment samples and sediment cores were photographed and visual observations and sediment descriptions were documented on core logs presented in Appendix A. Visual sample descriptions of surface sediment grabs are presented in Table A-2.

Physical parameters were determined only on samples BBP-SS-01 and BBP-SS-02. Samples consisted primarily of sandy gravel. Grain size results are summarized in Table 4. The surface sediment grab samples were additionally analyzed for Atterberg limits and specific gravity. Laboratory analysis results are presented in Appendix B.

### **7.4 Chemical Analysis**

Chemical analysis was conducted on the five sediment samples (two composite core samples and three surface sediment samples). The sediments were analyzed for total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc), SVOCs, TOC, total solids, ammonia, total sulfides, and NWTPH-Dx. Three surface sediment grab samples and core sample BBP-SC-01 were analyzed for dioxins/furans. Analytical results for the Bellingham Bay Piling Study area sediment samples compared to the AET dry-weight sediment quality criteria are presented in Table 9. Analytical results compared to the SMS criteria are presented in Table 10. Analytical results for dioxins/furans with TCDD TEQs are presented in Table 11.

#### **Conventional Sediment Analyses**

TOC concentrations ranged from 2.4 to 86.5 percent. TOC concentrations in the three surface sediment samples ranged from 2.4 to 86.5 percent with the maximum TOC concentration reported in the sample BBP-SS-03 located directly north of Boulevard Park. The high TOC concentration is associated with the extensive wood debris and slight oily sheen observed in sample BBP-SS-03 (Table A-2). TOC concentrations for the coring locations were 9.49 percent for BBP-SC-01 and 10.1 percent for BBP-SC-02.

Total solids concentrations ranged from 20.4 to 67 percent. Preserved total solids concentrations ranged from 18.8 to 69.5 percent.

Total sulfide concentrations in the three surface sediment samples and two core samples ranged from 212 to 393 mg/kg with the highest concentration detected in core sample BBP-SC-02.

Ammonia concentrations in the three surface sediment samples and two vibracore samples ranged from 2.82 to 10.4 mg/kg with the highest concentration detected in sample BBP-SS-01.

### **Diesel- and Motor Oil-Range Petroleum Hydrocarbons**

Diesel-range petroleum hydrocarbons concentrations ranged from 10 to 61 mg/kg, with the highest detection in sample BBP-SS-03 located directly north of Boulevard Park (Figure 13). Heavy oil-range petroleum hydrocarbons concentrations ranged from 15 to 180 mg/kg, with the highest detection in sample BBP-SS-03. An oily sheen was observed in samples BBP-SS-01 and BBP-SS-03.

### **Metals**

Arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc were detected in one or more of the sediment samples analyzed; however, at concentrations below SQS. Silver was not detected in any of the samples analyzed.

### **Non-Polar Semivolatile Organic Compounds**

Only sample BBP-SS-01 had a TOC concentration within the 0.5 to 3.5 percent range for organic carbon normalization of results. Therefore, only sample BBP-SS-01 was compared to SMS criteria for non-polar organic compounds. Results for other samples were compared to AET dry-weight criteria.

PAHs were detected in all samples collected from the pilings area. However, concentrations for individual PAHs as well as total low molecular weight PAHs (LPAHs) and total high molecular weight PAHs (HPAHs) were below their applicable SMS and AET criteria, with the following exceptions.

- Phenanthrene and fluoranthene in surface (0 to 12 cm) sample BBP-SS-02 exceeded the LAET, but were below the 2LAET (Figure 13).

Phthalates were detected at all sample locations but only butylbenzylphthalate exceeded LAET in sample BBP-SC-02.



## **Phenols**

Phenol and/or 4-methylphenol were detected in all samples but concentrations were below their respective SQS.

## **Dioxins/Furans**

The total TEQ concentrations ranged from 1.11 to 16.1 ng/kg, with the highest detection in sample BBP-SS-03 (Figure 14). Dioxin TEQs are lower than concentrations at the R.G. Haley site and are comparable to those detected in the bay-wide study (Section 4.0 and Figure 3).

### **7.5 Sediment Bioassay Testing Results**

Bioassay testing was performed on two surface sediment samples (BBP-SS-01 and BBP-SS-02) and one reference sample (Samish Bay Ref 1). The same reference sample (Samish Bay Ref 1) was used for the Bellingham Bay Piling Study area samples and the R.G. Haley site samples based on grain size distribution. The laboratory results and sediment bioassay summary are presented in Appendix C. Bioassay results are present graphically on Figure 9.

#### **Amphipod Test Results**

Relative to the Samish Bay reference, no significant differences were observed for BBP-SS-01 or BBP-SS-02. Both sediment samples also met the SQS and CSL; thus passing overall.

#### **Juvenile Polychaete Test Results**

There were no significant decreases in MIG in any of the test treatments, relative to the reference treatment (Appendix C). In addition, there was adequate growth in each of the test treatments to meet both the SQS and CSL.

#### **Larval Test Results**

There was no significant decrease in normal development for samples BBP-SS-01 or BBP-SS-02 compared to the Samish Bay reference sample. Normal development in each of the test treatments met the numeric threshold for both SQS and CSL (Appendix C); thus passing overall.

## **7.6 Summary and Conclusions**

Analytical data show that the concentrations of SMS chemicals of concern were below the corresponding SQS for surface sediment sample BBP-SS-01. Surface samples BBP-SS-02 and BBP-SS-03 had TOC concentrations outside the range for normalization, and were compared to AET criteria. The concentrations of the chemicals of concern were below the corresponding AETs with the following exceptions. Phenanthrene and fluoranthene in BBP-SS-02 exceeded the LAET, but were less than the 2LAET.

The core samples were also compared to the AET criteria due to high organic content. The concentrations of chemicals of concern were below corresponding AETs with the exception of butylbenzylphthalate in BBP-SC-02, which was above the LAET but below the 2LAET.

Sediment bioassay results indicate acceptable organism growth and survival in the surface sediment tested from the Bellingham Bay Piling Study area.

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## 9.0 LIMITATIONS

Work for this project was performed, and this report prepared, in general accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Ecology for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

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**Table 1 - Sediment Sample Collection Data**

<b>Site</b>	<b>Vibracore Locations</b>	<b>Vibracore Sediment Samples</b>	<b>Surface Sediment Samples</b>	<b>SPI</b>
<b>R.G. Haley Site</b>	9	27	3	0
<b>Cornwall Avenue Landfill Site</b>	44	0	0	141
<b>Bellingham Bay Piling Study Area</b>	3	2(a)	3	0
<b>Bay-Wide Dioxin Background Study</b>	0	0	6	0
<b>Boulevard Park Study</b>	9	62	9	0
<b>Samish Bay Reference</b>	0	0	3	0

(a) Vibracore sediment sample could not be collected at one location.

**Table 2 - Sediment Sample Testing Summary**

Sample Number	ARI Job No.	TA-SAC Project No.	Mercury	Metals <sup>1</sup>	NWTPH-Dx	SVOCs	PCBs	Ammonia	Total Sulfides	TOC	Dioxins/Furans	Bioassay	Grain Size	Atterberg Limits	Bulk Density	Specific Gravity	Moisture Content
<b>Boulevard Park Study</b>																	
Surface Sediment Samples																	
BLVD-SS-01	NQ36, NV31			x	x	x		x	x	x		x	x				
BLVD-SS-02	NQ36			x	x			x	x	x							
BLVD-SS-03	NQ36			x	x			x	x	x							
BLVD-SS-04	NQ36			x	x			x	x	x							
BLVD-SS-05	NQ36			x	x			x	x	x							
BLVD-SS-06	NQ36			x	x			x	x	x			x				
BLVD-SS-07	NQ36			x	x			x	x	x		x	x				
BLVD-SS-08	NQ36			x	x			x	x	x			x				
BLVD-SS-09	NQ36			x	x		x	x	x	x		x	x				
Sediment Core Samples																	
BLVD-SC-01-0-2'	NR34, NV30			x	x	x				x							
BLVD-SC-01-2-4'	NR34, NV30			x	x	x				x							
BLVD-SC-01-4-6'	NR34, NV30			x	x	x				x							
BLVD-SC-02-2-4'	NR34, OI72			x	x	x				x							
BLVD-SC-02-6-8'	NR34, OI72			x	x	x				x							
BLVD-SC-03-4-6'	NR34			x	x												
BLVD-SC-03-6-8'	NR34			x	x												
BLVD-SC-04-0-2'	NR34, NV30			x	x	x				x							
BLVD-SC-04-2-4'	NR34, OI72					x				x							
BLVD-SC-04-4-6'	NR34, OI72					x				x							
BLVD-SC-04-8-10'	NR34			x	x							x	x		x	x	
BLVD-SC-04-10-10.5'	NR34														x		x
BLVD-SC-05-6-8'	NR34			x	x												
BLVD-SC-05-8-9.5'	NR34			x	x												
BLVD-SC-05-9.5-10'	NR34												x	x		x	x
BLVD-SC-05-10-10.5'	NR34														x		x
BLVD-SC-05-10.5-12'	NR34			x	x								x	x		x	x
BLVD-SC-05-13.5-14'	NR34												x				
BLVD-SC-06-0-2'	NR34			x	x												
BLVD-SC-06-2-4'	NR34			x	x												
BLVD-SC-06-4-6'	NR34			x	x												
BLVD-SC-06-6-8'	NR34												x	x		x	x
BLVD-SC-06-8-9'	NR34														x		x
BLVD-SC-06-12-14'	NR33												x	x		x	x
BLVD-SC-06-14-14.5'	NR33														x		x
BLVD-SC-07-0-4'	NR33			x	x												
BLVD-SC-08-0-2'	NR33			x	x												
BLVD-SC-08-2-2.5'	NR33														x		x
BLVD-SC-08-2.5-4'	NR33			x	x								x	x		x	x
BLVD-SC-08-4-6'	NR33			x	x												
BLVD-SC-08-8-8.5'	NR33																
BLVD-SC-08-8.5-10'	NR33												x	x		x	x
BLVD-SC-08-14-14.5'	NR33															x	x
BLVD-SC-09-0-2'	NR33			x	x		x										
BLVD-SC-09-2-3'	NR33, NV29			x	x	x	x			x							
BLVD-SC-09-3-4'	NR33, NV29			x	x	x	x			x							
BLVD-SC-09-4-6'	NR33, NV29, OG54			x	x	x	x			x							
BLVD-SC-09-6-8'	NR33, NV29, OG54			x	x	x	x			x							
BLVD-SC-09-8-8.5'	NR33														x		x
BLVD-SC-09-8.5-9.7'	NR33, NV66												x	x		x	x

**Table 2 - Sediment Sample Testing Summary**

Sample Number	ARI Job No.	TA-SAC Project No.	Mercury	Metals <sup>1</sup>	NWTPH-Dx	SVOCs	PCBs	Ammonia	Total Sulfides	TOC	Dioxins/Furans	Bioassay	Grain Size	Atterberg Limits	Bulk Density	Specific Gravity	Moisture Content
<b>R.G. Haley Site</b>																	
Surface Sediment Samples																	
RGH-SS-01	NM56	G8I030194	x		x	x		x	x	x	x	x	x				
RGH-SS-02	NM56	G8I030194	x		x	x		x	x	x	x	x	x				
RGH-SS-03	NM56	G8I030194	x		x	x		x	x	x	x	x	x				
Sediment Core Samples																	
RGH-SC-01-0-2'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-01-2-4'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-01-4-6'	NM56		x		x	x				x							
RGH-SC-02-0-2'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-02-2-4'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-02-4-6'	NM56		x		x	x				x							
RGH-SC-03-0-2'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-03-2-4'	NM56		x		x	x				x							
RGH-SC-03-4-6'	NM56		x		x	x				x							
RGH-SC-04-0-2'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-04-2-4'	NM56		x		x	x				x							
RGH-SC-04-4-6'	NM56		x		x	x				x							
RGH-SC-05-0-2'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-05-2-4'	NM56		x		x	x				x							
RGH-SC-05-4-6'	NM56		x		x	x				x							
RGH-SC-06-0-2'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-06-2-4'	NM56	G8I030194	x		x	x				x	x						
RGH-SC-06-4-6'	NM56		x		x	x				x							
RGH-SC-07-0-2'	NR16		x		x	x				x							
RGH-SC-07-2-4'	NR16		x		x	x				x							
RGH-SC-07-4-6.8'	NR16		x		x	x				x							
RGH-SC-08-0-2'	NR16		x		x	x				x							
RGH-SC-08-2-4'	NR16		x		x	x				x							
RGH-SC-08-4-5.5'	NR16		x		x	x				x							
RGH-SC-09-0-2'	NR16		x		x	x				x							
RGH-SC-09-2-4'	NR16		x		x	x				x							
RGH-SC-09-4-5.5'	NR16		x		x	x				x							
<b>Bellingham Bay Piling Study</b>																	
Surface Sediment Samples																	
BBP-SS-01	NM66	G8I030305		x	x	x		x	x	x	x	x	x	x		x	x
BBP-SS-02	NM66	G8I030305		x	x	x		x	x	x	x	x	x	x		x	x
BBP-SS-03	NM66	G8I030305		x	x	x		x	x	x	x						
Sediment Core Samples																	
BBP-SC-01	NM66	G8I030305		x	x	x		x	x	x	x						
BBP-SC-02	NM66			x	x	x		x	x	x							
<b>Bay-Wide Dioxin Background Study</b>																	
Surface Sediment Samples																	
BBDx-SS-01	NQ49	G8I240290									x						
BBDx-SS-02	NQ49	G8I240290									x						
BBDx-SS-03	NQ49	G8I240290									x						
BBDx-SS-04	NQ49	G8I240290									x						
BBDx-SS-05	NQ49	G8I240290									x						
BBDx-SS-06	NQ49	G8I240290									x						

**Table 2 - Sediment Sample Testing Summary**

Sample Number	ARI Job No.	TA-SAC Project No.	Mercury	Metals <sup>1</sup>	NWTPH-Dx	SVOCs	PCBs	Ammonia	Total Sulfides	TOC	Dioxins/Furans	Bioassay	Grain Size	Atterberg Limits	Bulk Density	Specific Gravity	Moisture Content
<b>Samish Bay Reference</b>																	
Surface Sediment Samples																	
Samish Bay Ref 1								x	x	x		x	x				
Samish Bay Ref 2								x	x	x		x	x				
Samish Bay Ref 3								x	x	x		x	x				

1 Metals analysis will include the SMS Metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.



**Table 3 - Sediment Quality Criteria Compared to Laboratory Detection and Quantitation Limits**

Sample ID Sampling Date	SMS (OC normalized for non-ionizable organics)		AETs (dry wt)		MDL	PQL
	SQS	CSL	LAET	2LAET		
<b>Metals in mg/kg</b>						
Arsenic	57	93	57	93	0.52	5
Cadmium	5.1	6.7	5.1	6.7	0.02	0.2
Chromium	260	270	260	270	0.28	0.5
Copper	390	390	390	390	0.04	0.2
Lead	450	530	450	530	0.2	2
Mercury	0.41	0.59	0.41	0.59	0.005	0.05
Nickel			140	140	0.31	1
Silver	6.1	6.1	6.1	6.1	0.11	0.3
Zinc	410	960	410	960	0.28	1
<b>PAHs in ug/kg</b>						
Naphthalene	99000	170000	2100	2400	8.7	20
Acenaphthylene	66000	66000	1300	1300	8.7	20
Acenaphthene	16000	57000	500	730	8.2	20
Fluorene	23000	79000	540	1000	9	20
Phenanthrene	100000	480000	1500	5400	8.4	20
Anthracene	220000	1200000	960	4400	7.7	20
2-Methylnaphthalene	38000	64000	670	1400	8.2	20
1-Methylnaphthalene					7.2	20
Total LPAHs	370000	780000	5200	13000		
Fluoranthene	160000	1200000	1700	2500	7.9	20
Pyrene	1000000	1400000	2600	3300	7.8	20
Benzo(a)anthracene	110000	270000	1300	1600	5.9	20
Chrysene	110000	460000	1400	2800	6.6	20
Benzo(b)fluoranthene					9.5	20
Benzo(k)fluoranthene					9.3	20
Total Benzofluoranthenes	230000	450000	3200	3600		
Benzo(a)pyrene	99000	210000	1600	3000	8.2	20
Indeno(1,2,3-cd)pyrene	34000	88000	600	690	8.6	20
Dibenz(a,h)anthracene	12000	33000	230	540	8.6	20
Benzo(g,h,i)perylene	31000	78000	670	720	6.8	20
Total HPAHs	960000	5300000	12000	17000		
<b>Chlorinated Benzenes in ug/kg</b>						
1,2-Dichlorobenzene	2300	2300	35	50	7.9	20
1,3-Dichlorobenzene			170	170	7.4	20
1,4-Dichlorobenzene	3100	9000	110	120	7.4	20
1,2,4-Trichlorobenzene	810	1800	31	51	9.1	20
Hexachlorobenzene	380	2300	22	70	8	20

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**Table 3 - Sediment Quality Criteria Compared to Laboratory Detection and Quantitation Limits**

Sample ID Sampling Date	SMS (OC normalized for non-ionizable organics) SQS	CSL	LAET	AETs (dry wt) 2LAET	MDL	PQL
<b>Phthalate Esters in ug/kg</b>						
Dimethylphthalate	53000	53000	71	160	7.8	20
Diethylphthalate	61000	110000	200	200	16	20
Di-n-Butylphthalate	220000	1700000	1400	1400	12	20
Butylbenzylphthalate	4900	64000	63	900	11	20
bis(2-Ethylhexyl)phthalate	47000	78000	1300	1900	11	200
Di-n-Octyl phthalate	58000	4500000	6200	6200	8.3	20
<b>Miscellaneous Compounds in ug/kg</b>						
Dibenzofuran	15000	58000	540	700	7.6	20
Hexachlorobutadiene	3900	6200	11	120	8.1	20
N-Nitrosodiphenylamine	11000	11000	28	40	8.7	20
Hexachloroethane					7.2	20
<b>Ionizable Organic Compounds in ug/kg</b>						
Phenol	420	1200	420	1200	14	20
2-Methylphenol	63	63	63	63	14	20
4-Methylphenol	670	670	670	670	13	20
2,4-Dimethylphenol	29	29	29	29	15	20
Pentachlorophenol	360	690	360	690	48	100
Benzyl Alcohol	57	73	57	73	14	20
Benzoic Acid	650	650	650	650	120	200
<b>Conventionals in %</b>						
Total Organic Carbon						0.02
Preserved Total Solids						0.01
Total Solids						0.01
<b>Conventionals in mg/kg</b>						
N-Ammonia						0.1
Sulfide						1
<b>TPH in mg/kg</b>						
Diesel-Range Hydrocarbons					0.5	5
Motor Oil-Range Hydrocarbons					3.3	10

Note: MDL and PQL will vary based on initial sample weight, dry weight corrections, and dilution factors. These limits are the laboratory reported limits.

**Table 4 - Grain Size and Conventional Parameter Results for Sediment Samples**

Sample ID	SAMISH BAY REF 1	BBP-SS-01	BBP-SS-02	RGH-SS-01	RGH-SS-02	RGH-SS-03
Sampling Date	08/29/08	8/26/2008	8/26/2008	8/26/08	8/26/08	8/26/08
<b>Grain Size in %</b>						
Gravel	0.1	11.6	9.1	55.2	56	19.5
Very Coarse Sand	1.5	5.3	8.2	11.8	9.2	7.3
Coarse Sand	17.3	5.4	6.9	9.5	11.5	9.9
Medium Sand	60.2	16	19.7	13.7	16.5	19.5
Fine Sand	11.2	34.7	30.6	7.6	5	20.2
Very Fine Sand	1.4	12.9	9.2	2	0.8	12.4
Coarse Silt	3.0	4.3	1.7			1.3
Medium Silt	0.2	4.9	3.8			1.3
Fine Silt	1.1	1.1	2.6			2
Very Fine Silt	1.0	0.5	1.5			1.2
8-9 Phi Clay	0.7	0.5	1.5			1.3
9-10 Phi Clay	0.9	0.9	1.7			1.3
> 10 Phi Clay	1.3	1.9	3.5			2.7
Total Fines	8.3	14.1	16.2	0.2	1.1	11.1
<b>Conventionals in %</b>						
Total Organic Carbon	1.16					
Preserved Total Solids	70.40					
Total Solids	81.00					
<b>Conventionals in mg/kg</b>						
N-Ammonia	8.69					
Sulfide	8.42					

Blank indicates sample not analyzed for specific analyte or screen size.

**Table 5 - Analytical Results and TCDD TEQs for Bay-Wide Sediment Samples**

Sample ID	TEF	BBDX-SS-01	TEQ	TEQ	BBDX-SS-02	TEQ	TEQ	BBDX-SS-03	TEQ	TEQ
Sampling Date		9/19/2008	ND=1/2 RL	ND=0	9/19/2008	ND=1/2 RL	ND=0	9/19/2008	ND=1/2 RL	ND=0
Depth Interval		0 to 12 cm			0 to 12 cm			0 to 12 cm		
Percent Moisture		59.1			49			61.4		
<b>Dioxins in ng/kg</b>										
2,3,7,8-TCDD	1	0.32 U	0.16	0	0.31 U	0.155	0	0.62 U	0.31	0
1,2,3,7,8-PeCDD	1	0.61 U	0.305	0	0.92 U	0.46	0	3.2 U	1.6	0
1,2,3,4,7,8-HxCDD	0.1	2.1 U	0.105	0	2.3 T	0.23	0.23	16	1.6	1.6
1,2,3,6,7,8-HxCDD	0.1	1.5 U	0.075	0	4.8 T	0.48	0.48	22	2.2	2.2
1,2,3,7,8,9-HxCDD	0.1	1.2 T	0.12	0.12	3 U	0.15	0	16	1.6	1.6
1,2,3,4,6,7,8-HpCDD	0.01	33	0.33	0.33	90	0.9	0.9	290	2.9	2.9
OCDD	0.0003	280	0.084	0.084	630	0.189	0.189	1300	0.39	0.39
2,3,7,8-TCDF	0.1	0.98 T	0.098	0.098	2.6 U C	0.13	0	23 J	2.3	2.3
1,2,3,7,8-PeCDF	0.03	0.34 U	0.0051	0	0.35 U	0.00525	0	1.2 U	0.018	0
2,3,4,7,8-PeCDF	0.3	0.37 U	0.0555	0	0.57 T	0.171	0.171	1.9 U	0.285	0
1,2,3,4,7,8-HxCDF	0.1	0.59 T	0.059	0.059	1.4 T	0.14	0.14	4.2 T	0.42	0.42
1,2,3,7,8,9-HxCDF	0.1	0.24 U	0.012	0	0.35 T	0.035	0.035	0.67 U	0.0335	0
2,3,4,6,7,8-HxCDF	0.1	0.32 U	0.016	0	0.37 U	0.0185	0	1.1 T	0.11	0.11
1,2,3,6,7,8-HxCDF	0.1	0.34 U	0.017	0	0.45 U	0.0225	0	1.7 T	0.17	0.17
1,2,3,4,6,7,8-HpCDF	0.01	4.7 T	0.047	0.047	11 J	0.11	0.11	27 J	0.27	0.27
1,2,3,4,7,8,9-HpCDF	0.01	0.39 U	0.00195	0	0.69 U	0.00345	0	2.7 T	0.027	0.027
OCDF	0.0003	16 T	0.0048	0.0048	41	0.0123	0.0123	110	0.033	0.033
Total TCDD		4.7			56			640		
Total PeCDD		6.3			64			780		
Total HxCDD		19			120			1200		
Total HpCDD		68			190			540		
Total TCDF		0.98			4.2			74		
Total PeCDF		0.76			2.1			11		
Total HxCDF		3.8			18			30		
Total HpCDF		17			50			130		
Total TEQ			1.50	0.743		3.21	2.27		14.3	12.0

**Table 5 - Analytical Results and TCDD TEQs for Bay-Wide Sediment Samples**

Sample ID	TEF	BBDX-SS-04	TEQ	TEQ	BBDX-SS-05	TEQ	TEQ	BBDX-SS-06	TEQ	TEQ
Sampling Date		9/19/2008	ND=1/2 RL	ND=0	9/18/2008	ND=1/2 RL	ND=0	9/18/2008	ND=1/2 RL	ND=0
Depth Interval		0 to 12 cm			0 to 12 cm			0 to 12 cm		
Percent Moisture		62.4			70.4			51.6		
<b>Dioxins in ng/kg</b>										
2,3,7,8-TCDD	1	1.5 U	0.75	0	2.5 T	2.5	2.5	1.5 T	1.5	1.5
1,2,3,7,8-PeCDD	1	3.4 U	1.7	0	3 T	3	3	1.6 U	0.8	0
1,2,3,4,7,8-HxCDD	0.1	14	1.4	1.4	8 T	0.8	0.8	5.1 U	0.255	0
1,2,3,6,7,8-HxCDD	0.1	18	1.8	1.8	11 U	0.55	0	8.6 T	0.86	0.86
1,2,3,7,8,9-HxCDD	0.1	13 T	1.3	1.3	8.8 T	0.88	0.88	8 T	0.8	0.8
1,2,3,4,6,7,8-HpCDD	0.01	220	2.2	2.2	140	1.4	1.4	120	1.2	1.2
OCDD	0.0003	630	0.189	0.189	540	0.162	0.162	590	0.177	0.177
2,3,7,8-TCDF	0.1	26 CON	2.6	2.6	18 CON	1.8	1.8	12 CON	1.2	1.2
1,2,3,7,8-PeCDF	0.03	1.8 T	0.054	0.054	0.85 U	0.01275	0	0.85 U	0.01275	0
2,3,4,7,8-PeCDF	0.3	1.8 U	0.27	0	1.6 T	0.48	0.48	1.2 U	0.18	0
1,2,3,4,7,8-HxCDF	0.1	2.6 U	0.13	0	2.2 T	0.22	0.22	1.7 U	0.085	0
1,2,3,7,8,9-HxCDF	0.1	0.4 U	0.02	0	0.44 U	0.022	0	0.43 U	0.0215	0
2,3,4,6,7,8-HxCDF	0.1	0.85 U	0.0425	0	0.74 U	0.037	0	0.56 U	0.028	0
1,2,3,6,7,8-HxCDF	0.1	0.53 U	0.0265	0	0.88 U	0.044	0	1.1 T	0.11	0.11
1,2,3,4,6,7,8-HpCDF	0.01	16 J	0.16	0.16	10 U	0.05	0	14 J	0.14	0.14
1,2,3,4,7,8,9-HpCDF	0.01	1.3 T	0.013	0.013	0.74 U	0.0037	0	0.87 U	0.00435	0
OCDF	0.0003	47	0.0141	0.0141	31 T	0.0093	0.0093	42	0.0126	0.0126
Total TCDD		490			350			220		
Total PeCDD		660			430			280		
Total HxCDD		1200			610			430		
Total HpCDD		390			260			260		
Total TCDF		70			49			24		
Total PeCDF		8.1			7			1.2 U		
Total HxCDF		9.8			20			14		
Total HpCDF		62			32			55		
Total TEQ			12.7	9.73		12.0	11.3		7.39	6.00

U = Not detected at the reporting limit (RL) indicated.

CON = Confirmation analysis. J = Estimated value.

ND = Not detected.

TEF = Toxicity Equivalence Factor. Blank indicates not applicable.

T = Value is between the method reporting limit and the method detection limit.

E = Estimated result. Result concentration exceeds the calibration range.

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**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		RGH-SS-01	RGH-SS-02	RGH-SS-03	RGH-SC-01-0-2'	RGH-SC-01-2-4'	RGH-SC-01-4-6'
	LAET	2LAET	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Metals in mg/kg</b>								
Mercury	0.41	0.59	0.10	0.05	0.13	0.13	0.27	0.16
<b>PAHs in ug/kg</b>								
Naphthalene	2100	2400	15 T	19 U	25	20	82	37
Acenaphthylene	1300	1300	9.9 T	19 U	21	21	26	13 T
Acenaphthene	500	730	10 T	10 T	17 T	14 T	110	89
Fluorene	540	1000	19 U	12 T	23	16 T	160	120
Phenanthrene	1500	5400	100	120	190	200	1100	680
Anthracene	960	4400	23	22	47	53	310	290
2-Methylnaphthalene	670	1400	15 T	28	25	26	95	130
1-Methylnaphthalene			15 T	26	25	22	84	140
Total LPAHs	5200	13000	158	164	323	324	1788	1229
Fluoranthene	1700	2500	180	150	350	530	1600	720
Pyrene	2600	3300	160	130	300	510	1400	700
Benzo(a)anthracene	1300	1600	55	57	140	150	480	160
Chrysene	1400	2800	86	75	210	270	660	230
Benzo(b)fluoranthene			68	69	200	200	600	160
Benzo(k)fluoranthene			62	67	150	220	430	160
Total Benzofluoranthenes	3200	3600	130	136	350	420	1030	320
Benzo(a)pyrene	1600	3000	63	79	180	210	610	130
Indeno(1,2,3-cd)pyrene	600	690	28	24	45	49	130	56 T
Dibenz(a,h)anthracene	230	540	19 U	19 U	10 T	19 T	61	59 U
Benzo(g,h,i)perylene	670	720	33	26	51	45	130	71
Total HPAHs	12000	17000	735	677	1636	2203	6101	2387
<b>Chlorinated Benzenes in ug/kg</b>								
1,2-Dichlorobenzene	35	50	19 U	19 U	19 U	19 U	20 U	20 U
1,3-Dichlorobenzene	170	170	19 U	19 U	19 U	19 U	20 U	20 U
1,4-Dichlorobenzene	110	120	19 U	19 U	19 U	19 U	20 U	11 T
1,2,4-Trichlorobenzene	31	51	19 U	19 U	19 U	19 U	20 U	20 U
Hexachlorobenzene	22	70	19 U	19 U	19 U	19 U	20 U	20 U
<b>Phthalate Esters in ug/kg</b>								
Dimethylphthalate	71	160	19 U	19 U	19 U	19 U	14 T	20 U
Diethylphthalate	200	200	19 U	19 U	19 U	19 U	20 U	20 U
Di-n-Butylphthalate	1400	1400	19 U	19 U	19 U	19 U	20 U	20 U
Butylbenzylphthalate	63	900	19 U	19 U	19 U	19 U	20 U	20 U
bis(2-Ethylhexyl)phthalate	1300	1900	140	25	86	170	130	190
Di-n-Octyl phthalate	6200	6200	19 U	19 U	19 U	19 U	20 U	20 U

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**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SS-01	RGH-SS-02	RGH-SS-03	RGH-SC-01-0-2'	RGH-SC-01-2-4'	RGH-SC-01-4-6'
	LAET	2LAET	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Sampling Date			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 2 feet	2 to 4 feet	4 to 6 feet
Depth Interval								
<b>Miscellaneous Compounds in ug/kg</b>								
Dibenzofuran	540	700	19 U	19 U	14 T	16 T	84	31
Hexachlorobutadiene	11	120	19 U	19 U	19 U	19 U	20 U	20 U
N-Nitrosodiphenylamine	28	40	19 U	19 U	19 U	19 U	20 U	120 U
Hexachloroethane			19 U	19 U	19 U	19 U	20 U	20 U
<b>Ionizable Organic Compounds in ug/kg</b>								
Phenol	420	1200	30	32	19 U	41	20 U	20 U
2-Methylphenol	63	63	19 U	19 U	19 U	19 U	20 U	20 U
4-Methylphenol	670	670	19 U	19 U	29	19 U	20 U	16 T
2,4-Dimethylphenol	29	29	19 U	19 U	19 U	19 U	20 U	20 U
Pentachlorophenol	360	690	83 T	51 T	180	<b>380</b>	270	<b>530</b>
Benzyl Alcohol	57	73	19 U	19 U	19 U	19 U	20 U	20 U
Benzoic Acid	650	650	190 U	190 U	190 U	190 U	200 U	200 U
<b>Conventionals in %</b>								
Total Organic Carbon			4.13	2.38	2.2	2.87	4.24	8.12
Preserved Total Solids			79.3	80.3	64.5			
Total Solids			75.6	81.5	67.4	73.9	75.4	74.2
<b>Conventionals in mg/kg</b>								
N-Ammonia			3.39	5.01	6.34			
Sulfide			1420	1190	503			
<b>TPH in mg/kg</b>								
Diesel-Range Hydrocarbons			19	12	17	37	43	220
Motor Oil-Range Hydrocarbons			69	42	63	110	120	450
Total TPH	200 <sup>a</sup>		88	54	80	147	163	<b>670</b>

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		RGH-SC-02-0-2'	RGH-SC-02-2-4'	RGH-SC-02-4-6'	RGH-SC-03-0-2'	RGH-SC-03-2-4'
	LAET	2LAET	8/26/08 0 to 2 feet	8/26/08 2 to 4 feet	8/26/08 4 to 6 feet	8/26/08 0 to 2 feet	8/26/08 2 to 4 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	0.08	0.07	0.08	0.48	<b>0.70</b>
<b>PAHs in ug/kg</b>							
Naphthalene	2100	2400	48	31	14 T	23	40
Acenaphthylene	1300	1300	20 U	19 U	19 U	25	68
Acenaphthene	500	730	48	19 U	19 U	24	37
Fluorene	540	1000	68	19 U	19 U	31	60
Phenanthrene	1500	5400	490	22	39	350	670
Anthracene	960	4400	120	19 U	11 T	70	260
2-Methylnaphthalene	670	1400	63	19 U	16 T	29	33
1-Methylnaphthalene			60	19 U	12 T	30	24
Total LPAHs	5200	13000	774	53	64	523	1135
Fluoranthene	1700	2500	550	27	98	520	<b>4000</b>
Pyrene	2600	3300	550	59	120	550	<b>4000</b>
Benzo(a)anthracene	1300	1600	250	19 U	28	160	340
Chrysene	1400	2800	270	19 U	46	340	<b>1500</b>
Benzo(b)fluoranthene			280	19 U	52	210	740
Benzo(k)fluoranthene			230	19 U	52	290	830
Total Benzofluoranthenes	3200	3600	510	19 U	104	500	1570
Benzo(a)pyrene	1600	3000	270	19 U	47	220	490
Indeno(1,2,3-cd)pyrene	600	690	56	19 U	9.7 T	48	170
Dibenz(a,h)anthracene	230	540	17 T	19 U	19 U	20 U	59 U
Benzo(g,h,i)perylene	670	720	56	19 U	14 T	44	170
Total HPAHs	12000	17000	2529	86	466.7	2382	<b>12240</b>
<b>Chlorinated Benzenes in ug/kg</b>							
1,2-Dichlorobenzene	35	50	20 U	19 U	19 U	20 U	20 U
1,3-Dichlorobenzene	170	170	20 U	19 U	19 U	20 U	20 U
1,4-Dichlorobenzene	110	120	20 U	19 U	19 U	20 U	20 U
1,2,4-Trichlorobenzene	31	51	20 U	19 U	19 U	20 U	20 U
Hexachlorobenzene	22	70	20 U	19 U	19 U	20 U	20 U
<b>Phthalate Esters in ug/kg</b>							
Dimethylphthalate	71	160	17 T	19 U	<b>590</b>	20 U	19 T
Diethylphthalate	200	200	20 U	19 U	19 U	20 U	20 U
Di-n-Butylphthalate	1400	1400	19 T	19 U	19 U	20 U	20 U
Butylbenzylphthalate	63	900	20 U	19 U	19 U	20 U	20 U
bis(2-Ethylhexyl)phthalate	1300	1900	390	19 U	270	190	640
Di-n-Octyl phthalate	6200	6200	20 U	19 U	19 U	20 U	20 U



**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SC-02-0-2'	RGH-SC-02-2-4'	RGH-SC-02-4-6'	RGH-SC-03-0-2'	RGH-SC-03-2-4'
	LAET	2LAET	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Sampling Date							
Depth Interval			0 to 2 feet	2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet
<b>Miscellaneous Compounds in ug/kg</b>							
Dibenzofuran	540	700	42	19 U	19 U	21	25
Hexachlorobutadiene	11	120	20 U	19 U	19 U	20 U	20 U
N-Nitrosodiphenylamine	28	40	20 U	19 U	19 U	20 U	20 U
Hexachloroethane			20 U	19 U	19 U	20 U	20 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	20 U	19 U	19 U	20 U	18 T
2-Methylphenol	63	63	20 U	19 U	19 U	20 U	20 U
4-Methylphenol	670	670	20 U	19 U	19 U	20 U	26
2,4-Dimethylphenol	29	29	20 U	19 U	19 U	20 U	20 U
Pentachlorophenol	360	690	230	96 U	170	220	720
Benzyl Alcohol	57	73	20 U	19 U	18 T	20 U	20 U
Benzoic Acid	650	650	200 U	190 U	250	200 U	200 U
<b>Conventionals in %</b>							
Total Organic Carbon			5.01	1.47	6.86	4.32	7.94
Preserved Total Solids							
Total Solids			73.2	84.7	80	47.8	39.8
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			32	18	25	46	180
Motor Oil-Range Hydrocarbons			100	100	92	140	510
Total TPH	200 <sup>a</sup>		132	118	117	186	690

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		RGH-SC-03-4-6'	RGH-SC-04-0-2'	RGH-SC-04-2-4'	RGH-SC-04-4-6'	RGH-SC-05-0-2'
	LAET	2LAET	8/26/08 4 to 6 feet	8/26/08 0 to 2 feet	8/26/08 2 to 4 feet	8/26/08 4 to 6 feet	8/26/08 0 to 2 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	<b>1.59</b>	0.23	0.11	0.09	0.30
<b>PAHs in ug/kg</b>							
Naphthalene	2100	2400	120 U	130	27	14 T	50
Acenaphthylene	1300	1300	120 U	95	20 U	20 U	37
Acenaphthene	500	730	120 U	110	20 U	20 U	43
Fluorene	540	1000	120 U	180	20 U	20 U	43
Phenanthrene	1500	5400	230	<b>2700</b>	34	28	480
Anthracene	960	4400	79 T	370	10 T	20 U	150
2-Methylnaphthalene	670	1400	120 U	54	20 U	20 U	14 T
1-Methylnaphthalene			120 U	55	20 U	20 U	12 T
Total LPAHs	5200	13000	309	3585	71	42	803
Fluoranthene	1700	2500	550 J	<b>2300</b>	53	31	730
Pyrene	2600	3300	630	2500	48	26	640
Benzo(a)anthracene	1300	1600	260 J	140	13 T	20 U	280
Chrysene	1400	2800	370	1200	20	11 T	340
Benzo(b)fluoranthene			320	750	18 T	14 T	340
Benzo(k)fluoranthene			210	570	21	20 U	360
Total Benzofluoranthenes	3200	3600	530	1320	39	14 T	700
Benzo(a)pyrene	1600	3000	230	550	18 T	11 T	380
Indeno(1,2,3-cd)pyrene	600	690	72 T	190	20 U	20 U	81
Dibenz(a,h)anthracene	230	540	120 U	31 T	20 U	20 U	32
Benzo(g,h,i)perylene	670	720	86 T	190	20 U	20 U	80
Total HPAHs	12000	17000	2728	8421	230	107	3263
<b>Chlorinated Benzenes in ug/kg</b>							
1,2-Dichlorobenzene	35	50	120 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	170	170	120 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	110	120	120 U	20 U	20 U	20 U	20 U
1,2,4-Trichlorobenzene	31	51	120 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	22	70	120 U	20 U	20 U	20 U	20 U
<b>Phthalate Esters in ug/kg</b>							
Dimethylphthalate	71	160	120 U	20 U	20 U	20 U	20 U
Diethylphthalate	200	200	120 U	20 U	20 U	20 U	20 U
Di-n-Butylphthalate	1400	1400	120 U	20 U	20 U	20 U	20 U
Butylbenzylphthalate	63	900	<b>69 JT</b>	20 U	20 U	20 U	20 U
bis(2-Ethylhexyl)phthalate	1300	1900	470 J	59	20 U	20 U	11 T
Di-n-Octyl phthalate	6200	6200	120 U	20 U	20 U	20 U	20 U

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SC-03-4-6'	RGH-SC-04-0-2'	RGH-SC-04-2-4'	RGH-SC-04-4-6'	RGH-SC-05-0-2'
	LAET	2LAET	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Sampling Date							
Depth Interval			4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet	0 to 2 feet
<b>Miscellaneous Compounds in ug/kg</b>							
Dibenzofuran	540	700	120 U	160	20 U	20 U	21
Hexachlorobutadiene	11	120	120 U	20 U	20 U	20 U	20 U
N-Nitrosodiphenylamine	28	40	120 U	20 U	20 U	20 U	20 U
Hexachloroethane			120 U	20 U	20 U	20 U	20 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	120 U	22	20 U	20 U	20 U
2-Methylphenol	63	63	120 U	20 U	20 U	20 U	20 U
4-Methylphenol	670	670	120 U	46	20 U	20 U	19 T
2,4-Dimethylphenol	29	29	120 U	20 U	20 U	20 U	20 U
Pentachlorophenol	360	690	590 U	130	99 U	98 U	99 U
Benzyl Alcohol	57	73	120 U	20 U	20 U	20 U	20 U
Benzoic Acid	650	650	1200 U	200 U	200 U	200 U	200 U
<b>Conventionals in %</b>							
Total Organic Carbon			10.1	10.6	4.22	1.64	4.8
Preserved Total Solids							
Total Solids			39.3	59.9	50.5	56.1	44.7
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			110	28	13	8.8 U	120
Motor Oil-Range Hydrocarbons			240	75	28	18 U	200
Total TPH	200 <sup>a</sup>		<b>350</b>	103	41	18 U	<b>320</b>

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		RGH-SC-05-2-4'	RGH-SC-05-4-6'	RGH-SC-06-0-2'	RGH-SC-06-2-4'	RGH-SC-06-4-6'
	LAET	2LAET	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
			2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	0.09	0.29	0.20	<b>0.74</b>	<b>0.83</b> J
<b>PAHs in ug/kg</b>							
Naphthalene	2100	2400	20 U	29	38	120	480
Acenaphthylene	1300	1300	20 U	16 T	20 U	16 T	440
Acenaphthene	500	730	20 U	20 U	20 U	15 T	110
Fluorene	540	1000	20 U	20	11 T	17 T	440
Phenanthrene	1500	5400	12 T	470	130	140	<b>3300</b>
Anthracene	960	4400	20 U	110	30	28	<b>1100</b>
2-Methylnaphthalene	670	1400	20 U	20 U	20 U	94	200
1-Methylnaphthalene			20 U	20 U	20 U	64	170
Total LPAHs	5200	13000	20 U	645	209	336	<b>5870</b>
Fluoranthene	1700	2500	17 T	680	180	120	<b>4200</b>
Pyrene	2600	3300	19 T	610	180	140	<b>5100</b>
Benzo(a)anthracene	1300	1600	20 U	160	52	54	<b>2100</b>
Chrysene	1400	2800	20 U	250	77	77	<b>2300</b>
Benzo(b)fluoranthene			20 U	120	40	52	2100
Benzo(k)fluoranthene			20 U	150	58	50	1200
Total Benzofluoranthenes	3200	3600	20 U	270	98	102	<b>3300</b>
Benzo(a)pyrene	1600	3000	20 U	170	61	72	<b>2400</b>
Indeno(1,2,3-cd)pyrene	600	690	20 U	92	35	38	<b>1300</b>
Dibenz(a,h)anthracene	230	540	20 U	18 T	20 U	20 U	<b>460</b>
Benzo(g,h,i)perylene	670	720	20 U	110	42	48	<b>1400</b>
Total HPAHs	12000	17000	20 U	2360	725	651	<b>22560</b>
<b>Chlorinated Benzenes in ug/kg</b>							
1,2-Dichlorobenzene	35	50	20 U	20 U	20 U	20 U	59 U
1,3-Dichlorobenzene	170	170	20 U	20 U	20 U	20 U	59 U
1,4-Dichlorobenzene	110	120	20 U	20 U	20 U	20 U	59 U
1,2,4-Trichlorobenzene	31	51	20 U	20 U	20 U	20 U	59 U
Hexachlorobenzene	22	70	20 U	20 U	20 U	20 U	59 U
<b>Phthalate Esters in ug/kg</b>							
Dimethylphthalate	71	160	20 U	20 U	20 U	20 U	59 U
Diethylphthalate	200	200	20 U	20 U	20 U	20 U	59 U
Di-n-Butylphthalate	1400	1400	20 U	20 U	20 U	20 U	59 U
Butylbenzylphthalate	63	900	20 U	20 U	20 U	20 U	59 U
bis(2-Ethylhexyl)phthalate	1300	1900	20 U	20 U	20 U	14 T	59 U
Di-n-Octyl phthalate	6200	6200	20 U	20 U	20 U	20 U	59 U

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SC-05-2-4'	RGH-SC-05-4-6'	RGH-SC-06-0-2'	RGH-SC-06-2-4'	RGH-SC-06-4-6'
	LAET	2LAET	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Sampling Date							
Depth Interval			2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Miscellaneous Compounds in ug/kg</b>							
Dibenzofuran	540	700	20 U	11 T	20 U	32	180
Hexachlorobutadiene	11	120	20 U	20 U	20 U	20 U	59 U
N-Nitrosodiphenylamine	28	40	20 U	20 U	20 U	20 U	59 U
Hexachloroethane			20 U	20 U	20 U	20 U	59 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	20 U	21	20 U	15 T	56 T
2-Methylphenol	63	63	20 U	20 U	20 U	20 U	59 U
4-Methylphenol	670	670	20 U	23	22	89	230
2,4-Dimethylphenol	29	29	20 U	20 U	20 U	15 T	59 U
Pentachlorophenol	360	690	98 U	98 U	98 U	98 U	300 U
Benzyl Alcohol	57	73	20 U	20 U	20 U	20 U	59 U
Benzoic Acid	650	650	200 U	200 U	200 U	200 U	590 U
<b>Conventionals in %</b>							
Total Organic Carbon			2.38	6.39	4.08	3.89	8.08
Preserved Total Solids							
Total Solids			45	44.1	44.3	48.4	44.3
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			12	41	61	50	110
Motor Oil-Range Hydrocarbons			21 U	72	99	64	190
Total TPH	200 <sup>a</sup>		12	113	160	114	<b>300</b>

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		RGH-SC-07-0-2'	RGH-SC-07-2-4'	RGH-SC-07-4-6.8'	RGH-SC-08-0-2'	RGH-SC-08-2-4'
	LAET	2LAET	9/24/08	9/24/08	9/24/08	9/24/08	9/24/08
			0 to 2 feet	2 to 4 feet	4 to 6.8 feet	0 to 2 feet	2 to 4 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	0.2	0.2 U	0.09 U	<b>1.0</b>	<b>0.9</b>
<b>PAHs in ug/kg</b>							
Naphthalene	2100	2400	670	<b>5900</b>	840	13 T	27
Acenaphthylene	1300	1300	36	110	33	17 T	26
Acenaphthene	500	730	47	90	17 T	11 T	17 T
Fluorene	540	1000	63	170	32	13 T	19 T
Phenanthrene	1500	5400	580	840	180	120	180
Anthracene	960	4400	110	97	26	34	41
2-Methylnaphthalene	670	1400	38	210	35	20 U	32
1-Methylnaphthalene			38	230	34	20 U	27
Total LPAHs	5200	13000	1506	<b>7207</b>	1128	208	310
Fluoranthene	1700	2500	760	490	130	210	330
Pyrene	2600	3300	600	250	89	150	250
Benzo(a)anthracene	1300	1600	210	24	20 U	110	190
Chrysene	1400	2800	390 J	27	20 U	130	220
Benzo(b)fluoranthene			220	35	22	110	220
Benzo(k)fluoranthene			190	35	20	100	170
Total Benzofluoranthenes	3200	3600	410	70	42	210	390
Benzo(a)pyrene	1600	3000	310	42	27	120	240
Indeno(1,2,3-cd)pyrene	600	690	95	19 T	11 T	34	70
Dibenz(a,h)anthracene	230	540	39	20 U	20 U	14 T	20 U
Benzo(g,h,i)perylene	670	720	120	36	15 T	38	68
Total HPAHs	12000	17000	2934	958	314	1016	1758
<b>Chlorinated Benzenes in ug/kg</b>							
1,2-Dichlorobenzene	35	50	20 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	170	170	20 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	110	120	20 U	20 U	20 U	20 U	20 U
1,2,4-Trichlorobenzene	31	51	20 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	22	70	20 U	20 U	20 U	20 U	20 U
<b>Phthalate Esters in ug/kg</b>							
Dimethylphthalate	71	160	<b>180</b>	20 U	20 U	30	20 U
Diethylphthalate	200	200	20 U	20 U	20 U	20 U	20 U
Di-n-Butylphthalate	1400	1400	20 U	20 U	20 U	18 T	20 U
Butylbenzylphthalate	63	900	20 U	20 U	20 U	<b>110</b>	20 U
bis(2-Ethylhexyl)phthalate	1300	1900	100	20 U	20 U	84	250
Di-n-Octyl phthalate	6200	6200	20 U	20 U	20 U	20 U	60 U

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SC-07-0-2'	RGH-SC-07-2-4'	RGH-SC-07-4-6.8'	RGH-SC-08-0-2'	RGH-SC-08-2-4'
	LAET	2LAET	9/24/08	9/24/08	9/24/08	9/24/08	9/24/08
Sampling Date							
Depth Interval			0 to 2 feet	2 to 4 feet	4 to 6.8 feet	0 to 2 feet	2 to 4 feet
<b>Miscellaneous Compounds in ug/kg</b>							
Dibenzofuran	540	700	38	160	32	20 U	20 U
Hexachlorobutadiene	11	120	20 U	20 U	20 U	20 U	20 U
N-Nitrosodiphenylamine	28	40	20 U	20 U	20 U	20 U	20 U
Hexachloroethane			20 U	20 U	20 U	20 U	20 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	18 T	40	31	20 U	15 T
2-Methylphenol	63	63	20 U	32	20 U	20 U	20 U
4-Methylphenol	670	670	34	44	13 J	18 T	21
2,4-Dimethylphenol	29	29	20 U	<b>42</b>	20 U	20 U	20 U
Pentachlorophenol	360	690	98 U	99 U	97 U	150	<b>450</b>
Benzyl Alcohol	57	73	20 U	20 U	20 U	20 U	20 U
Benzoic Acid	650	650	200 U	200 U	200 U	200 U	200 U
<b>Conventionals in %</b>							
Total Organic Carbon			11.3	38.6	22.6	14.9	27.3
Preserved Total Solids							
Total Solids			53.8	29.7	35.6	38.4	33.8
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			63	210	330	210	320
Motor Oil-Range Hydrocarbons			170	190	650	670	800
Total TPH	200 <sup>a</sup>		<b>233</b>	<b>400</b>	<b>980</b>	<b>880</b>	<b>1120</b>

**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SC-08-4-5.5'	RGH-SC-09-0-2'	RGH-SC-09-2-4'	RGH-SC-09-4-5.5'
	LAET	2LAET	9/24/08	9/24/08	9/24/08	9/24/08
Sampling Date			9/24/08	9/24/08	9/24/08	9/24/08
Depth Interval			4 to 5.5 feet	0 to 2 feet	2 to 4 feet	4 to 5.5 feet
<b>Metals in mg/kg</b>						
Mercury	0.41	0.59	<b>11.3</b>	<b>0.56</b>	<b>1.5</b>	<b>1.9</b>
<b>PAHs in ug/kg</b>						
Naphthalene	2100	2400	84	15 T	32	68
Acenaphthylene	1300	1300	37 T	14 T	19 T	88
Acenaphthene	500	730	140	20 U	14 T	59
Fluorene	540	1000	110	12 T	24	71
Phenanthrene	1500	5400	780	96	120	680
Anthracene	960	4400	450	33	83	200
2-Methylnaphthalene	670	1400	180	12 T	26	70
1-Methylnaphthalene			120	10 T	25	58
Total LPAHs	5200	13000	1601	170	292	1166
Fluoranthene	1700	2500	<b>2000</b>	170	400	1200
Pyrene	2600	3300	1100	130	250	710
Benzo(a)anthracene	1300	1600	490	97	190	310
Chrysene	1400	2800	620	160	230	520
Benzo(b)fluoranthene			330	80	120	440
Benzo(k)fluoranthene			270	77	110	410
Total Benzofluoranthenes	3200	3600	600	157	230	850
Benzo(a)pyrene	1600	3000	340	78	110	480
Indeno(1,2,3-cd)pyrene	600	690	66	23	34	140
Dibenz(a,h)anthracene	230	540	60 U	20 U	20 U	47
Benzo(g,h,i)perylene	670	720	100	25	34	150
Total HPAHs	12000	17000	5316	840	1478	4407
<b>Chlorinated Benzenes in ug/kg</b>						
1,2-Dichlorobenzene	35	50	60 U	20 U	20 U	20 U
1,3-Dichlorobenzene	170	170	60 U	20 U	20 U	20 U
1,4-Dichlorobenzene	110	120	60 U	20 U	20 U	20 U
1,2,4-Trichlorobenzene	31	51	60 U	20 U	20 U	20 U
Hexachlorobenzene	22	70	60 U	20 U	20 U	20 U
<b>Phthalate Esters in ug/kg</b>						
Dimethylphthalate	71	160	<b>110</b>	20 U	20 U	12 T
Diethylphthalate	200	200	60 U	20 U	18 T	20 U
Di-n-Butylphthalate	1400	1400	190	20 U	20 U	20 U
Butylbenzylphthalate	63	900	60 U	20 U	20 U	20 U
bis(2-Ethylhexyl)phthalate	1300	1900	940	120	180	200
Di-n-Octyl phthalate	6200	6200	200 U	20 U	59 U	59 U



**Table 6 - Analytical Results for R.G. Haley Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID	AETs		RGH-SC-08-4-5.5'	RGH-SC-09-0-2'	RGH-SC-09-2-4'	RGH-SC-09-4-5.5'
	LAET	2LAET	9/24/08	9/24/08	9/24/08	9/24/08
Sampling Date			9/24/08	9/24/08	9/24/08	9/24/08
Depth Interval			4 to 5.5 feet	0 to 2 feet	2 to 4 feet	4 to 5.5 feet
<b>Miscellaneous Compounds in ug/kg</b>						
Dibenzofuran	540	700	110	20 U	15 T	42
Hexachlorobutadiene	11	120	<i>60 U</i>	<i>20 U</i>	<i>20 U</i>	<i>20 U</i>
N-Nitrosodiphenylamine	28	40	<i>60 U</i>	20 U	20 U	20 U
Hexachloroethane			60 U	20 U	20 U	20 U
<b>Ionizable Organic Compounds in ug/kg</b>						
Phenol	420	1200	60 U	20 U	260	22
2-Methylphenol	63	63	60 U	20 U	20 U	20 U
4-Methylphenol	670	670	48 T	20 U	76	27
2,4-Dimethylphenol	29	29	<i>60 U</i>	20 U	20 U	20 U
Pentachlorophenol	360	690	<b>4100</b>	91 T	260	<b>420</b>
Benzyl Alcohol	57	73	<i>60 U</i>	20 U	20 U	20 U
Benzoic Acid	650	650	600 U	200 U	200 U	200 U
<b>Conventionals in %</b>						
Total Organic Carbon			18.9	3.69	7.41	5.32
Preserved Total Solids						
Total Solids			29.3	43.4	42.1	41.3
<b>Conventionals in mg/kg</b>						
N-Ammonia						
Sulfide						
<b>TPH in mg/kg</b>						
Diesel-Range Hydrocarbons			670	300	130	360
Motor Oil-Range Hydrocarbons			690	500	300	950
Total TPH	200 <sup>a</sup>		<b>1360</b>	<b>800</b>	<b>430</b>	<b>1310</b>

U = Not detected at the reporting limit indicated.

T = Value is between the method reporting limit and the method detection limit.

Italic = Reporting limit is greater than screening criteria. If the analyte was present, the laboratory reported estimated concentrations between the MDL and the PQL.

The MDL was below screening criteria for all analytes.

Bold = Concentration is greater than LAET.

Bold/Box = Concentration is greater than 2LAET.

Blank indicates sample not analyzed for specific analyte or no criteria available.

a = Proposed TPH screening value (Pete Adolphson, Ecology, personal communication)

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SS-01 (a)	RGH-SS-02	RGH-SS-03	RGH-SC-01-0-2'	RGH-SC-01-2-4' (a)	RGH-SC-01-4-6' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Metals in mg/kg</b>								
Mercury	0.41	0.59	0.10	0.05	0.13	0.13	0.27	0.16
<b>PAHs in mg/kg OC</b>								
Naphthalene	99	170	0.36 T	0.80 U	1.14	0.70	1.93	0.46
Acenaphthylene	66	66	0.24 T	0.80 U	0.95	0.73	0.61	0.16 T
Acenaphthene	16	57	0.24 T	0.42 T	0.77 T	0.49 T	2.59	1.10
Fluorene	23	79	0.46 U	0.50 T	1.05	0.56 T	3.77	1.48
Phenanthrene	100	480	2.42	5.04	8.64	6.97	25.94	8.37
Anthracene	220	1200	0.56	0.92	2.14	1.85	7.31	3.57
2-Methylnaphthalene	38	64	0.36 T	1.18	1.14	0.91	2.24	1.60
1-Methylnaphthalene			0.36 T	1.09	1.14	0.77	1.98	1.72
Total LPAHs	370	780	3.82	6.89	14.68	11.29	42.17	15.14
Fluoranthene	160	1200	4.36	6.30	15.91	18.47	37.74	8.87
Pyrene	1000	1400	3.87	5.46	13.64	17.77	33.02	8.62
Benzo(a)anthracene	110	270	1.33	2.39	6.36	5.23	11.32	1.97
Chrysene	110	460	2.08	3.15	9.55	9.41	15.57	2.83
Benzo(b)fluoranthene			1.65	2.90	9.09	6.97	14.15	1.97
Benzo(k)fluoranthene			1.50	2.82	6.82	7.67	10.14	1.97
Total Benzofluoranthenes	230	450	3.15	5.71	15.91	14.63	24.29	3.94
Benzo(a)pyrene	99	210	1.53	3.32	8.18	7.32	14.39	1.60
Indeno(1,2,3-cd)pyrene	34	88	0.68	1.01	2.05	1.71	3.07	0.69 T
Dibenz(a,h)anthracene	12	33	0.46 U	0.80 U	0.45 T	0.66 T	1.44	0.73 U
Benzo(g,h,i)perylene	31	78	0.80	1.09	2.32	1.57	3.07	0.87
Total HPAHs	960	5300	17.80	28.45	74.36	76.76	143.89	29.40
<b>Chlorinated Benzenes in mg/kg OC</b>								
1,2-Dichlorobenzene	2.3	2.3	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
1,3-Dichlorobenzene			0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
1,4-Dichlorobenzene	3.1	9	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.14 T
1,2,4-Trichlorobenzene	0.81	1.8	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
Hexachlorobenzene	0.38	2.3	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
<b>Phthalate Esters in mg/kg OC</b>								
Dimethylphthalate	53	53	0.46 U	0.80 U	0.86 U	0.66 U	0.33 T	0.25 U
Diethylphthalate	61	110	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
Di-n-Butylphthalate	220	1700	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
Butylbenzylphthalate	4.9	64	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
bis(2-Ethylhexyl)phthalate	47	78	3.39	1.05	3.91	5.92	3.07	2.34
Di-n-Octyl phthalate	58	4500	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U

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**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SS-01 (a)	RGH-SS-02	RGH-SS-03	RGH-SC-01-0-2'	RGH-SC-01-2-4' (a)	RGH-SC-01-4-6' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Miscellaneous Compounds in mg/kg OC</b>								
Dibenzofuran	15	58	0.46 U	0.80 U	0.64 T	0.56 T	1.98	0.38
Hexachlorobutadiene	3.9	6.2	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
N-Nitrosodiphenylamine	11	11	0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	1.48 U
Hexachloroethane			0.46 U	0.80 U	0.86 U	0.66 U	0.47 U	0.25 U
<b>Ionizable Organic Compounds in ug/kg</b>								
Phenol	420	1200	30	32	19 U	41	20 U	20 U
2-Methylphenol	63	63	19 U	19 U	19 U	19 U	20 U	20 U
4-Methylphenol	670	670	19 U	19 U	29	19 U	20 U	16 T
2,4-Dimethylphenol	29	29	19 U	19 U	19 U	19 U	20 U	20 U
Pentachlorophenol	360	690	83 T	51 T	180	<b>380</b>	270	<b>530</b>
Benzyl Alcohol	57	73	19 U	19 U	19 U	19 U	20 U	20 U
Benzoic Acid	650	650	190 U	190 U	190 U	190 U	200 U	200 U
<b>Conventionals in %</b>								
Total Organic Carbon			4.13	2.38	2.2	2.87	4.24	8.12
Preserved Total Solids			79.3	80.3	64.5			
Total Solids			75.6	81.5	67.4	73.9	75.4	74.2
<b>Conventionals in mg/kg</b>								
N-Ammonia			3.39	5.01	6.34			
Sulfide			1420	1190	503			
<b>TPH in mg/kg</b>								
Diesel-Range Hydrocarbons			19	12	17	37	43	220
Motor Oil-Range Hydrocarbons			69	42	63	110	120	450
Total TPH	200 <sup>a</sup>		88	54	80	147	163	<b>670</b>

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-02-0-2' (a)	RGH-SC-02-2-4'	RGH-SC-02-4-6' (a)	RGH-SC-03-0-2' (a)	RGH-SC-03-2-4' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			0 to 2 feet	2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	0.08	0.07	0.08	<b>0.48</b>	<b>0.70</b>
<b>PAHs in mg/kg OC</b>							
Naphthalene	99	170	0.96	2.11	0.20 T	0.53	0.50
Acenaphthylene	66	66	0.40 U	1.29 U	0.28 U	0.58	0.86
Acenaphthene	16	57	0.96	1.29 U	0.28 U	0.56	0.47
Fluorene	23	79	1.36	1.29 U	0.28 U	0.72	0.76
Phenanthrene	100	480	9.78	1.50	0.57	8.10	8.44
Anthracene	220	1200	2.40	1.29 U	0.16 T	1.62	3.27
2-Methylnaphthalene	38	64	1.26	1.29 U	0.23 T	0.67	0.42
1-Methylnaphthalene			1.20	1.29 U	0.17 T	0.69	0.30
Total LPAHs	370	780	15.45	3.61	0.93	12.11	14.29
Fluoranthene	160	1200	10.98	1.84	1.43	12.04	50.38
Pyrene	1000	1400	10.98	4.01	1.75	12.73	50.38
Benzo(a)anthracene	110	270	4.99	1.29 U	0.41	3.70	4.28
Chrysene	110	460	5.39	1.29 U	0.67	7.87	18.89
Benzo(b)fluoranthene			5.59	1.29 U	0.76	4.86	9.32
Benzo(k)fluoranthene			4.59	1.29 U	0.76	6.71	10.45
Total Benzofluoranthenes	230	450	10.18	1.29 U	1.52	11.57	19.77
Benzo(a)pyrene	99	210	5.39	1.29 U	0.69	5.09	6.17
Indeno(1,2,3-cd)pyrene	34	88	1.12	1.29 U	0.14 T	1.11	2.14
Dibenz(a,h)anthracene	12	33	0.34 T	1.29 U	0.28 U	0.46 U	0.74 U
Benzo(g,h,i)perylene	31	78	1.12	1.29 U	0.20 T	1.02	2.14
Total HPAHs	960	5300	50.48	5.85	6.80	55.14	154.16
<b>Chlorinated Benzenes in mg/kg OC</b>							
1,2-Dichlorobenzene	2.3	2.3	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
1,3-Dichlorobenzene			0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
1,4-Dichlorobenzene	3.1	9	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
1,2,4-Trichlorobenzene	0.81	1.8	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
Hexachlorobenzene	0.38	2.3	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
<b>Phthalate Esters in mg/kg OC</b>							
Dimethylphthalate	53	53	0.34 T	1.29 U	8.60	0.46 U	0.24 T
Diethylphthalate	61	110	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
Di-n-Butylphthalate	220	1700	0.38 T	1.29 U	0.28 U	0.46 U	0.25 U
Butylbenzylphthalate	4.9	64	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
bis(2-Ethylhexyl)phthalate	47	78	7.78	1.29 U	3.94	4.40	8.06
Di-n-Octyl phthalate	58	4500	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-02-0-2' (a)	RGH-SC-02-2-4'	RGH-SC-02-4-6' (a)	RGH-SC-03-0-2' (a)	RGH-SC-03-2-4' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			0 to 2 feet	2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet
<b>Miscellaneous Compounds in mg/kg OC</b>							
Dibenzofuran	15	58	0.84	1.29 U	0.28 U	0.49	0.31
Hexachlorobutadiene	3.9	6.2	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
N-Nitrosodiphenylamine	11	11	0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
Hexachloroethane			0.40 U	1.29 U	0.28 U	0.46 U	0.25 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	20 U	19 U	19 U	20 U	18 T
2-Methylphenol	63	63	20 U	19 U	19 U	20 U	20 U
4-Methylphenol	670	670	20 U	19 U	19 U	20 U	26
2,4-Dimethylphenol	29	29	20 U	19 U	19 U	20 U	20 U
Pentachlorophenol	360	690	230	96 U	170	220	<b>720</b>
Benzyl Alcohol	57	73	20 U	19 U	18 T	20 U	20 U
Benzoic Acid	650	650	200 U	190 U	250	200 U	200 U
<b>Conventionals in %</b>							
Total Organic Carbon			5.01	1.47	6.86	4.32	7.94
Preserved Total Solids							
Total Solids			73.2	84.7	80	47.8	39.8
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			32	18	25	46	180
Motor Oil-Range Hydrocarbons			100	100	92	140	510
Total TPH	200 <sup>a</sup>		132	118	117	186	<b>690</b>

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-03-4-6' (a)	RGH-SC-04-0-2' (a)	RGH-SC-04-2-4' (a)	RGH-SC-04-4-6'	RGH-SC-05-0-2' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet	0 to 2 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	1.59	0.23	0.11	0.09	0.30
<b>PAHs in mg/kg OC</b>							
Naphthalene	99	170	1.19 U	1.23	0.64	0.85 T	1.04
Acenaphthylene	66	66	1.19 U	0.90	0.47 U	1.22 U	0.77
Acenaphthene	16	57	1.19 U	1.04	0.47 U	1.22 U	0.90
Fluorene	23	79	1.19 U	1.70	0.47 U	1.22 U	0.90
Phenanthrene	100	480	2.28	25.47	0.81	1.71	10.00
Anthracene	220	1200	0.78 T	3.49	0.24 T	1.22 U	3.13
2-Methylnaphthalene	38	64	1.19 U	0.51	0.47 U	1.22 U	0.29 T
1-Methylnaphthalene			1.19 U	0.52	0.47 U	1.22 U	0.25 T
Total LPAHs	370	780	3.06	33.82	1.68	2.56	16.73
Fluoranthene	160	1200	5.45 J	21.70	1.26	1.89	15.21
Pyrene	1000	1400	6.24	23.58	1.14	1.59	13.33
Benzo(a)anthracene	110	270	2.57 J	1.32	0.31 T	1.22 U	5.83
Chrysene	110	460	3.66	11.32	0.47	0.67 T	7.08
Benzo(b)fluoranthene			3.17	7.08	0.43 T	0.85 T	7.08
Benzo(k)fluoranthene			2.08	5.38	0.50	1.22 U	7.50
Total Benzofluoranthenes	230	450	5.25	12.45	0.92	0.85 T	14.58
Benzo(a)pyrene	99	210	2.28	5.19	0.43 T	0.67 T	7.92
Indeno(1,2,3-cd)pyrene	34	88	0.71 T	1.79	0.47 U	1.22 U	1.69
Dibenz(a,h)anthracene	12	33	1.19 U	0.29 T	0.47 U	1.22 U	0.67
Benzo(g,h,i)perylene	31	78	0.85 T	1.79	0.47 U	1.22 U	1.67
Total HPAHs	960	5300	27.01	79.44	5.45	6.52	67.98
<b>Chlorinated Benzenes in mg/kg OC</b>							
1,2-Dichlorobenzene	2.3	2.3	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
1,3-Dichlorobenzene			1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
1,4-Dichlorobenzene	3.1	9	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
1,2,4-Trichlorobenzene	0.81	1.8	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
Hexachlorobenzene	0.38	2.3	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
<b>Phthalate Esters in mg/kg OC</b>							
Dimethylphthalate	53	53	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
Diethylphthalate	61	110	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
Di-n-Butylphthalate	220	1700	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
Butylbenzylphthalate	4.9	64	0.68 JT	0.19 U	0.47 U	1.22 U	0.42 U
bis(2-Ethylhexyl)phthalate	47	78	4.65 J	0.56	0.47 U	1.22 U	0.23 T
Di-n-Octyl phthalate	58	4500	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-03-4-6' (a)	RGH-SC-04-0-2' (a)	RGH-SC-04-2-4' (a)	RGH-SC-04-4-6'	RGH-SC-05-0-2' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet	0 to 2 feet
<b>Miscellaneous Compounds in mg/kg OC</b>							
Dibenzofuran	15	58	1.19 U	1.51	0.47 U	1.22 U	0.44
Hexachlorobutadiene	3.9	6.2	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
N-Nitrosodiphenylamine	11	11	1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
Hexachloroethane			1.19 U	0.19 U	0.47 U	1.22 U	0.42 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	20 U	22	20 U	20 U	20 U
2-Methylphenol	63	63	20 U	20 U	20 U	20 U	20 U
4-Methylphenol	670	670	20 U	46	20 U	20 U	19 T
2,4-Dimethylphenol	29	29	24 U	20 U	20 U	20 U	20 U
Pentachlorophenol	360	690	210 U	130	99 U	98 U	99 U
Benzyl Alcohol	57	73	20 U	20 U	20 U	20 U	20 U
Benzoic Acid	650	650	200 U	200 U	200 U	200 U	200 U
<b>Conventionals in %</b>							
Total Organic Carbon			10.1	10.6	4.22	1.64	4.8
Preserved Total Solids							
Total Solids			39.3	59.9	50.5	56.1	44.7
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			110	28	13	8.8 U	120
Motor Oil-Range Hydrocarbons			240	75	28	18 U	200
Total TPH	200 <sup>a</sup>		<b>350</b>	103	41	18 U	<b>320</b>

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-05-2-4'	RGH-SC-05-4-6' (a)	RGH-SC-06-0-2' (a)	RGH-SC-06-2-4' (a)	RGH-SC-06-4-6' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	0.09	0.29	0.20	<b>0.74</b>	<b>0.83</b> J
<b>PAHs in mg/kg OC</b>							
Naphthalene	99	170	0.84 U	0.45	0.93	3.08	5.94
Acenaphthylene	66	66	0.84 U	0.25 T	0.49 U	0.41 T	5.45
Acenaphthene	16	57	0.84 U	0.31 U	0.49 U	0.39 T	1.36
Fluorene	23	79	0.84 U	0.31	0.27 T	0.44 T	5.45
Phenanthrene	100	480	0.50 T	7.36	3.19	3.60	40.84
Anthracene	220	1200	0.84 U	1.72	0.74	0.72	13.61
2-Methylnaphthalene	38	64	0.84 U	0.31 U	0.49 U	2.42	2.48
1-Methylnaphthalene			0.84 U	0.31 U	0.49 U	1.65	2.10
Total LPAHs	370	780	0.84 T	10.09	5.12	8.64	72.65
Fluoranthene	160	1200	0.71 T	10.64	4.41	3.08	51.98
Pyrene	1000	1400	0.80 T	9.55	4.41	3.60	63.12
Benzo(a)anthracene	110	270	0.84 U	2.50	1.27	1.39	25.99
Chrysene	110	460	0.84 U	3.91	1.89	1.98	28.47
Benzo(b)fluoranthene			0.84 U	1.88	0.98	1.34	25.99
Benzo(k)fluoranthene			0.84 U	2.35	1.42	1.29	14.85
Total Benzofluoranthenes	230	450	0.84 U	4.23	2.40	2.62	40.84
Benzo(a)pyrene	99	210	0.84 U	2.66	1.50	1.85	29.70
Indeno(1,2,3-cd)pyrene	34	88	0.84 U	1.44	0.86	0.98	16.09
Dibenz(a,h)anthracene	12	33	0.84 U	0.28 T	0.49 U	0.51 U	5.69
Benzo(g,h,i)perylene	31	78	0.84 U	1.72	1.03	1.23	17.33
Total HPAHs	960	5300	1.51 T	36.93	17.77	16.74	279.21
<b>Chlorinated Benzenes in mg/kg OC</b>							
1,2-Dichlorobenzene	2.3	2.3	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
1,3-Dichlorobenzene			0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
1,4-Dichlorobenzene	3.1	9	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
1,2,4-Trichlorobenzene	0.81	1.8	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
Hexachlorobenzene	0.38	2.3	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
<b>Phthalate Esters in mg/kg OC</b>							
Dimethylphthalate	53	53	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
Diethylphthalate	61	110	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
Di-n-Butylphthalate	220	1700	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
Butylbenzylphthalate	4.9	64	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
bis(2-Ethylhexyl)phthalate	47	78	0.84 U	0.31 U	0.49 U	0.36 T	0.73 U
Di-n-Octyl phthalate	58	4500	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U



**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-05-2-4'	RGH-SC-05-4-6' (a)	RGH-SC-06-0-2' (a)	RGH-SC-06-2-4' (a)	RGH-SC-06-4-6' (a)
Sampling Date	SQS	CSL	8/26/08	8/26/08	8/26/08	8/26/08	8/26/08
Depth Interval			2 to 4 feet	4 to 6 feet	0 to 2 feet	2 to 4 feet	4 to 6 feet
<b>Miscellaneous Compounds in mg/kg OC</b>							
Dibenzofuran	15	58	0.84 U	0.17 T	0.49 U	0.82	2.23
Hexachlorobutadiene	3.9	6.2	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
N-Nitrosodiphenylamine	11	11	0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
Hexachloroethane			0.84 U	0.31 U	0.49 U	0.51 U	0.73 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	20 U	21	20 U	15 T	56 T
2-Methylphenol	63	63	20 U	20 U	20 U	20 U	59 U
4-Methylphenol	670	670	20 U	23	22	89	230
2,4-Dimethylphenol	29	29	20 U	20 U	20 U	15 T	59 U
Pentachlorophenol	360	690	98 U	98 U	98 U	98 U	300 U
Benzyl Alcohol	57	73	20 U	20 U	20 U	20 U	59 U
Benzoic Acid	650	650	200 U	200 U	200 U	200 U	590 U
<b>Conventionals in %</b>							
Total Organic Carbon			2.38	6.39	4.08	3.89	8.08
Preserved Total Solids							
Total Solids			45	44.1	44.3	48.4	44.3
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			12	41	61	50	110
Motor Oil-Range Hydrocarbons			21 U	72	99	64	190
Total TPH	200 <sup>a</sup>		12	113	160	114	<b>300</b>

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-07-0-2' (a)	RGH-SC-07-2-4' (a)	RGH-SC-07-4-6.8' (a)	RGH-SC-08-0-2' (a)	RGH-SC-08-2-4' (a)
Sampling Date	SQS	CSL	9/24/08	9/24/08	9/24/08	9/24/08	9/24/08
Depth Interval			0 to 2 feet	2 to 4 feet	4 to 6.8 feet	0 to 2 feet	2 to 4 feet
<b>Metals in mg/kg</b>							
Mercury	0.41	0.59	0.2	0.2 U	0.09 U	1.0	0.9
<b>PAHs in mg/kg OC</b>							
Naphthalene	99	170	5.93	15.28	3.72	0.09 T	0.10
Acenaphthylene	66	66	0.32	0.28	0.15	0.11 T	0.10
Acenaphthene	16	57	0.42	0.23	0.08 T	0.07 T	0.06 T
Fluorene	23	79	0.56	0.44	0.14	0.09 T	0.07 T
Phenanthrene	100	480	5.13	2.18	0.80	0.81	0.66
Anthracene	220	1200	0.97	0.25	0.12	0.23	0.15
2-Methylnaphthalene	38	64	0.34	0.54	0.15	0.13 U	0.12
1-Methylnaphthalene			0.34	0.60	0.15	0.13 U	0.10
Total LPAHs	370	780	13.33	18.67	4.99	1.40	1.14
Fluoranthene	160	1200	6.73	1.27	0.58	1.41	1.21
Pyrene	1000	1400	5.31	0.65	0.39	1.01	0.92
Benzo(a)anthracene	110	270	1.86	0.06	0.09 U	0.74	0.70
Chrysene	110	460	3.45 J	0.07	0.09 U	0.87	0.81
Benzo(b)fluoranthene			1.95	0.09	0.10	0.74	0.81
Benzo(k)fluoranthene			1.68	0.09	0.09	0.67	0.62
Total Benzofluoranthenes	230	450	3.63	0.18	0.19	1.41	1.43
Benzo(a)pyrene	99	210	2.74	0.11	0.12	0.81	0.88
Indeno(1,2,3-cd)pyrene	34	88	0.84	0.05 T	0.05 T	0.23	0.26
Dibenz(a,h)anthracene	12	33	0.35	0.05 U	0.09 U	0.09 T	0.07 U
Benzo(g,h,i)perylene	31	78	1.06	0.09	0.07 T	0.26	0.25
Total HPAHs	960	5300	25.96	2.48	1.39	6.82	6.44
<b>Chlorinated Benzenes in mg/kg OC</b>							
1,2-Dichlorobenzene	2.3	2.3	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
1,3-Dichlorobenzene			0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
1,4-Dichlorobenzene	3.1	9	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
1,2,4-Trichlorobenzene	0.81	1.8	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
Hexachlorobenzene	0.38	2.3	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
<b>Phthalate Esters in mg/kg OC</b>							
Dimethylphthalate	53	53	1.59	0.05 U	0.09 U	0.20	0.07 U
Diethylphthalate	61	110	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
Di-n-Butylphthalate	220	1700	0.18 U	0.05 U	0.09 U	0.12 T	0.07 U
Butylbenzylphthalate	4.9	64	0.18 U	0.05 U	0.09 U	0.74	0.07 U
bis(2-Ethylhexyl)phthalate	47	78	0.88	0.05 U	0.09 U	0.56	0.92
Di-n-Octyl phthalate	58	4500	0.18 U	0.05 U	0.09 U	0.13 U	0.22 U

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**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-07-0-2' (a)	RGH-SC-07-2-4' (a)	RGH-SC-07-4-6.8' (a)	RGH-SC-08-0-2' (a)	RGH-SC-08-2-4' (a)
Sampling Date	SQS	CSL	9/24/08	9/24/08	9/24/08	9/24/08	9/24/08
Depth Interval			0 to 2 feet	2 to 4 feet	4 to 6.8 feet	0 to 2 feet	2 to 4 feet
<b>Miscellaneous Compounds in mg/kg OC</b>							
Dibenzofuran	15	58	0.34	0.41	0.14	0.13 U	0.07 U
Hexachlorobutadiene	3.9	6.2	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
N-Nitrosodiphenylamine	11	11	0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
Hexachloroethane			0.18 U	0.05 U	0.09 U	0.13 U	0.07 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	18 T	40	31	20 U	15 T
2-Methylphenol	63	63	20 U	32	20 U	20 U	20 U
4-Methylphenol	670	670	34	44	13 J	18 T	21
2,4-Dimethylphenol	29	29	20 U	<b>42</b>	20 U	20 U	20 U
Pentachlorophenol	360	690	98 U	99 U	97 U	150	<b>450</b>
Benzyl Alcohol	57	73	20 U	20 U	20 U	20 U	20 U
Benzoic Acid	650	650	200 U	200 U	200 U	200 U	200 U
<b>Conventionals in %</b>							
Total Organic Carbon			11.3	38.6	22.6	14.9	27.3
Preserved Total Solids							
Total Solids			53.8	29.7	35.6	38.4	33.8
<b>Conventionals in mg/kg</b>							
N-Ammonia							
Sulfide							
<b>TPH in mg/kg</b>							
Diesel-Range Hydrocarbons			63	210	330	210	320
Motor Oil-Range Hydrocarbons			170	190	650	670	800
Total TPH	200 <sup>a</sup>		<b>233</b>	<b>400</b>	<b>980</b>	<b>880</b>	<b>1120</b>

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-08-4-5.5' (a)	RGH-SC-09-0-2' (a)	RGH-SC-09-2-4' (a)	RGH-SC-09-4-5.5' (a)
Sampling Date	SQS	CSL	9/24/08	9/24/08	9/24/08	9/24/08
Depth Interval			4 to 5.5 feet	0 to 2 feet	2 to 4 feet	4 to 5.5 feet
<b>Metals in mg/kg</b>						
Mercury	0.41	0.59	<b>11.3</b>	<b>0.56</b>	<b>1.5</b>	<b>1.9</b>
<b>PAHs in mg/kg OC</b>						
Naphthalene	99	170	0.44	0.41 T	0.43	1.28
Acenaphthylene	66	66	0.20 T	0.38 T	0.26 T	1.65
Acenaphthene	16	57	0.74	0.54 U	0.19 T	1.11
Fluorene	23	79	0.58	0.33 T	0.32	1.33
Phenanthrene	100	480	4.13	2.60	1.62	12.78
Anthracene	220	1200	2.38	0.89	1.12	3.76
2-Methylnaphthalene	38	64	0.95	0.33 T	0.35	1.32
1-Methylnaphthalene			0.63	0.27 T	0.34	1.09
Total LPAHs	370	780	8.47	4.61	3.94	21.92
Fluoranthene	160	1200	10.58	4.61	5.40	22.56
Pyrene	1000	1400	5.82	3.52	3.37	13.35
Benzo(a)anthracene	110	270	2.59	2.63	2.56	5.83
Chrysene	110	460	3.28	4.34	3.10	9.77
Benzo(b)fluoranthene			1.75	2.17	1.62	8.27
Benzo(k)fluoranthene			1.43	2.09	1.48	7.71
Total Benzofluoranthenes	230	450	3.17	4.25	3.10	15.98
Benzo(a)pyrene	99	210	1.80	2.11	1.48	9.02
Indeno(1,2,3-cd)pyrene	34	88	0.35	0.62	0.46	2.63
Dibenz(a,h)anthracene	12	33	0.32 U	0.54 U	0.27 U	0.88
Benzo(g,h,i)perylene	31	78	0.53	0.68	0.46	2.82
Total HPAHs	960	5300	28.13	22.76	19.95	82.84
<b>Chlorinated Benzenes in mg/kg OC</b>						
1,2-Dichlorobenzene	2.3	2.3	0.32 U	0.54 U	0.27 U	0.38 U
1,3-Dichlorobenzene			0.32 U	0.54 U	0.27 U	0.38 U
1,4-Dichlorobenzene	3.1	9	0.32 U	0.54 U	0.27 U	0.38 U
1,2,4-Trichlorobenzene	0.81	1.8	0.32 U	0.54 U	0.27 U	0.38 U
Hexachlorobenzene	0.38	2.3	0.32 U	0.54 U	0.27 U	0.38 U
<b>Phthalate Esters in mg/kg OC</b>						
Dimethylphthalate	53	53	0.58	0.54 U	0.27 U	0.23 T
Diethylphthalate	61	110	0.32 U	0.54 U	0.24 T	0.38 U
Di-n-Butylphthalate	220	1700	1.01	0.54 U	0.27 U	0.38 U
Butylbenzylphthalate	4.9	64	0.32 U	0.54 U	0.27 U	0.38 U
bis(2-Ethylhexyl)phthalate	47	78	4.97	3.25	2.43	3.76
Di-n-Octyl phthalate	58	4500	1.06 U	0.54 U	0.80 U	1.11 U

**Table 7 - Analytical Results for R.G. Haley Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		RGH-SC-08-4-5.5' (a)	RGH-SC-09-0-2' (a)	RGH-SC-09-2-4' (a)	RGH-SC-09-4-5.5' (a)
Sampling Date	SQS	CSL	9/24/08	9/24/08	9/24/08	9/24/08
Depth Interval			4 to 5.5 feet	0 to 2 feet	2 to 4 feet	4 to 5.5 feet
<b>Miscellaneous Compounds in mg/kg OC</b>						
Dibenzofuran	15	58	0.58	0.54 U	0.20 T	0.79
Hexachlorobutadiene	3.9	6.2	0.32 U	0.54 U	0.27 U	0.38 U
N-Nitrosodiphenylamine	11	11	0.32 U	0.54 U	0.27 U	0.38 U
Hexachloroethane			0.32 U	0.54 U	0.27 U	0.38 U
<b>Ionizable Organic Compounds in ug/kg</b>						
Phenol	420	1200	60 U	20 U	260	22
2-Methylphenol	63	63	60 U	20 U	20 U	20 U
4-Methylphenol	670	670	48 T	20 U	76	27
2,4-Dimethylphenol	29	29	60 U	20 U	20 U	20 U
Pentachlorophenol	360	690	<b>4100</b>	91 T	260	<b>420</b>
Benzyl Alcohol	57	73	60 U	20 U	20 U	20 U
Benzoic Acid	650	650	600 U	200 U	200 U	200 U
<b>Conventionals in %</b>						
Total Organic Carbon			18.9	3.69	7.41	5.32
Preserved Total Solids						
Total Solids			29.3	43.4	42.1	41.3
<b>Conventionals in mg/kg</b>						
N-Ammonia						
Sulfide						
<b>TPH in mg/kg</b>						
Diesel-Range Hydrocarbons			670	300	130	360
Motor Oil-Range Hydrocarbons			690	500	300	950
Total TPH	200 <sup>a</sup>		<b>1360</b>	<b>800</b>	<b>430</b>	<b>1310</b>

U = Not detected at the reporting limit indicated.

T = Value is between the method reporting limit and the method detection limit.

Italic = Reporting limit is greater than screening criteria. If the analyte was present, the laboratory reported estimated concentrations between the MDL and the PQL.

The MDL was below screening criteria for all analytes.

Bold = Concentration is greater than SQS.

Bold/Box = Concentration is greater than CSL.

(a) TOC concentration outside of range (0.5 to 3.5%) for OC normalization.

Blank indicates sample not analyzed for specific analyte or no criteria available.

a = Proposed TPH screening value (Pete Adolphson, Ecology, personal communication)

**Table 8 - Analytical Results and TCDD TEQs for R.G. Haley Sediment Samples**

Sample ID	TEF	RGH-SS-01	TEQ	TEQ	RGH-SS-02	TEQ	TEQ	RGH-SS-03	TEQ	TEQ
Sampling Date		8/26/2008	ND=1/2 RL	ND=0	8/26/2008	ND=1/2 RL	ND=0	8/26/2008	ND=1/2 RL	ND=0
Depth Interval		0 to 12 cm			0 to 12 cm			0 to 12 cm		
Percent Moisture		21.4			20.2			32		
<b>Dioxins in ng/kg</b>										
2,3,7,8-TCDD	1	1.9	1.9	1.9	28	28	28	6	6	6
1,2,3,7,8-PeCDD	1	8.5	8.5	8.5	42	42	42	22	22	22
1,2,3,4,7,8-HxCDD	0.1	17	1.7	1.7	230	23	23	74	7.4	7.4
1,2,3,6,7,8-HxCDD	0.1	120	12	12	85	8.5	8.5	170	17	17
1,2,3,7,8,9-HxCDD	0.1	46	4.6	4.6	190	19	19	66	6.6	6.6
1,2,3,4,6,7,8-HpCDD	0.01	2900 E	29	29	3000 E	30	30	4500 E	45	45
OCDD	0.0003	24000 E	7.2	7.2	21000 E	6.3	6.3	39000 E	11.7	11.7
2,3,7,8-TCDF	0.1	3.2 CON	0.32	0.32	3.3 CON	0.33	0.33	3.7 CON	0.37	0.37
1,2,3,7,8-PeCDF	0.03	6.8	0.204	0.204	8.5	0.255	0.255	8.9	0.267	0.267
2,3,4,7,8-PeCDF	0.3	7.1	2.13	2.13	5.8	1.74	1.74	10	3	3
1,2,3,4,7,8-HxCDF	0.1	41	4.1	4.1	35	3.5	3.5	60	6	6
1,2,3,7,8,9-HxCDF	0.1	1.5	0.15	0.15	2.3 T	0.23	0.23	1.7 T	0.17	0.17
2,3,4,6,7,8-HxCDF	0.1	6.6	0.66	0.66	5	0.5	0.5	11	1.1	1.1
1,2,3,6,7,8-HxCDF	0.1	11	1.1	1.1	9.1	0.91	0.91	16	1.6	1.6
1,2,3,4,6,7,8-HpCDF	0.01	590	5.9	5.9	390	3.9	3.9	730	7.3	7.3
1,2,3,4,7,8,9-HpCDF	0.01	33	0.33	0.33	23	0.23	0.23	42	0.42	0.42
OCDF	0.0003	2300	0.69	0.69	1400	0.42	0.42	3100 E	0.93	0.93
Total TCDD		41			200			72		
Total PeCDD		73			210			170		
Total HxCDD		520			990			1100		
Total HpCDD		5100			5000			8800		
Total TCDF		22			24			25		
Total PeCDF		83			51			110		
Total HxCDF		780			540			1100		
Total HpCDF		2800			1800			3600		
Total TEQ			80.5	80.5		169	169		137	137

**Table 8 - Analytical Results and TCDD TEQs for R.G. Haley Sediment Samples**

Sample ID	RGH-SC-01-0-2'	TEQ	TEQ	RGH-SC-01-2-4'	TEQ	TEQ	RGH-SC-02-0-2'	TEQ	TEQ
Sampling Date	8/26/2008	ND=1/2 RL	ND=0	8/26/2008	ND=1/2 RL	ND=0	8/26/2008	ND=1/2 R	ND=0
Depth Interval	0 to 2 ft			2 to 4 ft			0 to 2 ft		
Percent Moisture	33.4			26.5			31.6		
<b>Dioxins in ng/kg</b>									
2,3,7,8-TCDD	4	4	4	3.1	3.1	3.1	39	39	39
1,2,3,7,8-PeCDD	17	17	17	25	25	25	34	34	34
1,2,3,4,7,8-HxCDD	68	6.8	6.8	66	6.6	6.6	250	25	25
1,2,3,6,7,8-HxCDD	160	16	16	310	31	31	160	16	16
1,2,3,7,8,9-HxCDD	57	5.7	5.7	100	10	10	110	11	11
1,2,3,4,6,7,8-HpCDD	4500	45	45	7900 E	79	79	4400	44	44
OCDD	40000 E	12	12	63000 E	18.9	18.9	36000 E	10.8	10.8
2,3,7,8-TCDF	3.1 CON, J	0.31	0.31	9.5 CON	0.95	0.95	5.5 CON	0.55	0.55
1,2,3,7,8-PeCDF	10	0.3	0.3	20	0.6	0.6	13	0.39	0.39
2,3,4,7,8-PeCDF	10	3	3	19	5.7	5.7	8.6	2.58	2.58
1,2,3,4,7,8-HxCDF	62	6.2	6.2	130	13	13	48	4.8	4.8
1,2,3,7,8,9-HxCDF	4.7	0.47	0.47	8.2	0.82	0.82	5.6	0.56	0.56
2,3,4,6,7,8-HxCDF	10	1	1	22	2.2	2.2	7.5	0.75	0.75
1,2,3,6,7,8-HxCDF	17	1.7	1.7	42	4.2	4.2	12	1.2	1.2
1,2,3,4,6,7,8-HpCDF	860	8.6	8.6	1500	15	15	710	7.1	7.1
1,2,3,4,7,8,9-HpCDF	47	0.47	0.47	85	0.85	0.85	40	0.4	0.4
OCDF	3200	0.96	0.96	5300	1.59	1.59	3200	0.96	0.96
Total TCDD	68			68			250		
Total PeCDD	130			200			240		
Total HxCDD	900			1500			1500		
Total HpCDD	8000			13000			7800		
Total TCDF	33			61			81		
Total PeCDF	130			270			110		
Total HxCDF	1200			2200			990		
Total HpCDF	3800			6100			3300		
Total TEQ	130			130			199		

**Table 8 - Analytical Results and TCDD TEQs for R.G. Haley Sediment Samples**

Sample ID	RGH-SC-02-2-4'	TEQ	TEQ	RGH-SC-03-0-2'	TEQ	TEQ	RGH-SC-04-0-2'	TEQ	TEQ
Sampling Date	8/26/2008	ND=1/2 R	ND=0	8/27/2008	ND=1/2 RL	ND=0	8/27/2008	ND=1/2 RL	ND=0
Depth Interval	2 to 4 ft			0 to 2 ft			0 to 2 ft		
Percent Moisture	12.8			58.9			41.9		
<b>Dioxins in ng/kg</b>									
2,3,7,8-TCDD	3.3	3.3	3.3	58	58	58	19	19	19
1,2,3,7,8-PeCDD	14	14	14	110	110	110	39	39	39
1,2,3,4,7,8-HxCDD	24	2.4	2.4	260	26	26	68	6.8	6.8
1,2,3,6,7,8-HxCDD	99	9.9	9.9	580	58	58	230	23	23
1,2,3,7,8,9-HxCDD	44	4.4	4.4	150	15	15	72	7.2	7.2
1,2,3,4,6,7,8-HpCDD	2700 E	27	27	15000	150	150	5500	55	55
OCDD	23000 E	6.9	6.9	220000 E	66	66	49000 E	14.7	14.7
2,3,7,8-TCDF	1.2 CON,J	0.12	0.12	22 CON	2.2	2.2	8.4 CON	0.84	0.84
1,2,3,7,8-PeCDF	5.3	0.159	0.159	32	0.96	0.96	14	0.42	0.42
2,3,4,7,8-PeCDF	5.8	1.74	1.74	32	9.6	9.6	14	4.2	4.2
1,2,3,4,7,8-HxCDF	38	3.8	3.8	210	21	21	72	7.2	7.2
1,2,3,7,8,9-HxCDF	2.9	0.29	0.29	7.2	0.72	0.72	6.4	0.64	0.64
2,3,4,6,7,8-HxCDF	5.7	0.57	0.57	31	3.1	3.1	13	1.3	1.3
1,2,3,6,7,8-HxCDF	9.3	0.93	0.93	51	5.1	5.1	24	2.4	2.4
1,2,3,4,6,7,8-HpCDF	480	4.8	4.8	2600	26	26	910	9.1	9.1
1,2,3,4,7,8,9-HpCDF	26	0.26	0.26	140 J	1.4	1.4	51	0.51	0.51
OCDF	2200	0.66	0.66	13000	3.9	3.9	3400	1.02	1.02
Total TCDD	62			730			260		
Total PeCDD	160			1000			330		
Total HxCDD	730			4100			1300		
Total HpCDD	5000			29000			10000		
Total TCDF	20			150			79		
Total PeCDF	74			340			180		
Total HxCDF	670			3900			1300		
Total HpCDF	2300			13000			3700		
Total TEQ		81.2	81.2		557	557		192	192



**Table 8 - Analytical Results and TCDD TEQs for R.G. Haley Sediment Samples**

Sample ID	RGH-SC-05-0-2'	TEQ	TEQ	RGH-SC-06-0-2'	TEQ	TEQ	RGH-SC-06-2-4'	TEQ	TEQ
Sampling Date	8/27/2008	ND=1/2 RL	ND=0	8/27/2008	ND=1/2 RL	ND=0	8/27/2008	ND=1/2 RL	ND=0
Depth Interval	0 to 2 ft			0 to 2 ft			2 to 4 ft		
Percent Moisture	58.4			55.1			51.4		
<b>Dioxins in ng/kg</b>									
2,3,7,8-TCDD	1.4	1.4	1.4	0.78 T	0.78	0.78	0.23 U	0.115	
1,2,3,7,8-PeCDD	5.1 T	5.1	5.1	2.7 T	2.7	2.7	0.49 U	0.245	
1,2,3,4,7,8-HxCDD	11	1.1	1.1	6.5	0.65	0.65	0.35 U	0.0175	
1,2,3,6,7,8-HxCDD	45	4.5	4.5	28	2.8	2.8	1.2 T	0.12	0.12
1,2,3,7,8,9-HxCDD	13	1.3	1.3	9.3	0.93	0.93	1.1 T	0.11	0.11
1,2,3,4,6,7,8-HpCDD	1500	15	15	990	9.9	9.9	26	0.26	0.26
OCDD	10000 E	3	3	7500 E	2.25	2.25	250	0.075	0.075
2,3,7,8-TCDF	6.4 CON	0.64	0.64	5.1 CON	0.51	0.51	1.4 U CON	0.07	
1,2,3,7,8-PeCDF	3.9 T	0.117	0.117	2.2 T	0.066	0.066	0.7 T	0.021	0.021
2,3,4,7,8-PeCDF	4.1 T	1.23	1.23	2.4 T	0.72	0.72	0.72 U	0.108	
1,2,3,4,7,8-HxCDF	12	1.2	1.2	8	0.8	0.8	1.7 T	0.17	0.17
1,2,3,7,8,9-HxCDF	1.3 T	0.13	0.13	2.3 T	0.23	0.23	0.25 T	0.025	0.025
2,3,4,6,7,8-HxCDF	2.6 T	0.26	0.26	1.9 T	0.19	0.19	0.74 T	0.074	0.074
1,2,3,6,7,8-HxCDF	4.2 T	0.42	0.42	2.5 U	0.125		0.64 T	0.064	0.064
1,2,3,4,6,7,8-HpCDF	130	1.3	1.3	89	0.89	0.89	6.5	0.065	0.065
1,2,3,4,7,8,9-HpCDF	7.4	0.074	0.074	5.4 T	0.054	0.054	0.43 U	0.00215	
OCDF	570	0.171	0.171	420	0.126	0.126	12	0.0036	0.0036
Total TCDD	150			67			15		
Total PeCDD	180			110			14		
Total HxCDD	1000			600			28		
Total HpCDD	6700			3400			73		
Total TCDF	71			35			15		
Total PeCDF	39			21			2.2		
Total HxCDF	230			140			8.7		
Total HpCDF	610			410			16		
Total TEQ		36.9	36.9		23.7	23.6		1.55	0.988

U = Not detected at the reporting limit (RL) indicated.

CON = Confirmation analysis. J = Estimated value.

ND = Not detected.

TEF = Toxicity Equivalence Factor. Blank indicates not applicable.

T = Value is between the method reporting limit and the method detection limit.

E = Estimated result. Result concentration exceeds the calibration range.

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**Table 9 - Analytical Results for Bellingham Bay Piling Study Area Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		BBP-SS-01	BBP-SS-02	BBP-SS-03	BBP-SC-01	BBP-SC-02
	LAET	2LAET	8/26/2008	8/26/2008	8/26/2008	8/27/2008	8/27/2008
			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 4.5 ft	0 to 4 ft
<b>Metals in mg/kg</b>							
Arsenic	57	93	7 U	8 U	20 U	7	10 U
Cadmium	5.1	6.7	0.3	0.3	2	0.4	0.4 U
Chromium	260	270	22.9	25.2	15	26.5	28
Copper	390	390	12.7	14.5	32	18.1	18.2
Lead	450	530	5	8	30	7	7
Mercury	0.41	0.59	0.08	0.11	0.2 U	0.11	0.08 U
Nickel	140	140	26	30	19	36	38
Silver	6.1	6.1	0.4 U	0.5 U	1 U	0.4 U	0.6 U
Zinc	410	960	43	46	84	48	57
<b>PAHs in ug/kg</b>							
Naphthalene	2100	2400	25	80	170	37	88
Acenaphthylene	1300	1300	42	170	200	120	53
Acenaphthene	500	730	13 T	110	44	14 T	26
Fluorene	540	1000	12 T	380	50	14 T	22
Phenanthrene	1500	5400	130	<b>2000</b>	860	280	210
Anthracene	960	4400	53	430	270	160	200
2-Methylnaphthalene	670	1400	12 T	99	44	21	40
1-Methylnaphthalene			17 T	140	39	20	38
Total LPAHs	5200	13000	275	3170	1594	625	599
Fluoranthene	1700	2500	350	<b>2400</b>	1500	960	1100
Pyrene	2600	3300	390	2000	1500	1000	940
Benzo(a)anthracene	1300	1600	220	1100	1000	720	670
Chrysene	1400	2800	280	1200	1200	820	700
Benzo(b)fluoranthene			180	1100	1300	660	760
Benzo(k)fluoranthene			140	1100	940	660	870
Total Benzofluoranthenes	3200	3600	320	2200	2240	1320	1630
Benzo(a)pyrene	1600	3000	190	1200	1400	740	840
Indeno(1,2,3-cd)pyrene	600	690	56	400	340	130	160
Dibenz(a,h)anthracene	230	540	11 T	76	65	29	32
Benzo(g,h,i)perylene	670	720	52 J	360	310	110 J	140 J
Total HPAHs	12000	17000	1869	10936	9555	5829	6212
<b>Chlorinated Benzenes in ug/kg</b>							
1,2-Dichlorobenzene	35	50	19 U	20 U	20 U	20 U	20 U
1,3-Dichlorobenzene	170	170	19 U	20 U	20 U	20 U	20 U
1,4-Dichlorobenzene	110	120	19 U	20 U	20 U	20 U	20 U
1,2,4-Trichlorobenzene	31	51	19 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	22	70	19 U	20 U	20 U	20 U	20 U

**Table 9 - Analytical Results for Bellingham Bay Piling Study Area Sediment Samples Compared to AET Dry-Weight Criteria**

Sample ID Sampling Date Depth Interval	AETs		BBP-SS-01	BBP-SS-02	BBP-SS-03	BBP-SC-01	BBP-SC-02
	LAET	2LAET	8/26/2008 0 to 12 cm	8/26/2008 0 to 12 cm	8/26/2008 0 to 12 cm	8/27/2008 0 to 4.5 ft	8/27/2008 0 to 4 ft
<b>Phthalate Esters in ug/kg</b>							
Dimethylphthalate	71	160	19 U	20 U	20 U	20 U	20 U
Diethylphthalate	200	200	19 U	20 U	20 U	20 U	20 U
Di-n-Butylphthalate	1400	1400	19 U	20 U	20 U	20 U	20 U
Butylbenzylphthalate	63	900	19 U	20 U	20 U	20 U	<b>71</b>
bis(2-Ethylhexyl)phthalate	1300	1900	11 T	35	290	20 U	20 U
Di-n-Octyl phthalate	6200	6200	19 U	20 U	20 U	20 U	20 U
<b>Miscellaneous Compounds in ug/kg</b>							
Dibenzofuran	540	700	19 U	93	48	10 T	13 T
Hexachlorobutadiene	11	120	<i>19 U</i>	<i>20 U</i>	<i>20 U</i>	<i>20 U</i>	<i>20 U</i>
N-Nitrosodiphenylamine	28	40	19 U	20 U	20 U	20 U	20 U
Hexachloroethane			19 U	20 U	20 U	20 U	20 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	48	15 T	23	16 T	40
2-Methylphenol	63	63	19 U	20 U	20 U	20 U	20 U
4-Methylphenol	670	670	19 U	20 U	63	27	33
2,4-Dimethylphenol	29	29	19 U	20 U	20 U	20 U	20 U
Pentachlorophenol	360	690	96 U	98 U	99 U	99 U	98 U
Benzyl Alcohol	57	73	19 U	20 U	20 U	20 U	20 U
Benzoic Acid	650	650	190 U	200 U	200 U	200 U	200 U
<b>Conventionals in %</b>							
Moisture Content			48.61	59.92			
Preserved Total Solids			69.5	50.9	18.8	64.4	38.4
Total Solids			65.3	62.2	20.4	67	48.1
Total Organic Carbon			2.4	4.1	86.5	9.49	10.1
<b>Conventionals in mg/kg</b>							
Ammonia (NH3) as Nitrogen (N)			10.4	6.93	2.82	2.88	3.79
Sulfide			212	265	290	234	393
Specific Gravity			2.66	2.65			
<b>TPH in mg/kg</b>							
Diesel Range Hydrocarbons			10	15	61	22	41
Motor Oil			15	16 U	180	20	36
Total TPH	200 <sup>a</sup>		25	15	<b>241</b>	42	77

U = Not detected at the reporting limit indicated.

T = Value is between the method reporting limit and the method detection limit.

Italic = Reporting limit is greater than screening criteria. If the analyte was present, the laboratory reported estimated concentrations between the MDL and the PQL. The MDL was below screening criteria for all analytes.

Bold = Concentration is greater than LAET.

Blank indicates sample not analyzed for specific analyte or no criteria available.

a = Proposed TPH screening value (Pete Adolphson, Ecology, personal communication)

**Table 10 - Analytical Results for Bellingham Bay Piling Study Area Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		BBP-SS-01	BBP-SS-02 (a)	BBP-SS-03 (a)	BBP-SC-01 (a)	BBP-SC-02 (a)
Sampling Date	SQS	CSL	8/26/2008	8/26/2008	8/26/2008	8/27/2008	8/27/2008
Depth Interval			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 4.5 ft	0 to 4 ft
<b>Metals in mg/kg</b>							
Arsenic	57	93	7 U	8 U	20 U	7	10 U
Cadmium	5.1	6.7	0.3	0.3	2	0.4	0.4 U
Chromium	260	270	22.9	25.2	15	26.5	28
Copper	390	390	12.7	14.5	32	18.1	18.2
Lead	450	530	5	8	30	7	7
Mercury	0.41	0.59	0.08	0.11	0.2 U	0.11	0.08 U
Nickel			26	30	19	36	38
Silver	6.1	6.1	0.4 U	0.5 U	1 U	0.4 U	0.6 U
Zinc	410	960	43	46	84	48	57
<b>PAHs in mg/kg OC</b>							
Naphthalene	99	170	1.04	1.95	0.20	0.39	0.87
Acenaphthylene	66	66	1.75	4.15	0.23	1.26	0.52
Acenaphthene	16	57	0.54 T	2.68	0.05	0.15 T	0.26
Fluorene	23	79	0.50 T	9.27	0.06	0.15 T	0.22
Phenanthrene	100	480	5.42	48.78	0.99	2.95	2.08
Anthracene	220	1200	2.21	10.49	0.31	1.69	1.98
2-Methylnaphthalene	38	64	0.50 T	2.41	0.05	0.22	0.40
1-Methylnaphthalene			0.71 T	3.41	0.05	0.21	0.38
Total LPAHs	370	780	11.46	77.32	1.84	6.59	5.93
Fluoranthene	160	1200	14.58	58.54	1.73	10.12	10.89
Pyrene	1000	1400	16.25	48.78	1.73	10.54	9.31
Benzo(a)anthracene	110	270	9.17	26.83	1.16	7.59	6.63
Chrysene	110	460	11.67	29.27	1.39	8.64	6.93
Benzo(b)fluoranthene			7.50	26.83	1.50	6.95	7.52
Benzo(k)fluoranthene			5.83	26.83	1.09	6.95	8.61
Total Benzofluoranthenes	230	450	13.33	53.66	2.59	13.91	16.14
Benzo(a)pyrene	99	210	7.92	29.27	1.62	7.80	8.32
Indeno(1,2,3-cd)pyrene	34	88	2.33	9.76	0.39	1.37	1.58
Dibenz(a,h)anthracene	12	33	0.46 T	1.85	0.08	0.31	0.32
Benzo(g,h,i)perylene	31	78	2.17 J	8.78	0.36	1.16 J	1.39 J
Total HPAHs	960	5300	77.88	266.73	11.05	61.42	61.50
<b>Chlorinated Benzenes in mg/kg OC</b>							
1,2-Dichlorobenzene	2.3	2.3	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
1,3-Dichlorobenzene			0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
1,4-Dichlorobenzene	3.1	9	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
1,2,4-Trichlorobenzene	0.81	1.8	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
Hexachlorobenzene	0.38	2.3	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U

**Table 10 - Analytical Results for Bellingham Bay Piling Study Area Sediment Samples Compared to SMS Criteria**

Sample ID	SMS		BBP-SS-01	BBP-SS-02 (a)	BBP-SS-03 (a)	BBP-SC-01 (a)	BBP-SC-02 (a)
Sampling Date	SQS	CSL	8/26/2008	8/26/2008	8/26/2008	8/27/2008	8/27/2008
Depth Interval			0 to 12 cm	0 to 12 cm	0 to 12 cm	0 to 4.5 ft	0 to 4 ft
<b>Phthalate Esters in mg/kg OC</b>							
Dimethylphthalate	53	53	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
Diethylphthalate	61	110	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
Di-n-Butylphthalate	220	1700	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
Butylbenzylphthalate	4.9	64	0.79 U	0.49 U	0.02 U	0.21 U	0.70
bis(2-Ethylhexyl)phthalate	47	78	0.46 T	0.85	0.34	0.21 U	0.20 U
Di-n-Octyl phthalate	58	4500	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
<b>Miscellaneous Compounds in mg/kg OC</b>							
Dibenzofuran	15	58	0.79 U	2.27	0.06	0.11 T	0.13 T
Hexachlorobutadiene	3.9	6.2	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
N-Nitrosodiphenylamine	11	11	0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
Hexachloroethane			0.79 U	0.49 U	0.02 U	0.21 U	0.20 U
<b>Ionizable Organic Compounds in ug/kg</b>							
Phenol	420	1200	48	15 T	23	16 T	40
2-Methylphenol	63	63	19 U	20 U	20 U	20 U	20 U
4-Methylphenol	670	670	19 U	20 U	63	27	33
2,4-Dimethylphenol	29	29	19 U	20 U	20 U	20 U	20 U
Pentachlorophenol	360	690	96 U	98 U	99 U	99 U	98 U
Benzyl Alcohol	57	73	19 U	20 U	20 U	20 U	20 U
Benzoic Acid	650	650	190 U	200 U	200 U	200 U	200 U
<b>Conventionals in %</b>							
Moisture Content			48.61	59.92			
Preserved Total Solids			69.5	50.9	18.8	64.4	38.4
Total Solids			65.3	62.2	20.4	67	48.1
Total Organic Carbon			2.4	4.1	86.5	9.49	10.1
<b>Conventionals in mg/kg</b>							
Ammonia (NH3) as Nitrogen (N)			10.4	6.93	2.82	2.88	3.79
Sulfide			212	265	290	234	393
Specific Gravity			2.66	2.65			
<b>TPH in mg/kg</b>							
Diesel Range Hydrocarbons			10	15	61	22	41
Motor Oil			15	16 U	180	20	36
Total TPH	200 <sup>a</sup>		25	15	<b>241</b>	42	77

U = Not detected at the reporting limit indicated.

T = Value is between the method reporting limit and the method detection limit.

Italic = Reporting limit is greater than screening criteria. If the analyte was present, the laboratory reported estimated concentrations between the MDL and the PQL. The MDL was below screening criteria for all analytes.

Bold = Concentration is greater than SQS.

Bold/Box = Concentration is greater than CSL.

(a) TOC concentration outside of range (0.5 to 3.5%) for OC normalization.

Blank indicates sample not analyzed for specific analyte or no criteria available.

a = Proposed TPH screening value (Pete Adolphson, Ecology, personal communication)

**Table 11 - Analytical Results and TCDD TEQs for Bellingham Bay Piling Study Area Sediment Samples**

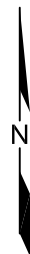
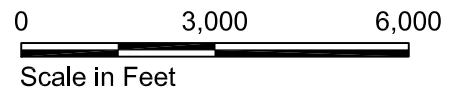
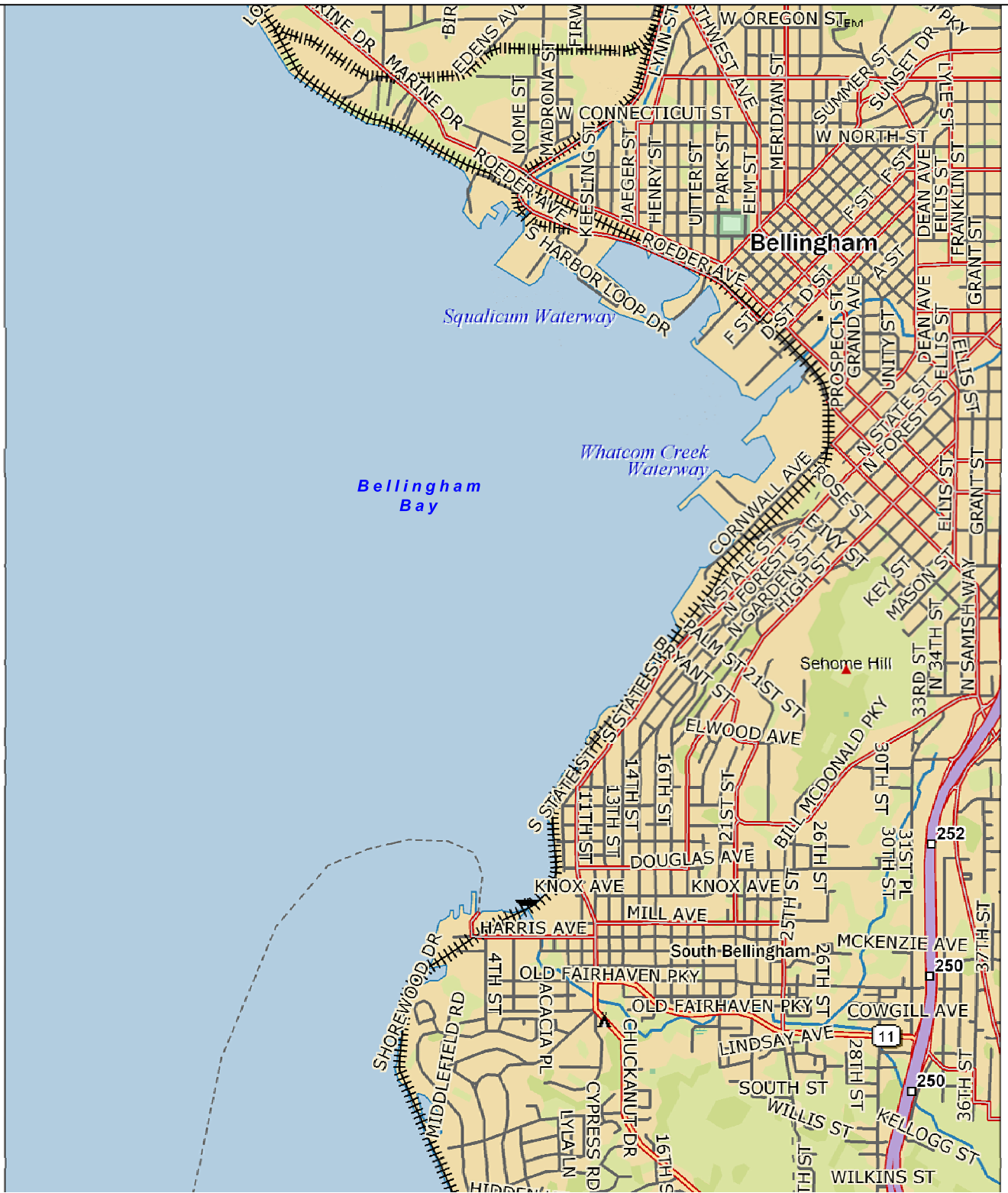
Sample ID	TEF	BBP-SS-01	TEQ	TEQ	BBP-SS-02	TEQ	TEQ	BBP-SS-03	TEQ	TEQ
Sampling Date		8/26/2008	ND=1/2 RL	ND=0	8/26/2008	ND=1/2 RL	ND=0	8/26/2008	ND=1/2 RL	ND=0
Depth Interval		0 to 12 cm			0 to 12 cm			0 to 12 cm		
Percent Moisture		30.3			36.8			80.1		
<b>Dioxins in ng/kg</b>										
2,3,7,8-TCDD	1	0.093 U	0.0465	0	0.17 U	0.085	0	1.6 J	1.6	1.6
1,2,3,7,8-PeCDD	1	0.19 U	0.095	0	0.66 J	0.66	0.66	4.6 U	2.3	0
1,2,3,4,7,8-HxCDD	0.1	0.53 J	0.053	0.053	1.3 J	0.13	0.13	4.6 J	0.46	0.46
1,2,3,6,7,8-HxCDD	0.1	1.5 J	0.15	0.15	3.1 J	0.31	0.31	19	1.9	1.9
1,2,3,7,8,9-HxCDD	0.1	1.1 J	0.11	0.11	2.2 J	0.22	0.22	12 J	1.2	1.2
1,2,3,4,6,7,8-HpCDD	0.01	32	0.32	0.32	59	0.59	0.59	410	4.1	4.1
OCDD	0.0003	350 B	0.105	0.105	540 B	0.162	0.162	5800 B	1.74	1.74
2,3,7,8-TCDF	0.1	0.78 CON	0.078	0.078	1.8 CON	0.18	0.18	7 CON	0.7	0.7
1,2,3,7,8-PeCDF	0.03	0.14 U	0.0021	0	0.32 J	0.0096	0.0096	2.2 U	0.033	0
2,3,4,7,8-PeCDF	0.3	0.14 U	0.021	0	0.38 J	0.114	0.114	2.2 J	0.66	0.66
1,2,3,4,7,8-HxCDF	0.1	0.43 J	0.043	0.043	1 J	0.1	0.1	5.1 J	0.51	0.51
1,2,3,7,8,9-HxCDF	0.1	0.079 U	0.00395	0	0.3 J	0.03	0.03	0.81 U	0.0405	0
2,3,4,6,7,8-HxCDF	0.1	0.23 U	0.0115	0	0.73 J	0.073	0.073	2.3 J	0.23	0.23
1,2,3,6,7,8-HxCDF	0.1	0.19 U	0.0095	0	0.51 J	0.051	0.051	2 U	0.1	0
1,2,3,4,6,7,8-HpCDF	0.01	5.1	0.051	0.051	9.5	0.095	0.095	46	0.46	0.46
1,2,3,4,7,8,9-HpCDF	0.01	0.34 J	0.0034	0.0034	0.54 U	0.0027	0	3.3 U	0.0165	0
OCDF	0.0003	19	0.0057	0.0057	31	0.0093	0.0093	220	0.066	0.066
Total TCDD		6.3			20			93		
Total PeCDD		10			33			95		
Total HxCDD		23			61			190		
Total HpCDD		76			140			740		
Total TCDF		2.3			9			56		
Total PeCDF		1.7			4.4			25		
Total HxCDF		6.2			15			73		
Total HpCDF		18			33			180		
Total TEQ			1.10865	0.9191		2.8216	2.7339		16.116	13.626

**Table 11 - Analytical Results and TCDD TEQs for Bellingham Bay Piling Study Area Sediment Samples**

Sample ID	TEF	BBP-SC-01	TEQ	TEQ
Sampling Date		8/26/2008	ND=1/2 RL	ND=0
Depth Interval		0 to 4.5 ft		
Percent Moisture		31.7		
<b>Dioxins in ng/kg</b>				
2,3,7,8-TCDD	1	1.6	1.6	1.6
1,2,3,7,8-PeCDD	1	0.54 J	0.54	0.54
1,2,3,4,7,8-HxCDD	0.1	0.88 J	0.088	0.088
1,2,3,6,7,8-HxCDD	0.1	2.1 J	0.21	0.21
1,2,3,7,8,9-HxCDD	0.1	1.4 J	0.14	0.14
1,2,3,4,6,7,8-HpCDD	0.01	31	0.31	0.31
OCDD	0.0003	250 B	0.075	0.075
2,3,7,8-TCDF	0.1	1.6 CON	0.16	0.16
1,2,3,7,8-PeCDF	0.03	0.35 J	0.0105	0.0105
2,3,4,7,8-PeCDF	0.3	0.38 J	0.114	0.114
1,2,3,4,7,8-HxCDF	0.1	0.53 U	0.0265	0
1,2,3,7,8,9-HxCDF	0.1	0.12 U	0.006	0
2,3,4,6,7,8-HxCDF	0.1	0.18 J	0.018	0.018
1,2,3,6,7,8-HxCDF	0.1	0.28 J	0.028	0.028
1,2,3,4,6,7,8-HpCDF	0.01	5.4	0.054	0.054
1,2,3,4,7,8,9-HpCDF	0.01	0.29 J	0.0029	0.0029
OCDF	0.0003	16	0.0048	0.0048
Total TCDD		27		
Total PeCDD		35		
Total HxCDD		45		
Total HpCDD		65		
Total TCDF		14		
Total PeCDF		4.4		
Total HxCDF		7.5		
Total HpCDF		18		
Total TEQ			3.3877	3.3552

U = Not detected at the reporting limit (RL) indicated.  
 CON = Confirmation analysis. J = Estimated value.  
 ND = Not detected.  
 TEF = Toxicity Equivalence Factor. Blank indicates not applicable.  
 T = Value is between the method reporting limit and the method detection limit.  
 E = Estimated result. Result concentration exceeds the calibration range.

EAL 06/22/09



Bellingham Bay Sediment Investigations  
Bellingham Bay, Washington

**Vicinity Map**

17330-17

6/09



Figure

**1**

Source: DeLorme Topo USA®.

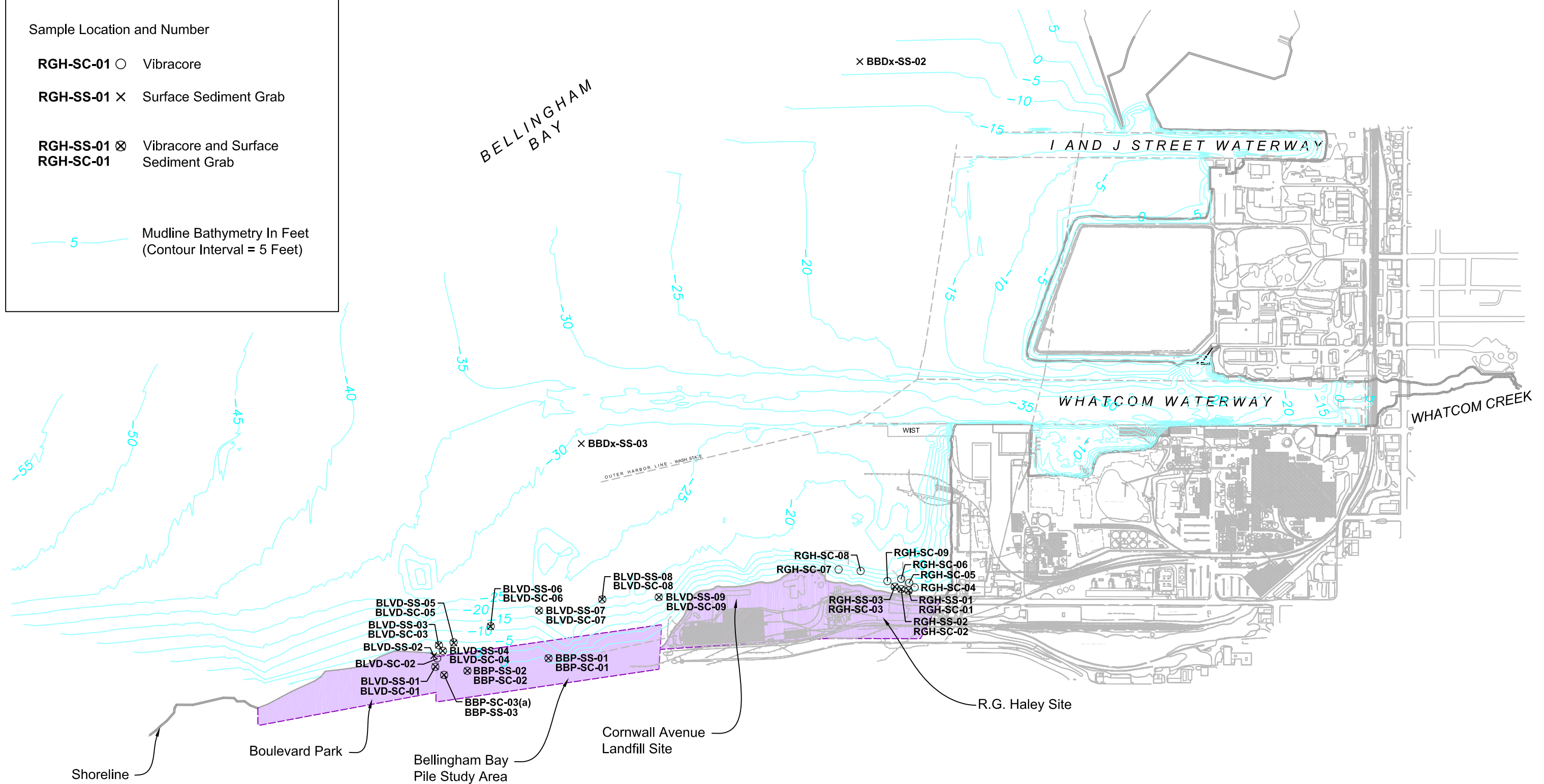
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Sample Location and Number

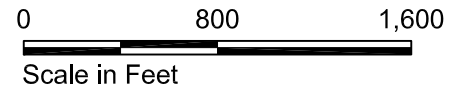
- RGH-SC-01 ○ Vibracore
- RGH-SS-01 × Surface Sediment Grab
- RGH-SS-01 ⊗ Vibracore and Surface Sediment Grab
- RGH-SC-01 ⊗

5 — Mudline Bathymetry In Feet (Contour Interval = 5 Feet)



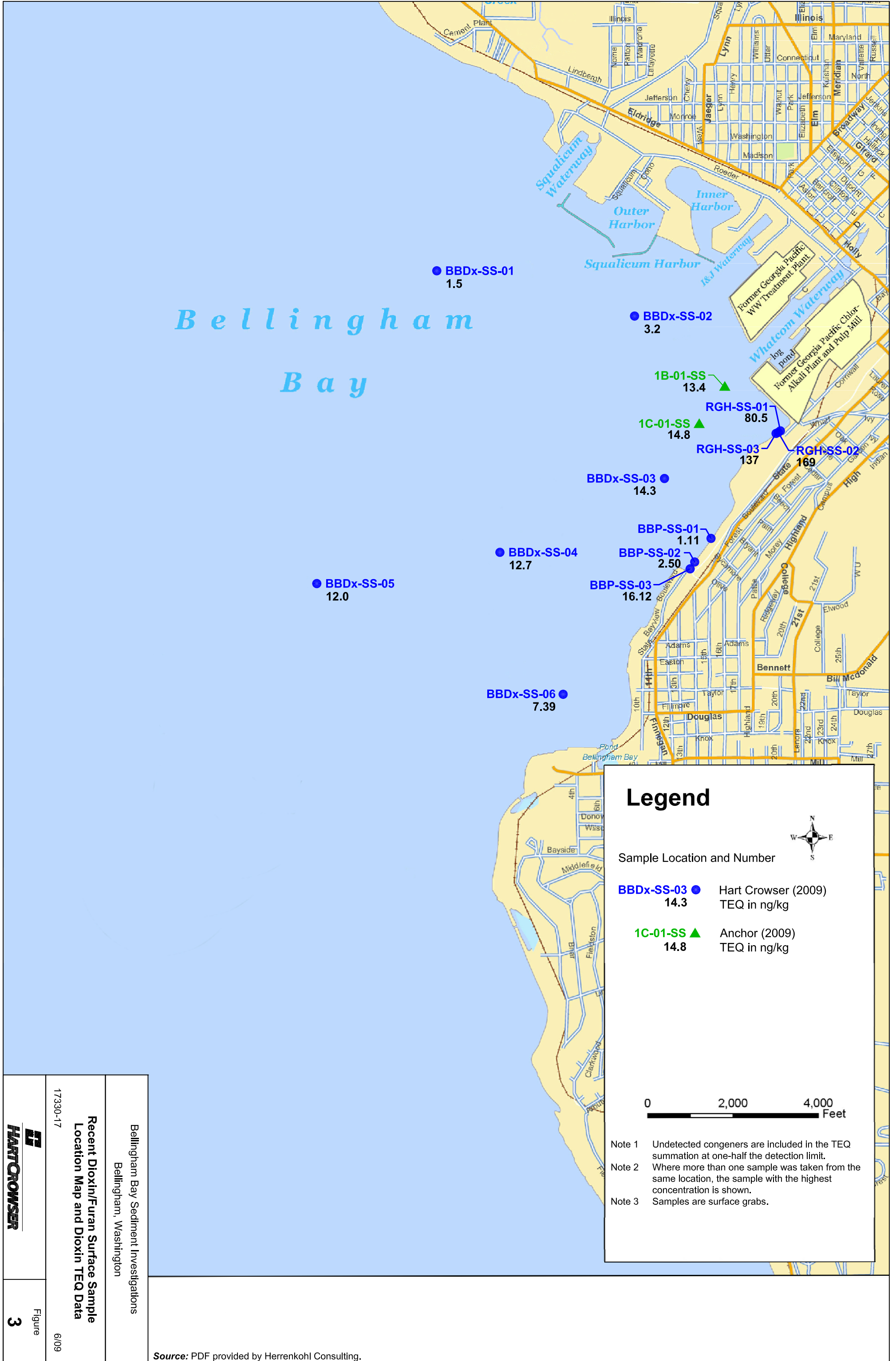
EAL 06/22/09

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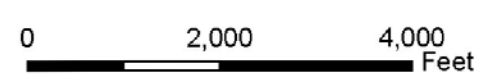
Bellingham Bay Sediment Investigations Bellingham, Washington	
<b>Site Plan</b>	
17330-17	6/09
Figure <b>2</b>	

**Source:** Base map generated from "Bellingham Millsite Plot Plan" by Cascade Aerial Maps and Survey's, Inc., dated July 1990, supplied by Georgia-Pacific Corporation. Whatcom Waterway bathymetry data from draft August 1994 survey by U.S. Corps of Engineers, Seattle District. I & J Street Waterway bathymetry data from 1992 survey by U.S. Army Corps of Engineers, Seattle District. WW Area bathymetry data from non-maintained channel areas obtained from September 1996 Blue Water Engineering (BWE) survey as part of RI/FS work plan study.



### Legend

- Sample Location and Number
- BBDx-SS-03** ● Hart Crowser (2009)  
14.3 TEQ in ng/kg
  - 1C-01-SS** ▲ Anchor (2009)  
14.8 TEQ in ng/kg



- Note 1 Undetected congeners are included in the TEQ summation at one-half the detection limit.
- Note 2 Where more than one sample was taken from the same location, the sample with the highest concentration is shown.
- Note 3 Samples are surface grabs.

Bellingham Bay Sediment Investigations  
Bellingham, Washington

**Recent Dioxin/Furan Surface Sample  
Location Map and Dioxin TEQ Data**

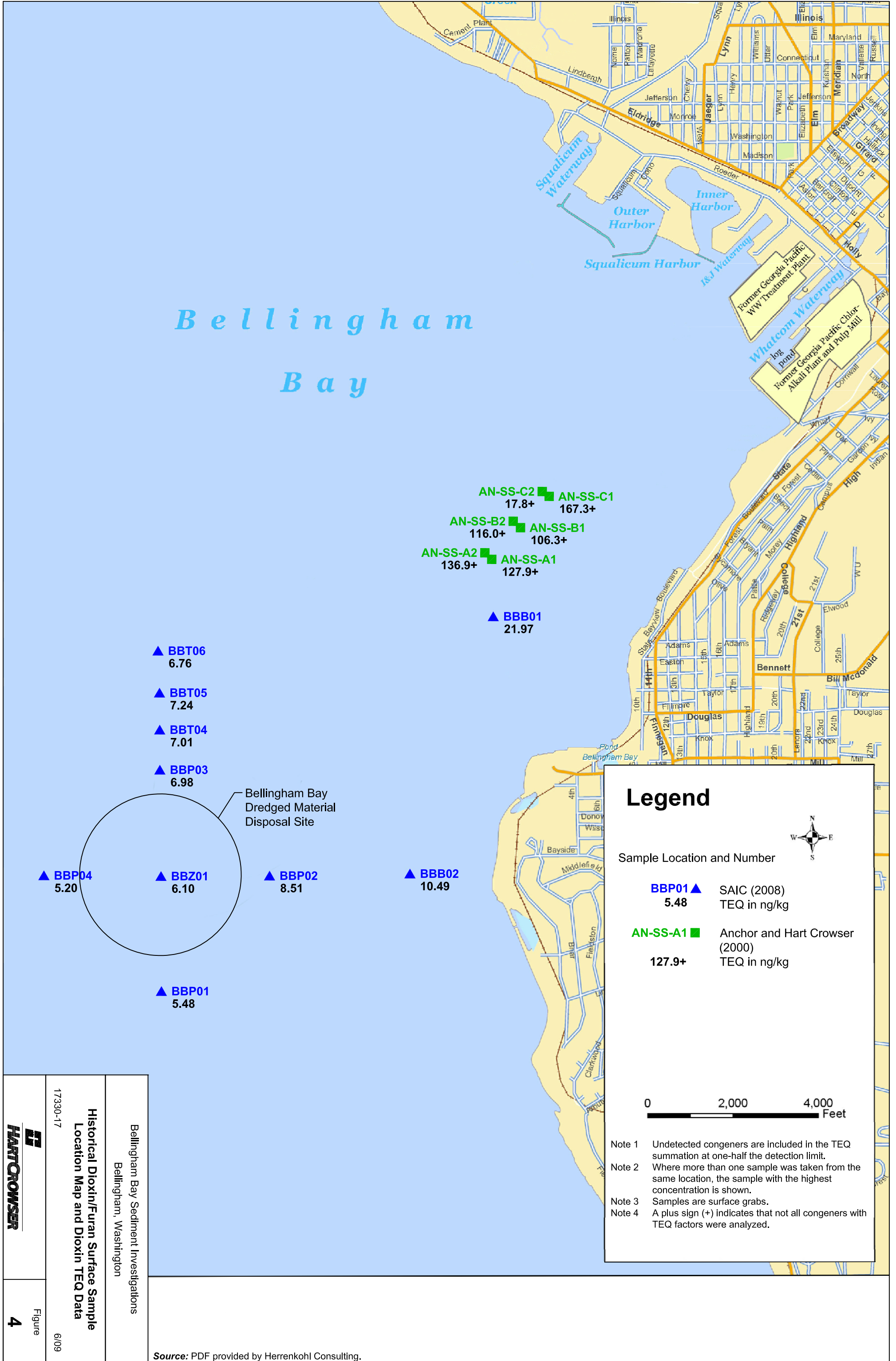
17330-17

**HART CROWSER**

6/09

Figure  
**3**





17330-17

**HART CROWSER**

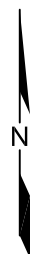
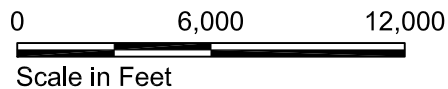
Figure 4


6/09

Bellingham Bay Sediment Investigations  
 Bellingham, Washington

**Historical Dioxin/Furan Surface Sample Location Map and Dioxin TEQ Data**

Source: PDF provided by Herrenkohl Consulting.

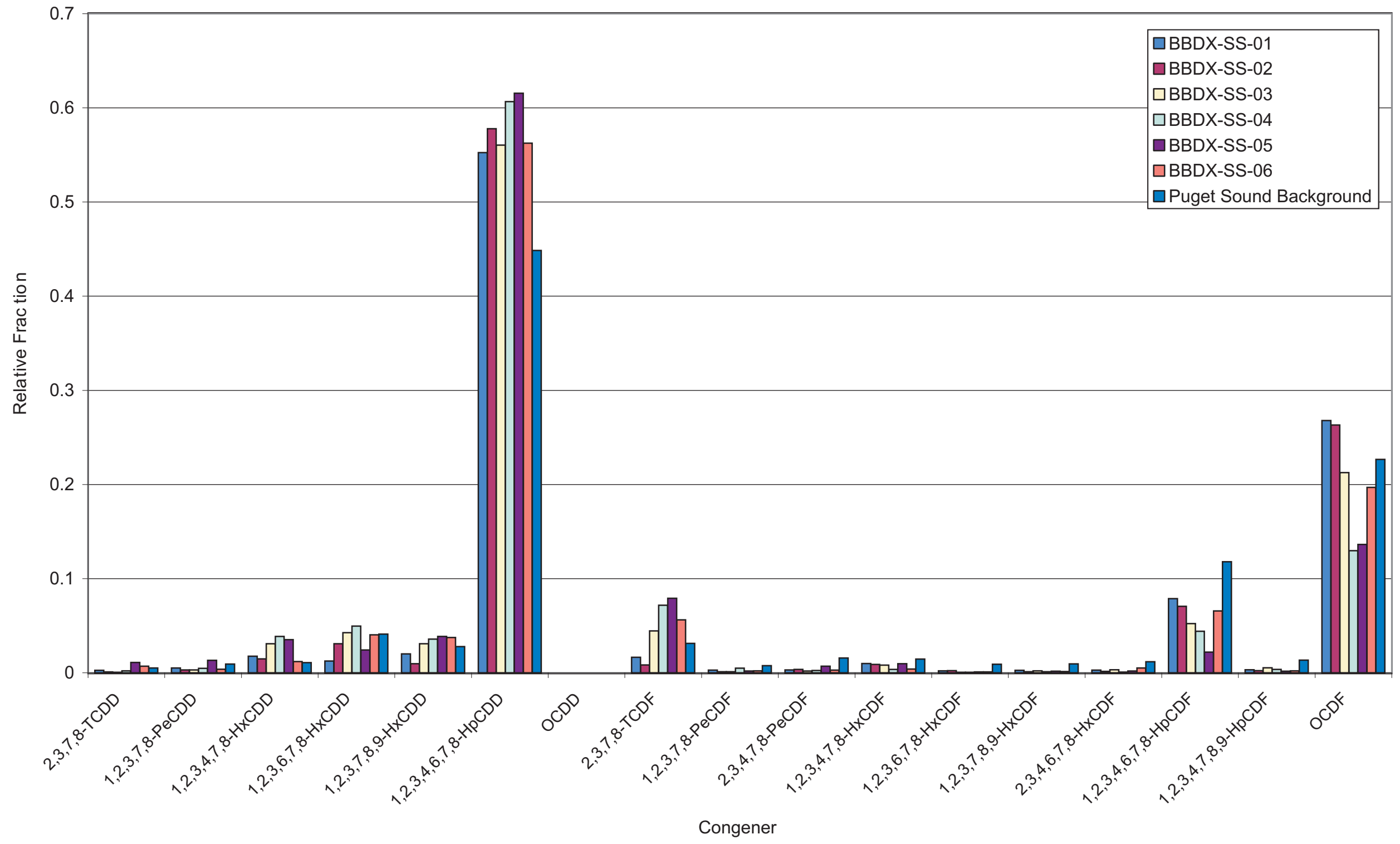


Bellingham Bay Sediment Investigations Bellingham Bay, Washington	
<b>Samish Bay Reference Sample Location Plan</b>	
17330-17	6/09
	Figure <b>5</b>

EAL 06/22/09

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Source: DeLorme Topo USA®.



Bellingham Bay Sediment Investigations  
 Bellingham, Washington

**Bellingham Bay-Wide Sediment Dioxin/  
 Furan Congener Ratios**

17330-17 6/09

 Figure  
**6**



EAL 06/22/09

Depth	Compound	Concentration
0 to 2 ft.	Dimethylphthalate <sup>2</sup>	180 µg/kg
2 to 4 ft.	Napthalene <sup>2</sup>	5900 µg/kg
	2,4-Dimethylphenol <sup>1</sup>	42 µg/kg
	Total LPAHs <sup>2</sup>	7417 µg/kg

● RGH-SC-07

Depth	Compound	Concentration
0 to 2 ft.	Mercury	1.0 mg/kg
	Butylbenzylphthalate <sup>2</sup>	110 µg/kg
2 to 4 ft.	Mercury	0.9 mg/kg
	Pentachlorophenol	450 µg/kg
4 to 5.5 ft.	Mercury	11.3 mg/kg
	Pentachlorophenol	4100 µg/kg
	Fluoranthene <sup>2</sup>	2000 µg/kg

● RGH-SC-08

Depth	Compound	Concentration
2 to 4 ft.	Mercury	0.74 mg/kg
4 to 6 ft.	Mercury	0.83 mg/kg
	Phenanthrene <sup>2</sup>	3300 µg/kg
	Anthracene <sup>2</sup>	1100 µg/kg
	Total LPAHs <sup>2</sup>	6070 µg/kg
	Fluoranthene <sup>2</sup>	4200 µg/kg
	Pyrene <sup>2</sup>	5100 µg/kg
	Benzo(a)anthracene <sup>2</sup>	2100 µg/kg
	Chrysene <sup>2</sup>	2300 µg/kg
	Total Benzo(a)fluoranthenes <sup>2</sup>	3300 µg/kg
	Benzo(a)pyrene <sup>2</sup>	2400 µg/kg
	Indeno(1,2,3-cd)pyrene <sup>2</sup>	1300 µg/kg
	Dibenz(a,h)anthracene <sup>2</sup>	460 µg/kg
	Benzo(g,h,i)perylene <sup>2</sup>	1400 µg/kg
	Total HPAHs <sup>2</sup>	22560 µg/kg

● RGH-06

Depth	Compound	Concentration
0 to 2 ft.	Mercury	0.56 mg/kg
2 to 4 ft.	Mercury	1.5 mg/kg
4 to 5.5 ft.	Mercury	1.9 mg/kg
	Pentachlorophenol	420 µg/kg

● RGH-SC-09

Depth	Compound	Concentration
0 to 2 ft.	Phenanthrene <sup>2</sup>	2700 µg/kg
	Fluoranthene <sup>2</sup>	2300 µg/kg

● RGH-05

● RGH-03

● RGH-02

● RGH-04

● RGH-01

Depth	Compound	Concentration
0 to 2 ft.	Pentachlorophenol	380 µg/kg
4 to 6 ft.	Pentachlorophenol	530 µg/kg

Depth	Compound	Concentration
0 to 2 ft.	Mercury	0.48 mg/kg
2 to 4 ft.	Mercury	0.7 mg/kg
	Pentachlorophenol	720 µg/kg
	Fluoranthene <sup>2</sup>	4000 µg/kg
	Pyrene <sup>2</sup>	4000 µg/kg
	Chrysene <sup>2</sup>	1500 µg/kg
	Total HPAHs <sup>2</sup>	12233 µg/kg
4 to 6 ft.	Mercury	1.59 mg/kg
	Butylbenzylphthalate <sup>2</sup>	69 µg/kg

Depth	Compound	Concentration
4 to 6 ft.	Dimethylphthalate <sup>2</sup>	590 µg/kg

**SMS Criteria**

- SQS** Blue Indicates Exceedance of SQS
- CSL** Red Indicates Exceedance of CSL

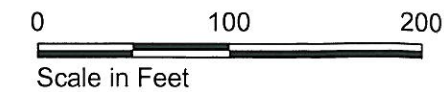
**AET Criteria**

- LAET** Green Indicates Exceedance of LAET
- 2LAET** Orange Indicates Exceedance of 2LAET

**Notes:**

- <sup>1</sup> SMS Criteria Applicable (TOC between 0.5 to 3.5%)
- <sup>2</sup> AAET Criteria Applicable (TOC outside the range of 0.5 to 3.5%)

● RGH-01 Sample Location and Number

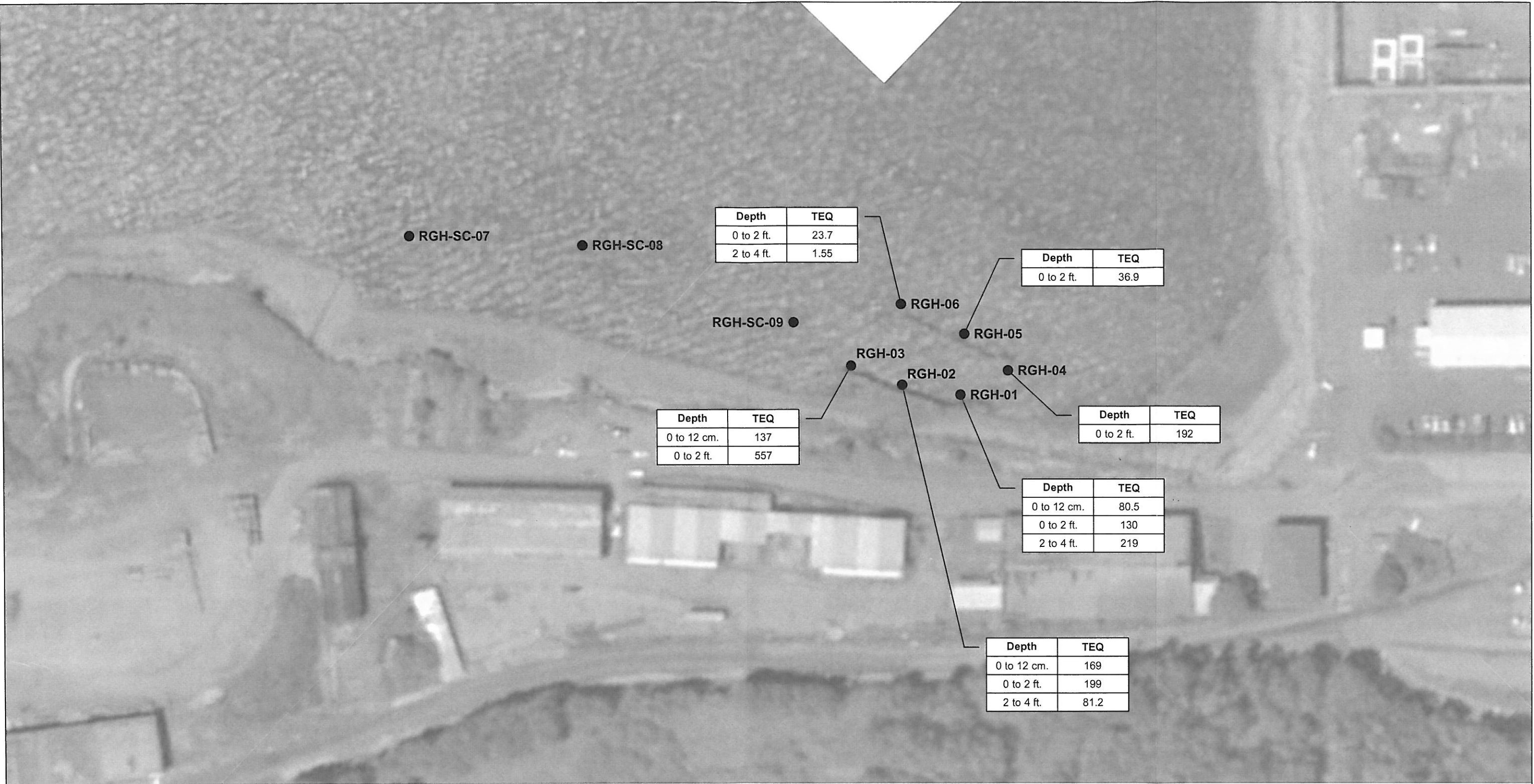


Bellingham Bay Sediment Investigations Bellingham, Washington	
<b>R.G. Haley Site Sample Location Plan and Sediment Criteria Exceedances</b>	
17330-17	6/09
	Figure <b>7</b>

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Source: Base map provided by Anchor Environmental.





Depth	TEQ
0 to 2 ft.	23.7
2 to 4 ft.	1.55

Depth	TEQ
0 to 2 ft.	36.9

Depth	TEQ
0 to 12 cm.	137
0 to 2 ft.	557

Depth	TEQ
0 to 2 ft.	192

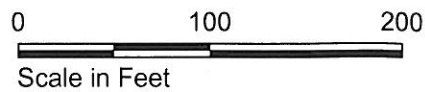
Depth	TEQ
0 to 12 cm.	80.5
0 to 2 ft.	130
2 to 4 ft.	219

Depth	TEQ
0 to 12 cm.	169
0 to 2 ft.	199
2 to 4 ft.	81.2

RGH-01 ● Sample Location and Number

**Notes:**

1. Undetected congeners are included in the TEQ summation using one-half the detection limits.
2. Bellingham Bay background TEQ concentrations range from 1.5 to 14.3 ng/kg.
3. TEQ presented in ng/kg.



Bellingham Bay Sediment Investigations  
Bellingham, Washington

**R.G. Haley Site Dioxin TEQ Data**

17330-17

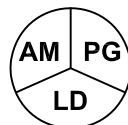
6/09



Figure

**8**

Exploration Location and Number

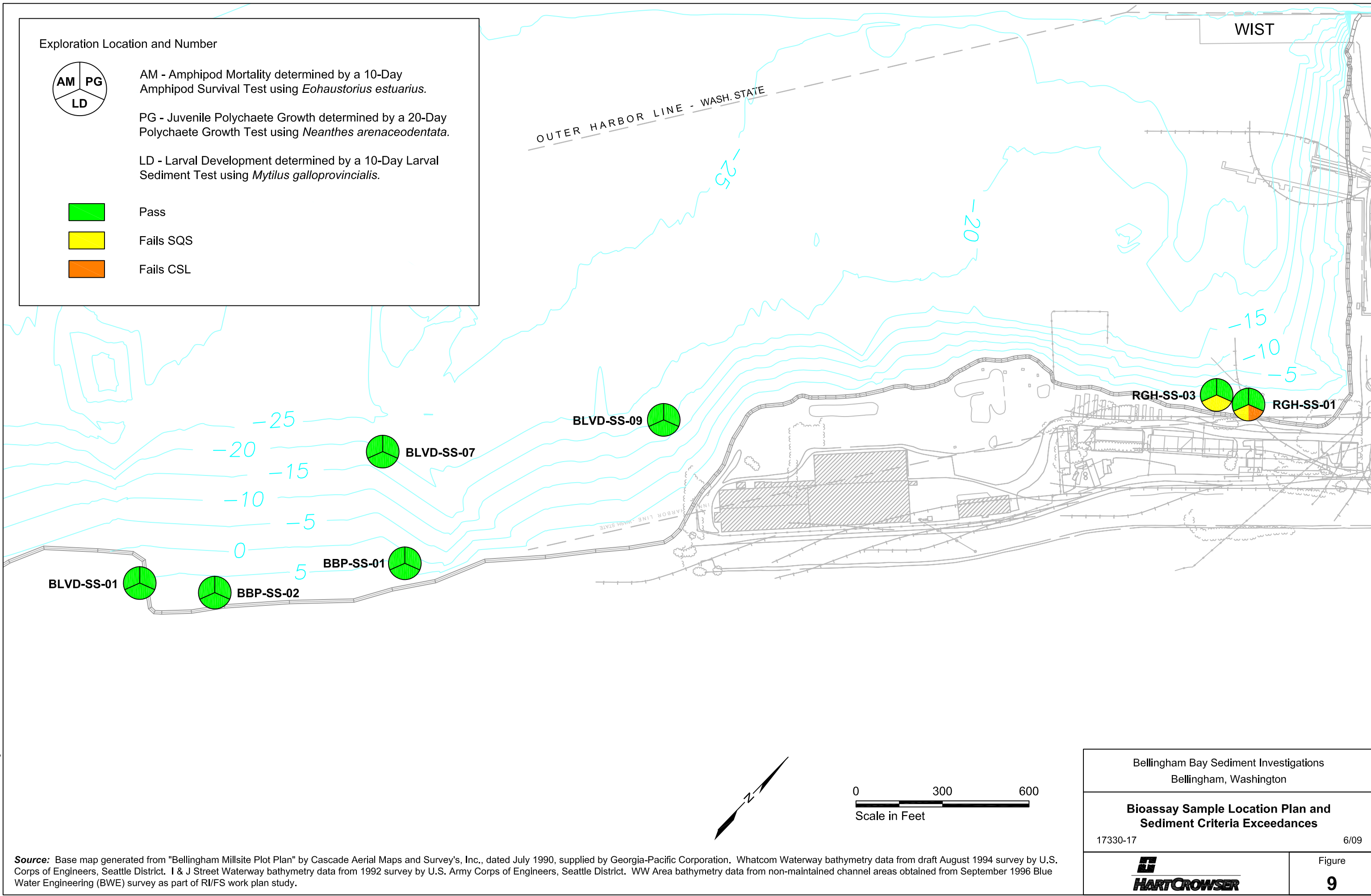


AM - Amphipod Mortality determined by a 10-Day Amphipod Survival Test using *Eohaustorius estuarius*.

PG - Juvenile Polychaete Growth determined by a 20-Day Polychaete Growth Test using *Neanthes arenaceodentata*.

LD - Larval Development determined by a 10-Day Larval Sediment Test using *Mytilus galloprovincialis*.

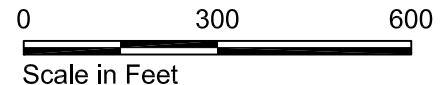
- Pass
- Fails SQS
- Fails CSL



EAL 06/22/09

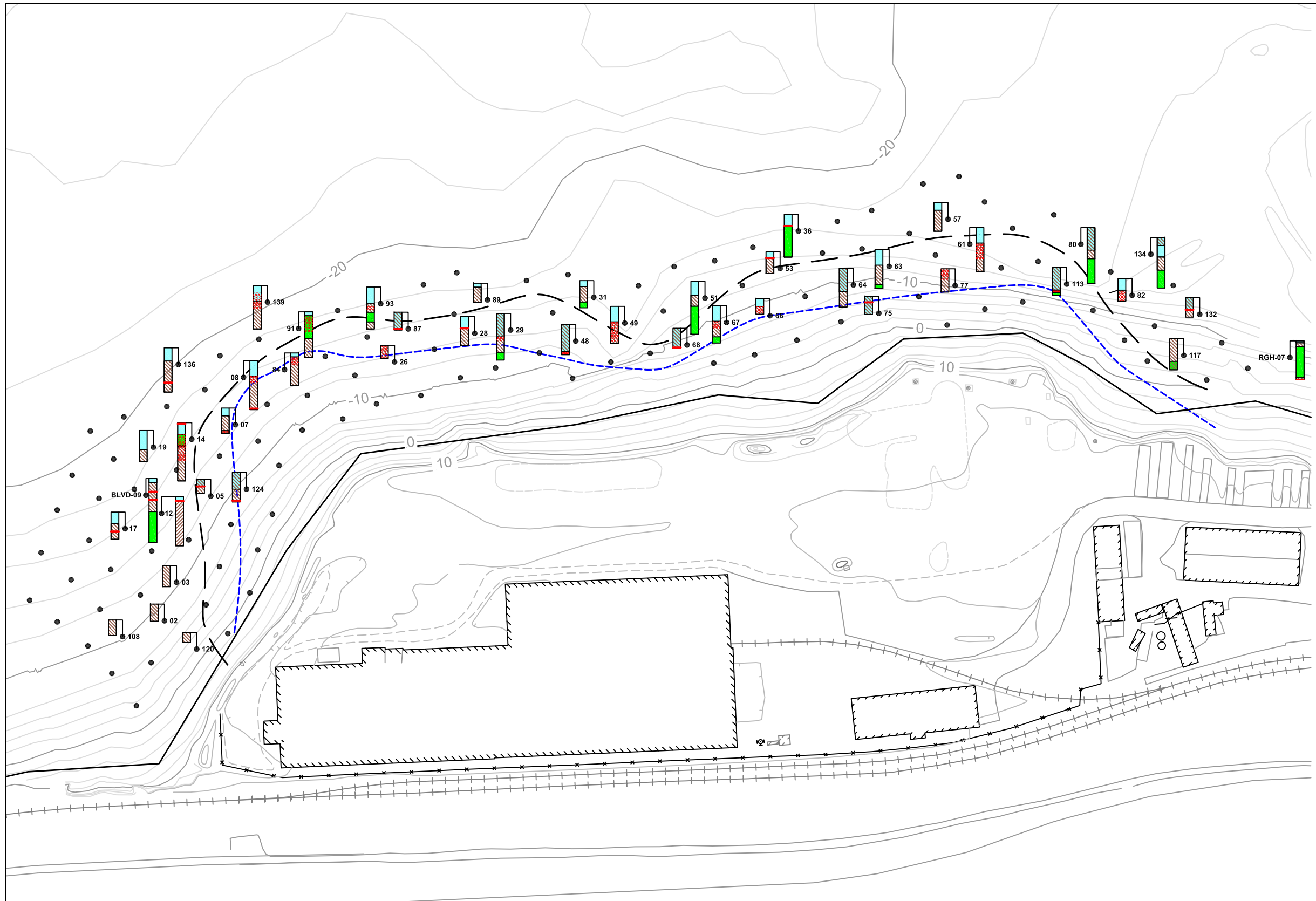
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**Source:** Base map generated from "Bellingham Millsite Plot Plan" by Cascade Aerial Maps and Survey's, Inc., dated July 1990, supplied by Georgia-Pacific Corporation. Whatcom Waterway bathymetry data from draft August 1994 survey by U.S. Corps of Engineers, Seattle District. I & J Street Waterway bathymetry data from 1992 survey by U.S. Army Corps of Engineers, Seattle District. WW Area bathymetry data from non-maintained channel areas obtained from September 1996 Blue Water Engineering (BWE) survey as part of RI/FS work plan study.



Bellingham Bay Sediment Investigations Bellingham, Washington	
<b>Bioassay Sample Location Plan and Sediment Criteria Exceedances</b>	
17330-17	6/09
Figure <b>9</b>	

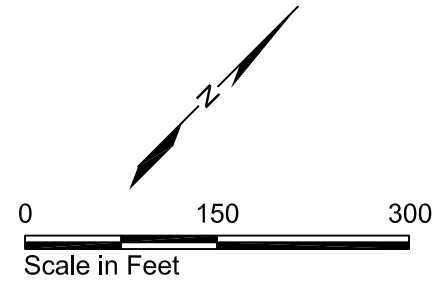





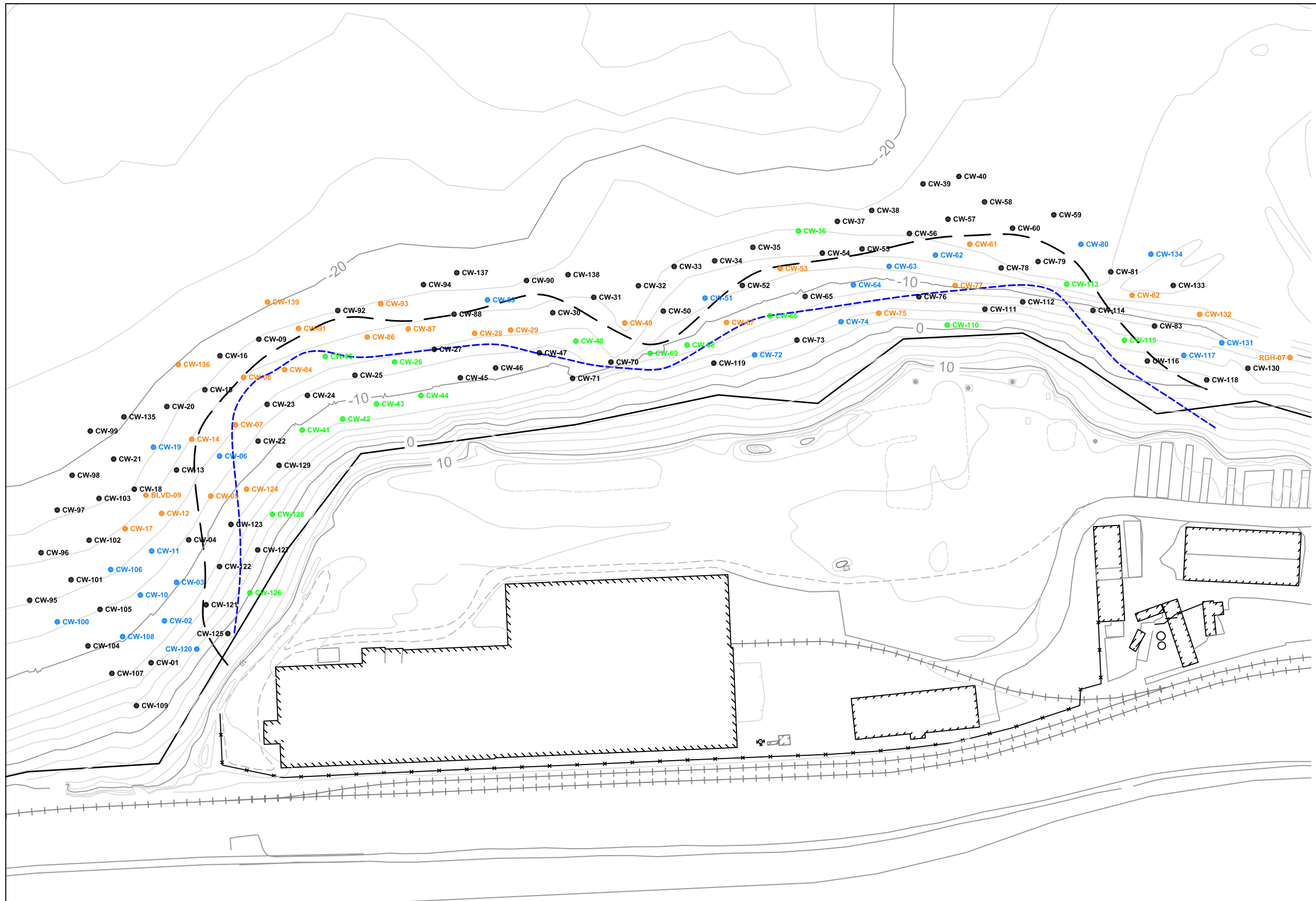
- 134 ● SPI Location and Number (Where Cored)
- Approximate Outer Boundary of Surface Debris (Landau 2007)
- - - Approximate Outer Boundary of Significant (i.e., Visually 50% or Greater) Surface Debris (Landau 2007)
- 0 ft | 5 ft | Vibracore Location
- Length Equivalent to Recovery (Uncorrected for Compaction)
- Recent Sediment Layer
- Sawdust/Wood Chips
- Refuse
- No Visual Evidence of Sawdust/Wood Chips or Refuse

EAL 06/22/09 1733017-016.dwg

**Reference:** Herrenkohl 2009. Final Report Focused Environmental Site Assessment Boulevard Park Shoreline and Overwater Walkway, Bellingham, WA.



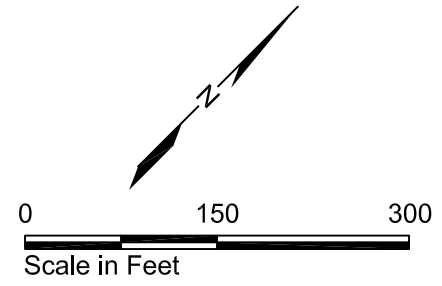
Bellingham Bay Sediment Investigations Bellingham Bay, Washington	
<b>Cornwall Avenue Landfill SPI and Core Location Plan Showing Core Material Types</b>	
17330-17	6/09
	Figure <b>10</b>




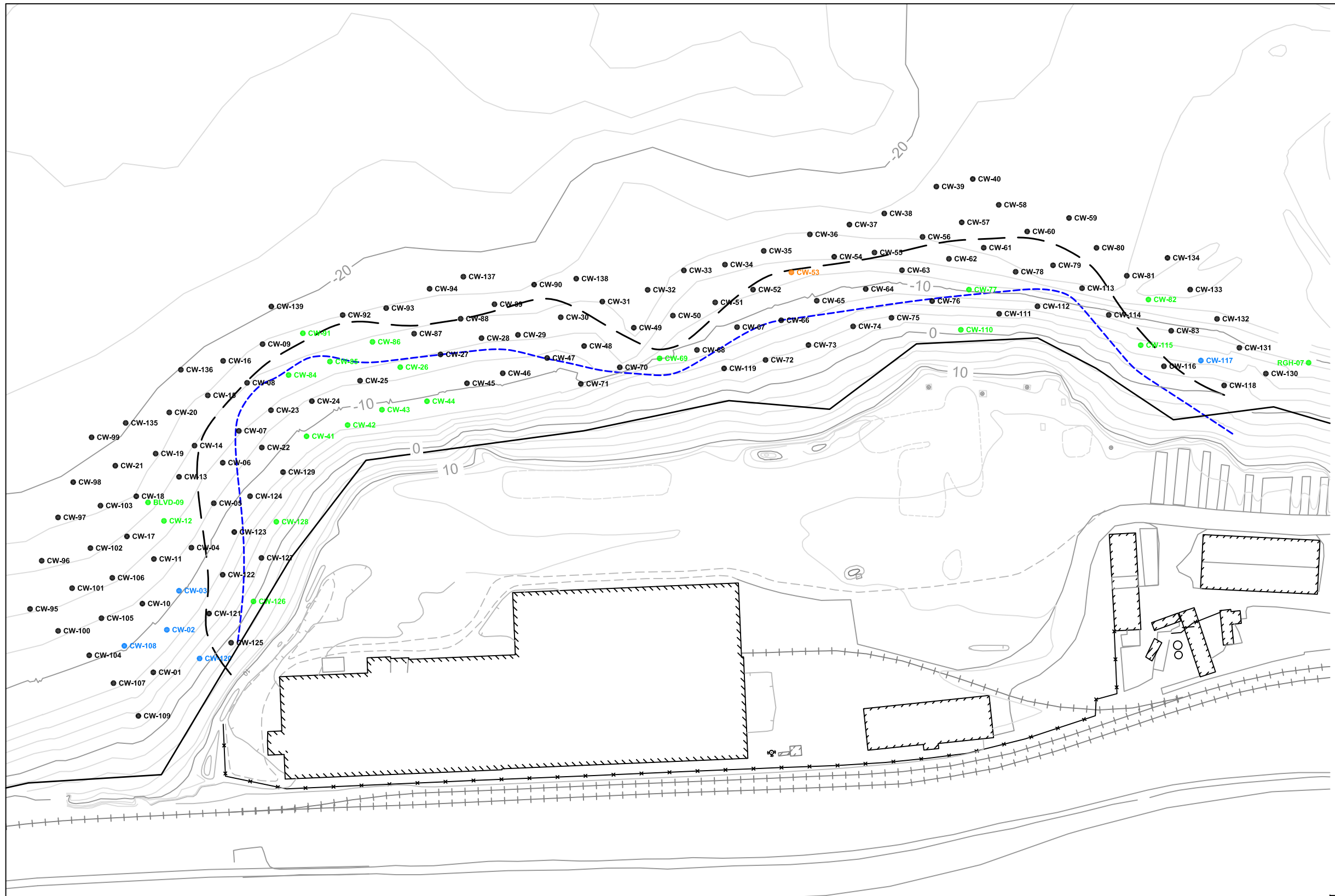
- CW-01 ● SPI and Core Location and Number
- Approximate Outer Boundary of Surface Debris (Landau 2007)
- - - Approximate Outer Boundary of Significant (i.e., Visually 50% or Greater) Surface Debris (Landau 2007)
- CW-02 ● Sawdust/Wood Chips Present
- CW-26 ● Municipal Refuse Present
- CW-12 ● Both Sawdust/Wood Chips and Municipal Refuse Present
- CW-01 ● No Visual Evidence of Sawdust/Wood Chips or Refuse

EAL 06/22/09 1733017-017.dwg

**Reference:** Herrenkohl 2009. Final Report Focused Environmental Site Assessment Boulevard Park Shoreline and Overwater Walkway, Bellingham, WA.



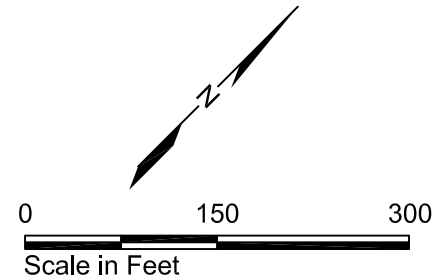
Bellingham Bay Sediment Investigations Bellingham Bay, Washington	
<b>Cornwall Avenue Landfill SPI and Core Location Plan Showing Wood Waste/Municipal Refuse Distribution</b>	
17330-17	6/09
	Figure <b>11</b>



- CW-01 ● SPI and Core Location and Number
- Approximate Outer Boundary of Surface Debris (Landau 2007)
- - - Approximate Outer Boundary of Significant (i.e., Visually 50% or Greater) Surface Debris (Landau 2007)
- CW-02 ● Greater than 1.0 Foot Accumulated Wood with < 1.0 Foot of Recent Overlying Sediment\*
- CW-12 ● Municipal Refuse Present with < 1.0 Foot of Recent Overlying Sediment\*\*
- CW-53 ● Both Sawdust/Wood Chips and Municipal Refuse Present Based on above Criteria
- CW-01 ● Less than 1 Foot of Wood\* or Municipal Refuse\*\*
- \* Wood debris present with > 50% sawdust or wood chips
- \*\* Visible refuse present

EAL 06/22/09 1733017-018.dwg

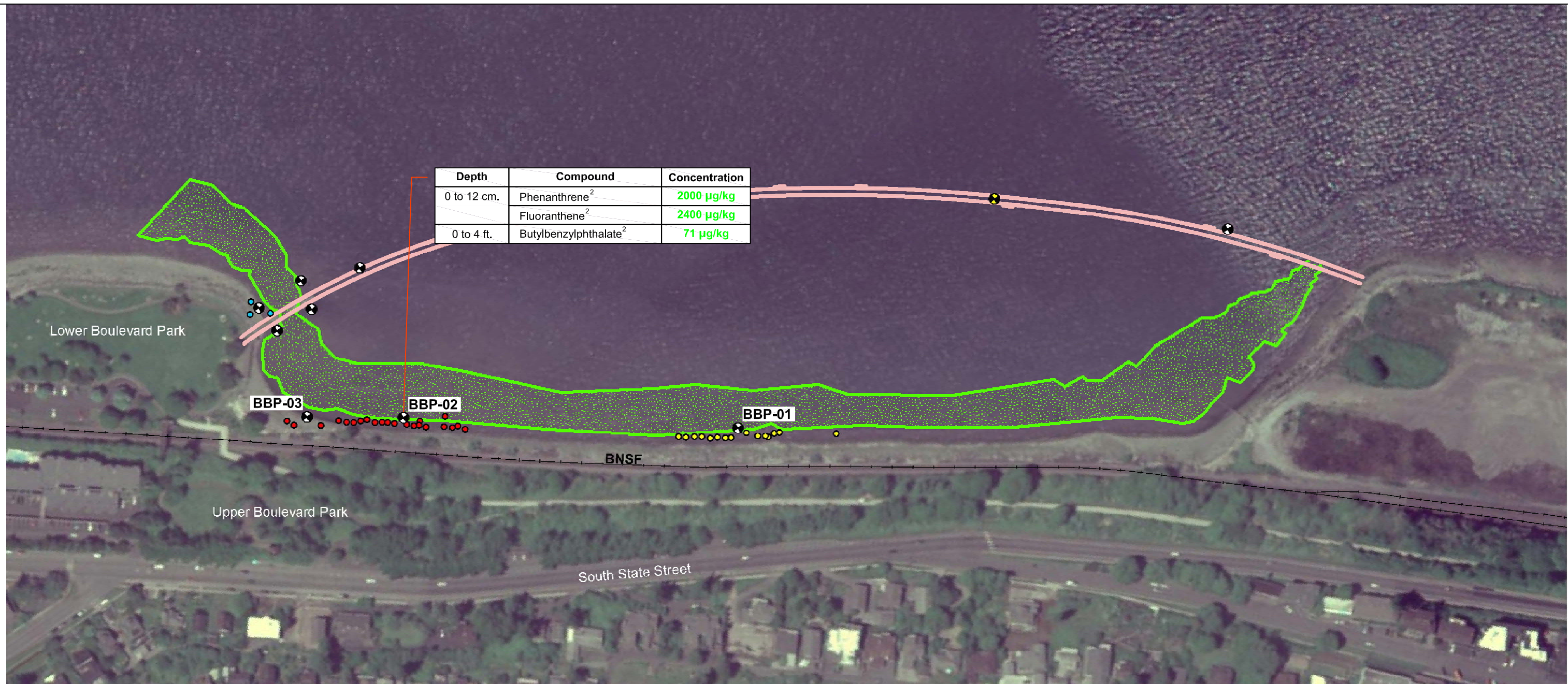
Reference: Herrenkohl 2009. Final Report Focused Environmental Site Assessment Boulevard Park Shoreline and Overwater Walkway, Bellingham, WA.



Bellingham Bay Sediment Investigations Bellingham Bay, Washington	
<b>Cornwall Avenue Landfill SPI and Core Location Plan Showing Wood Waste/Municipal Refuse Distribution with Recent Sedimentation</b>	
17330-17	6/09
	Figure <b>12</b>



EAL\_06/22/09



**Legend**

- BBP-01** Surface Sediment and Coring Location and Number
- Proposed City of Bellingham Surface Sediment and Coring Location Location Dependent on Alignment Option
- Boulevard Park Dock Pilings
- Boulevard Park North Pilings
- Boulevard Park Beach Pilings
- Proposed Walkway Alignment
- Railroad
- Eelgrass Survey

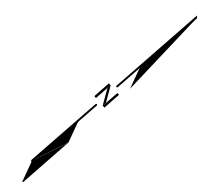
**AET Criteria**

**LAET** Green Indicates Exceedance of LAET

**Notes:**

- <sup>1</sup> SMS Criteria Applicable
- <sup>2</sup> AET Criteria Applicable
- No SQS, CSL, or 2LAET exceedances detected.

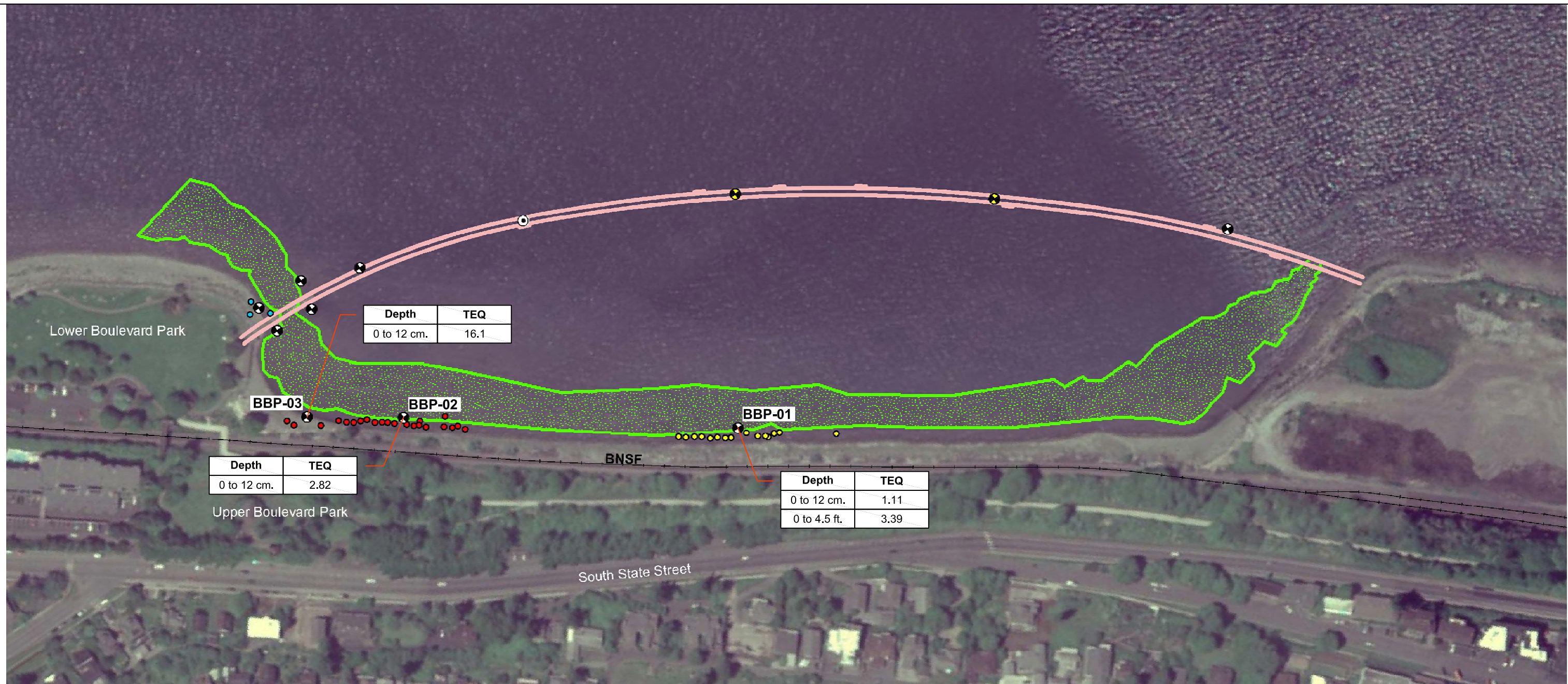
Source: Base map provided by Landau Associates (2007).



Bellingham Bay Sediment Investigations Bellingham, Washington	
<b>Bellingham Bay Piling Study Area Sample Location Plan and Sediment Criteria Exceedances</b>	
17330-17	6/09
	Figure <b>13</b>

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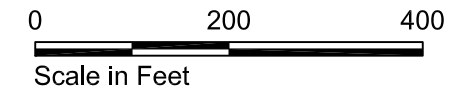
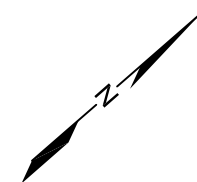
**Legend**

- BBP-01** Surface Sediment and Coring Location and Number
- Boulevard Park Dock Pilings
- Boulevard Park Beach Pilings
- Boulevard Park North Pilings
- Proposed Walkway Alignment
- Railroad
- Eelgrass Survey
- Proposed City of Bellingham Surface Sediment and Coring Location Location Dependent on Alignment Option

**Notes:**

1. Undetected congeners are included in the TEQ summation using one-half the detection limits.
2. Bellingham Bay background TEQ concentrations range from 1.5 to 14.3 ng/kg.
3. TEQ presented in ng/kg.

Source: Base map provided by Landau Associates, 2007.



Bellingham Bay Sediment Investigations Bellingham, Washington	
<b>Bellingham Bay Piling Study Area Dioxin TEQ Data</b>	
17330-17	6/09
	Figure <b>14</b>



**APPENDIX A  
FIELD DOCUMENTATION**

**VIBRACORE LOGS**

**Table A-1 - Sample Location Coordinates**

Location	Actual		Mudline Elevation in Feet (MLLW)
	NAD 1983, SPCS, WA. N.		
	Northing	Easting	
<b>R.G. Haley Site</b>			
<b>Surface Sediment Samples</b>			
RGH-SS-01	639752.23	1240402.80	-11.3
RGH-SS-02	639717.65	1240352.04	-10.1
RGH-SS-03	639695.17	1240299.76	-12.5
<b>Sediment Core Samples</b>			
RGH-SC-01	639752.23	1240402.80	-8.7
RGH-SC-02	639717.65	1240352.04	-6.2
RGH-SC-03	639695.17	1240299.76	-5.3
RGH-SC-04	639805.12	1240421.34	-2.0
RGH-SC-05	639800.84	1240362.04	-3.3
RGH-SC-06	639777.61	1240293.09	-1.6
RGH-SC-07	639473.31	1239872.88	-3
RGH-SC-08	639591.38	1240010.19	-5.7
RGH-SC-09	639685.89	1240225.03	-12.8
<b>Bellingham Bay Piling Study</b>			
<b>Surface Sediment Samples</b>			
BBP-SS-01	637287.63	1238685.95	0.2
BBP-SS-02	636748.57	1238283.37	-5.6
BBP-SS-03	636590.48	1238170.88	-6.6
<b>Sediment Core Samples</b>			
BBP-SC-01	637287.63	1238685.95	-15.1
BBP-SC-02	636748.57	1238283.37	-12.4
BBP-SC-03(a)	636590.48	1238170.88	-2.7
<b>Bay-Wide Dioxin Background Study</b>			
<b>Surface Sediment Samples</b>			
BBDx-SS-01	643795.15	1232478.73	-28.6
BBDx-SS-02	642566.99	1237078.74	-18.7
BBDx-SS-03	638732.06	1237644.31	-30.3
BBDx-SS-04	637137.64	1233722.86	-62.1
BBDx-SS-05	636558.88	1229401.50	-74.4
BBDx-SS-06	633754.73	1235086.13	-42.2
<b>Samish Bay Reference</b>			
Samish Bay Ref1	581839.03	1226227.52	--
Samish Bay Ref2	581861.41	1229858.57	-16.4
Samish Bay Ref3	581599.03	1227888.38	-16.6
<b>Boulevard Park Study</b>			
<b>Surface Sediment Samples</b>			
BLVD-SS-01	636588.54	1238072.56	-2.9
BLVD-SS-02	636643.64	1237999.73	-4.5
BLVD-SS-03	636733.15	1237967.07	-14.3
BLVD-SS-04	636722.77	1238024.78	-12.5
BLVD-SS-05	636833.66	1238044.08	-20.8
BLVD-SS-06	637140.62	1238164.99	-25.0
BLVD-SS-07	637512.34	1238356.90	-23.3
BLVD-SS-08	637941.27	1238659.87	-22.8
BLVD-SS-09	638280.40	1238980.60	-17.3

**Table A-1 - Sample Location Coordinates**

Location	Actual		Mudline Elevation in Feet (MLLW)
	NAD 1983, SPCS, WA. N.		
	Northing	Easting	
<b>Sediment Core Samples</b>			
BLVD-SC-01	636587.32	1238072.94	-3.5
BLVD-SC-02	636647.73	1238035.63	-5.7
BLVD-SC-03	636733.68	1237970.70	-11.2
BLVD-SC-04	636724.58	1238025.62	-13.1
BLVD-SC-05	636835.59	1238039.29	-22.5
BLVD-SC-06	637143.69	1238163.85	-28.4
BLVD-SC-07	637512.36	1238356.10	-24.2
BLVD-SC-08	637941.21	1238662.69	-24.0
BLVD-SC-09	638278.00	1238979.34	-17.1

Coordinates are in Washington State Plane North NAD83

(a) Sample not collected due to refusal.



**Table A-2 - Surface Sediment Grab Sample Descriptions**

Sample Number	Collection Date	Visual Sediment Description	Comments
<b>R.G. Haley Site</b>			
RGH-SS-01	8/26/2008	Saturated, very loose, black-gray, silty, sandy GRAVEL (GM) with small cobbles and moderate shell fragments.	van Veen power grab. Combined three grabs for chemistry and bioassay. Crab, barnacles, bivalves, gastropods. Broken glass and brick.
RGH-SS-02	8/26/2008	Saturated, very loose, black, silty, sandy GRAVEL (GM) with moderate cobbles.	van Veen power grab. Combined two grabs for chemistry. Barnacles, mussels, crabs, Ulva sp. Refuse including glass, brick, wire.
RGH-SS-03	8/26/2008	Saturated, very loose, black, silty SAND (SM) with small cobbles and gravel, and moderate shell fragments.	van Veen power grab. Combined two grabs for chemistry and bioassay. Barnacles, cockle, crabs, polychaete. Brick fragments.
<b>Bellingham Bay Pilings Study Area</b>			
BBP-SS-01	8/26/2008	Saturated, very loose, black-gray, silty SAND (SM), with scattered gravels and cobbles, and moderate shell fragments.	van Veen power grab. Combined five grabs for chemistry and bioassay. Crab, eelgrass, gastropod. Wood fragments and slight sheen on one grab.
BBP-SS-02	8/26/2008	Saturated, very loose, black, silty SAND (SM), with scattered gravel and cobbles, and moderate shell fragments.	van Veen power grab. Combined two grabs for chemistry and bioassay. Hermit crab, eelgrass, polychaete. Metal cable, rope, and wood debris.
BBP-SS-03	8/26/2008	Saturated, very soft, dark brown, fine organic PEAT (PT) with sand and scattered gravels and shell fragments.	van Veen power grab. Combined two grabs for chemistry and bioassay. Worm. Wood debris, and slight sheen on one grab.
<b>Bay-Wide Dioxin Samples</b>			
BBDx-SS-01	9/19/2008	Saturated, very soft, black-gray, sandy SILT (ML).	Double van Veen grab. Worms.
BBDx-SS-02	9/19/2008	Saturated, very soft, black-gray, sandy, clayey SILT (CL).	Double van Veen grab. Worms.
BBDx-SS-03	9/19/2008	Saturated, very soft, gray-black, clayey SILT (CL) with sand.	Double van Veen grab. Worms.
BBDx-SS-04	9/19/2008	Saturated, very soft, gray-black, clayey SILT (CL) with sand.	Double van Veen grab. Worms, eelgrass, Macoma. Wood debris.
BBDx-SS-05	9/18/2008	Saturated, very soft, black-gray, sandy SILT (ML).	Double van Veen grab. Worms, sea pen.
BBDx-SS-06	9/18/2008	Saturated, very soft, black to light gray, sandy SILT (ML) with clay.	Double van Veen grab. Worms, shell fragments. Wood debris.
<b>Bioassay Reference Sample</b>			
Samish Bay Ref1	8/29/2008	Saturated, very loose, gray to olive, silty SAND (SM).	80% fines. Abundant worms, tubes.

Note: REF SM-33 becomes Samish Bay Ref1

# Key to Exploration Logs

## Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:

Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

### Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

### Sampling Test Symbols

	1.5" I.D. Split Spoon		Grab (Jar)		3.0" I.D. Split Spoon
	Shelby Tube (Pushed)		Bag		
	Cuttings		Core Run		

### SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
		CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
		CLAYEY SANDS, SAND - CLAY MIXTURES		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	Liquid Limit LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
		Liquid Limit GREATER THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		Liquid Limit GREATER THAN 50		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	Liquid Limit GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
		Liquid Limit GREATER THAN 50		CH	INORGANIC CLAYS OF HIGH PLASTICITY
		Liquid Limit GREATER THAN 50		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

### Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

### Minor Constituents

### Estimated Percentage

Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

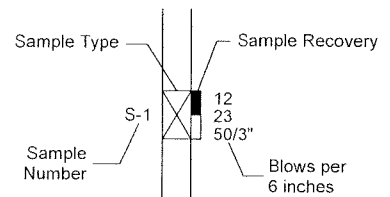
### Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer
	Approximate Compressive Strength in TSF
TV	Torvane
	Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
	Water Content in Percent
	Liquid Limit
	Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

### Groundwater Indicators

	Groundwater Level on Date or (ATD) At Time of Drilling
	Groundwater Seepage (Test Pits)

### Sample Key



**HARTCROWSER**

17330-17

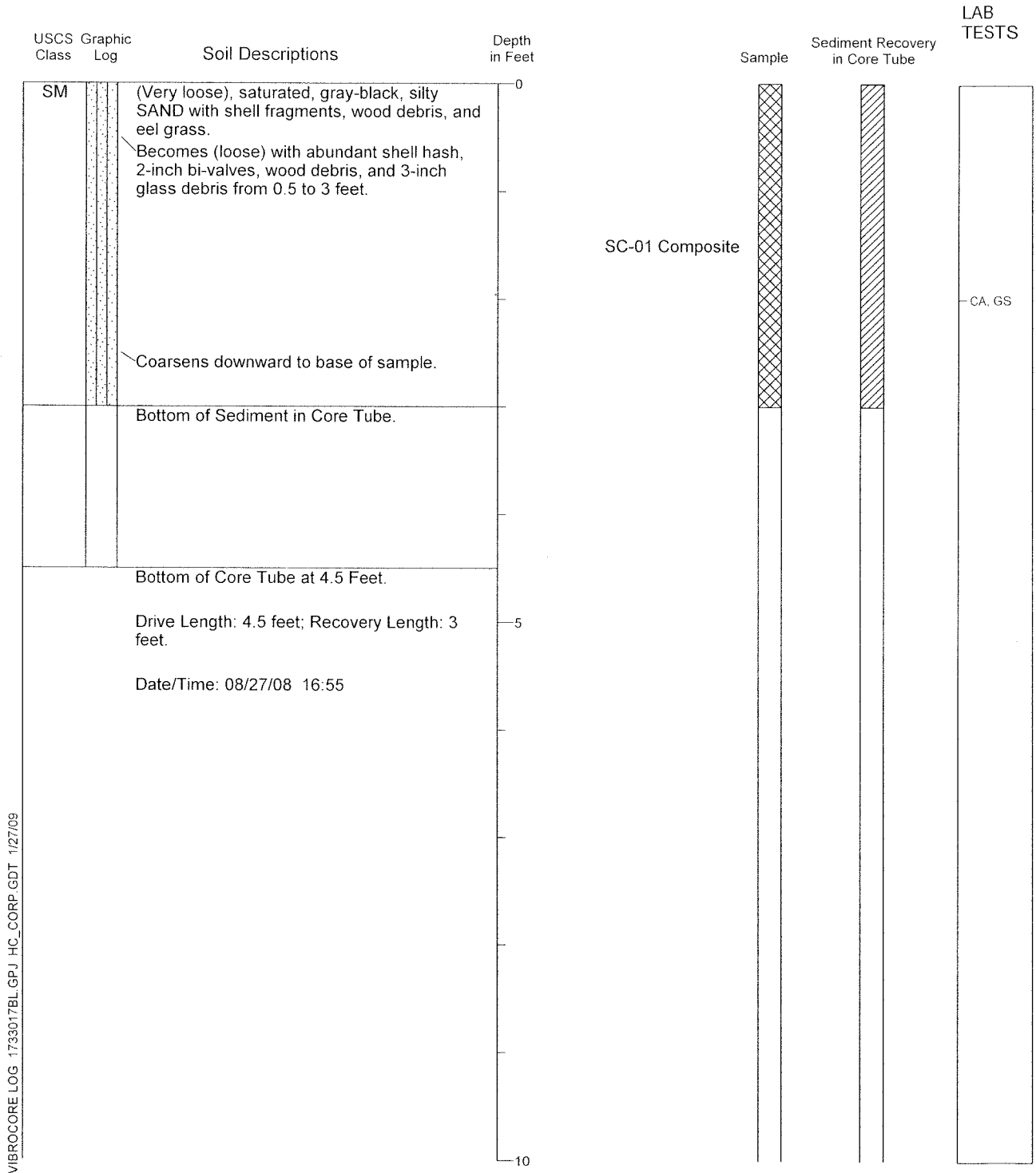
8/08

Figure A-1

# Vibrocure Log BBP-SC-01

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -15.1 Feet  
 Water Depth in Feet: 14.3 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 637287.6  
 Easting: 1238685.9  
 Logged By: C. Rust Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.



**HARTCROWSER**

17330-17

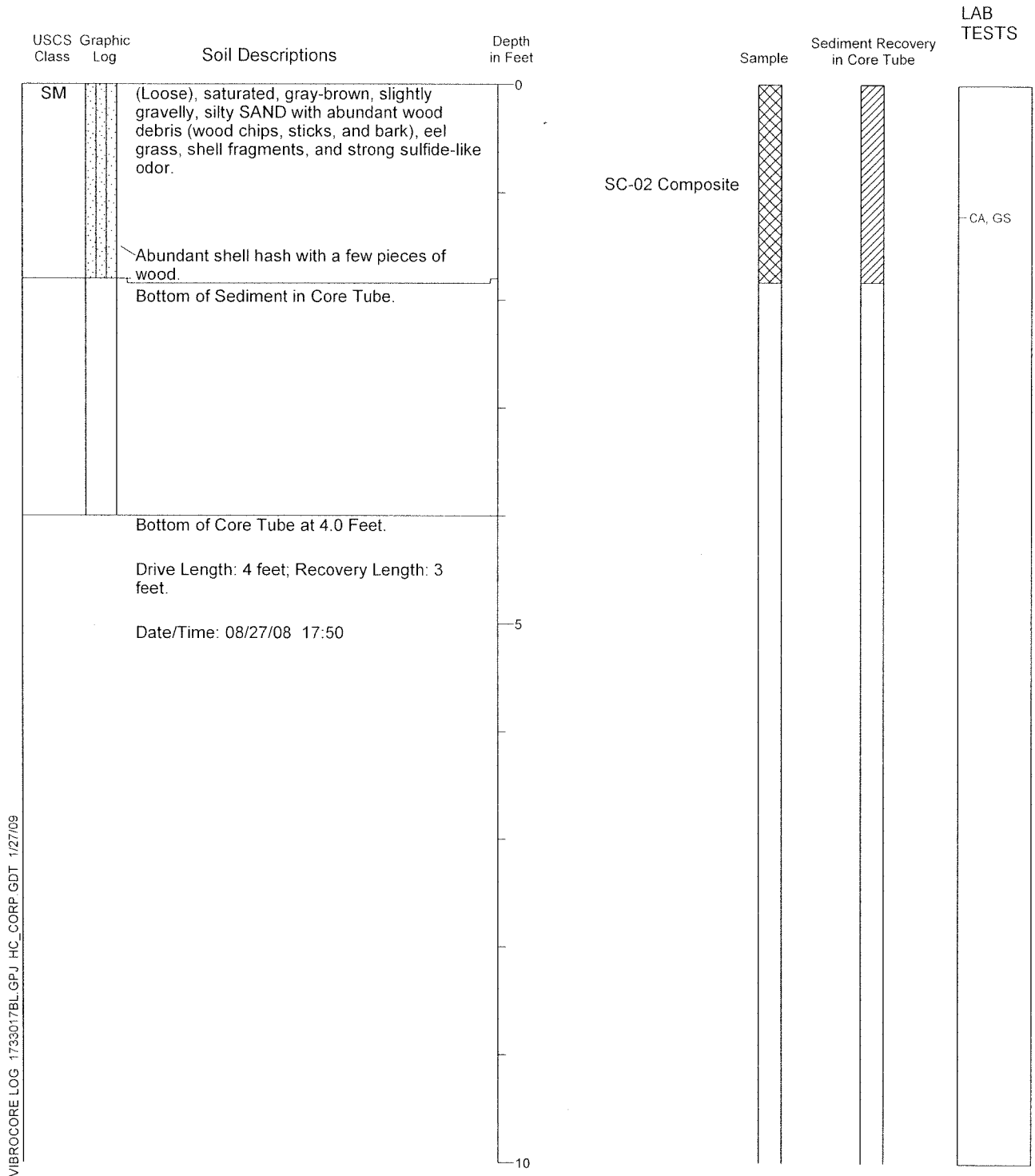
8/08

Figure A-2

# Vibrocure Log BBP-SC-02

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -12.4 Feet  
 Water Depth in Feet: 12.6 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 636748.6  
 Easting: 1238283.4  
 Logged By: C. Rust Reviewed By: G. Both



VIBROCORE LOG 1733017BL.GPJ\_HC\_CORP.GDT 1/27/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.



**HARTCROWSER**

17330-17

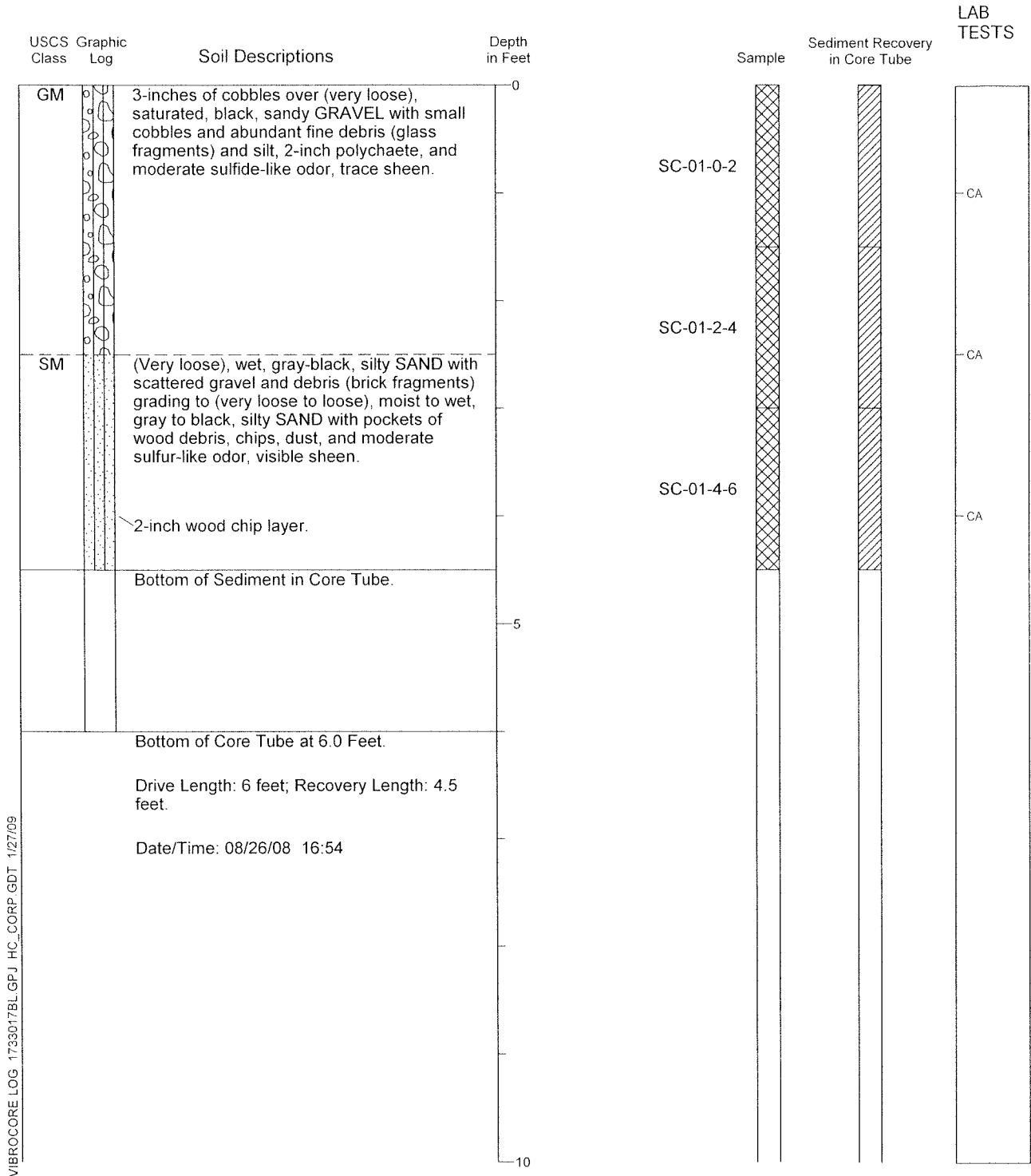
8/08

Figure A-3

# Vibrocure Log RGH-SC-01

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -8.7 Feet  
 Water Depth in Feet: 8.8 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 639752.2  
 Easting: 1240402.8  
 Logged By: M. Herrenkohl Reviewed By: G. Both



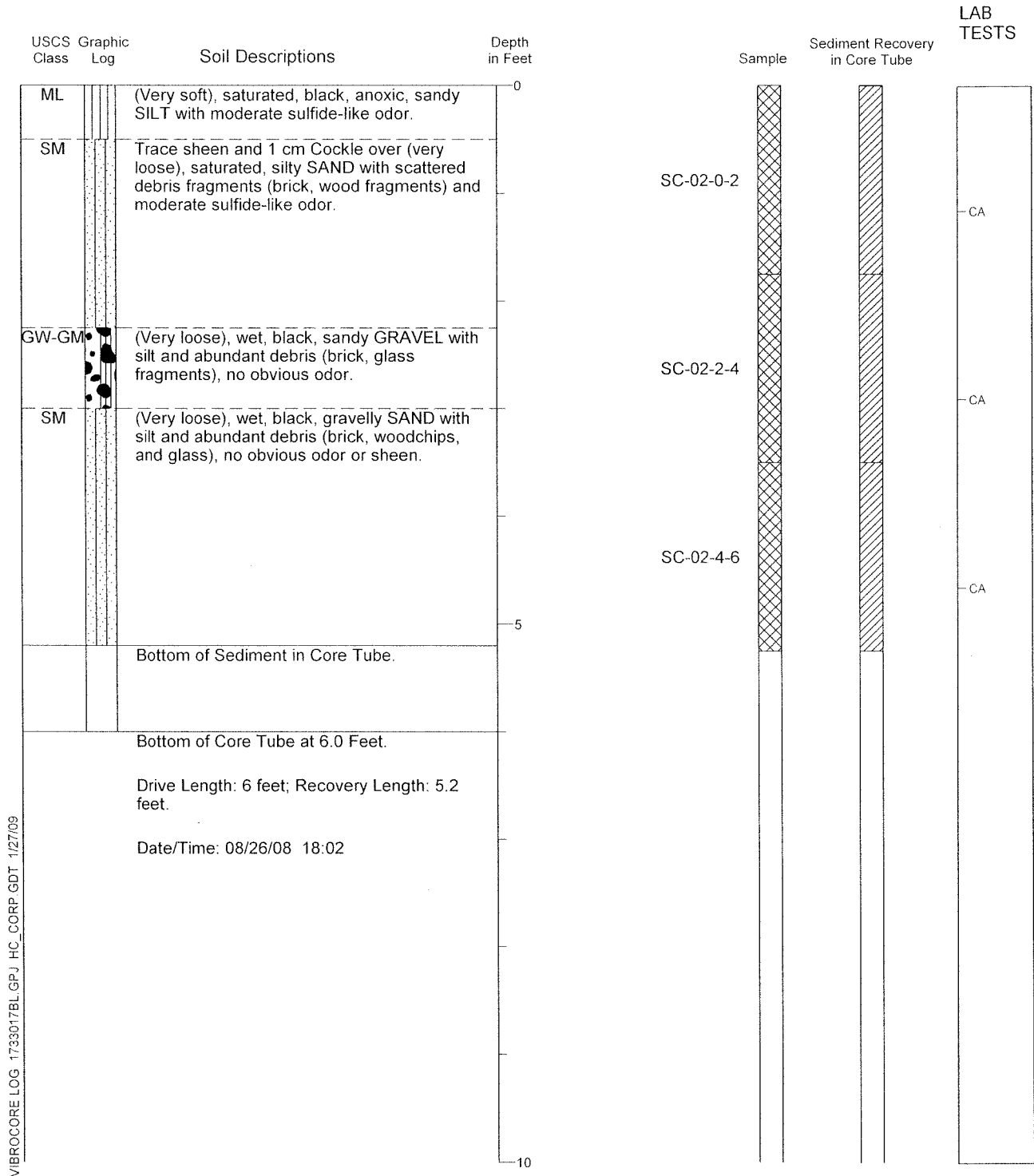
VIBROCURE LOG 1733017BL.GPJ\_HC\_CORP.GDT 1/27/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

# Vibracore Log RGH-SC-02

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -6.2 Feet  
 Water Depth in Feet: 8.2 Feet

Type of Sample: Vibracore  
 Core Diameter: 4 inches  
 Northing: 639717.7  
 Easting: 1240352  
 Logged By: M. Herrenkohl Reviewed By: G. Both



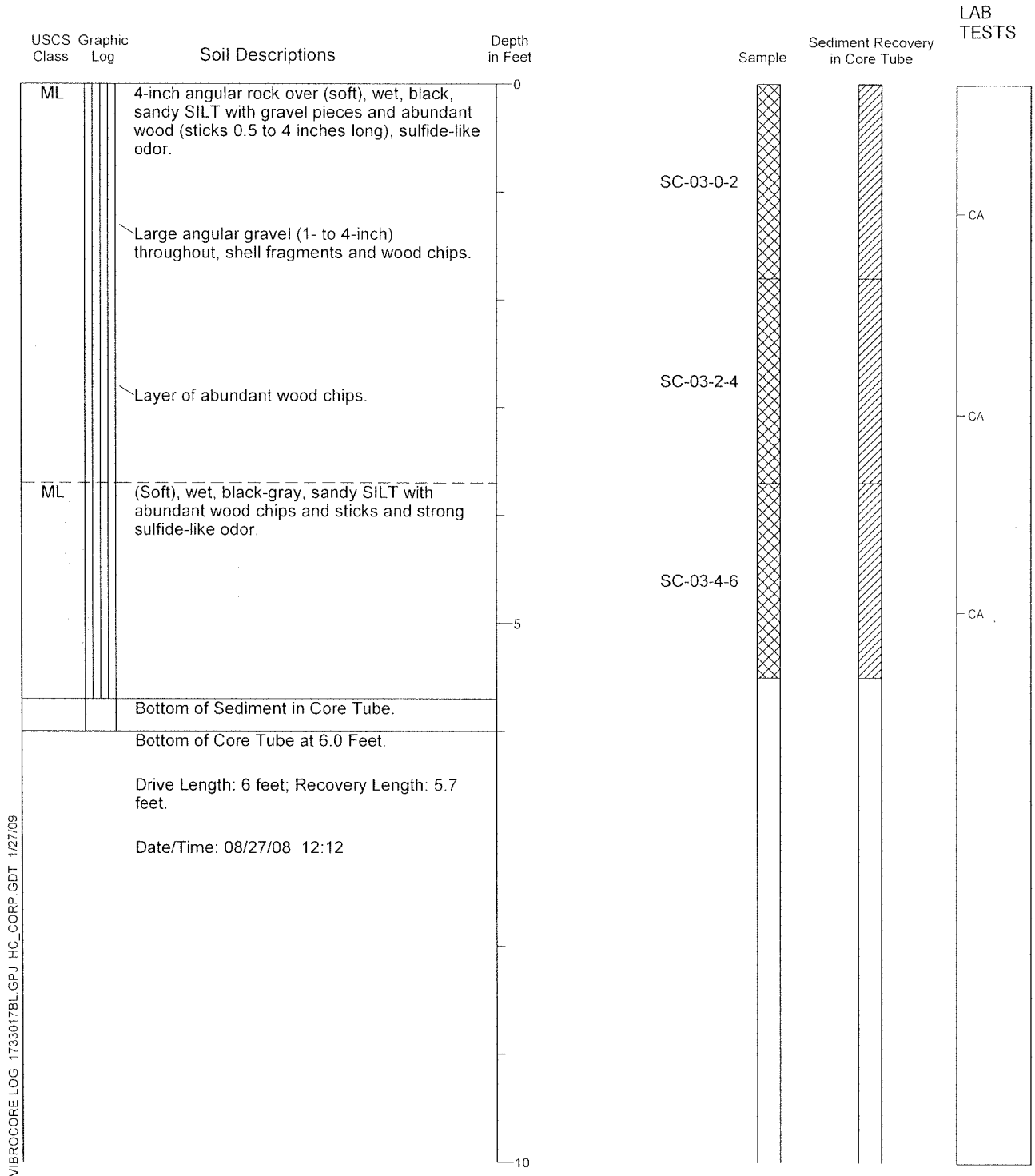
VIBROCORE LOG 1733017BL.GPJ\_HC\_CORP.GDT 1/27/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

# Vibracore Log RGH-SC-03

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -5.3 Feet  
 Water Depth in Feet: 9 Feet

Type of Sample: Vibracore  
 Core Diameter: 4 inches  
 Northing: 639695.2  
 Easting: 1240299.8  
 Logged By: C. Rust Reviewed By: G. Both



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.



**HARTCROWSER**

17330-17

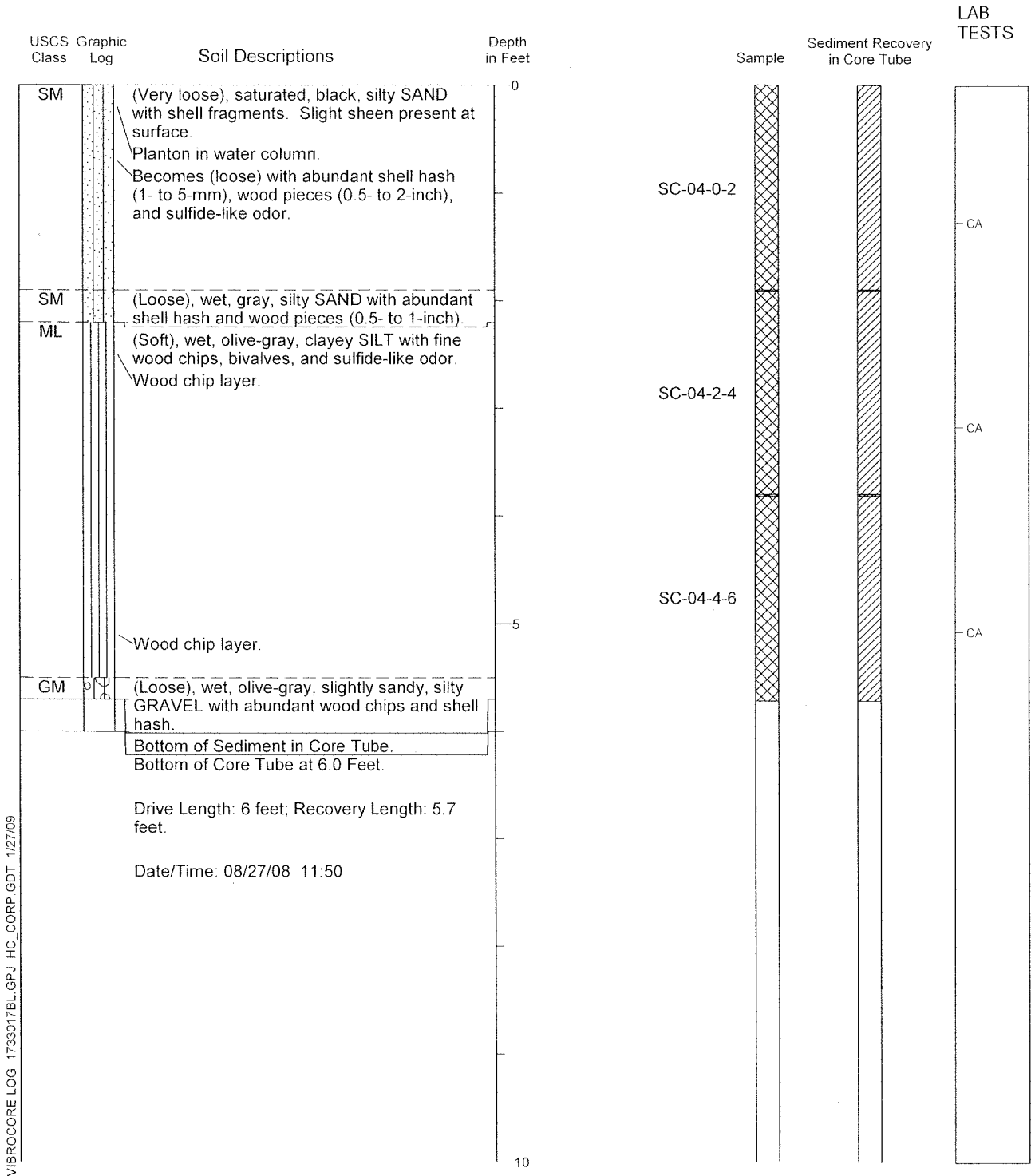
8/08

Figure A-6

# Vibracore Log RGH-SC-04

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -2.0 Feet  
 Water Depth in Feet: 6.5 Feet

Type of Sample: Vibracore  
 Core Diameter: 4 inches  
 Northing: 639805.1  
 Easting: 1240421.3  
 Logged By: C. Rust Reviewed By: G. Both



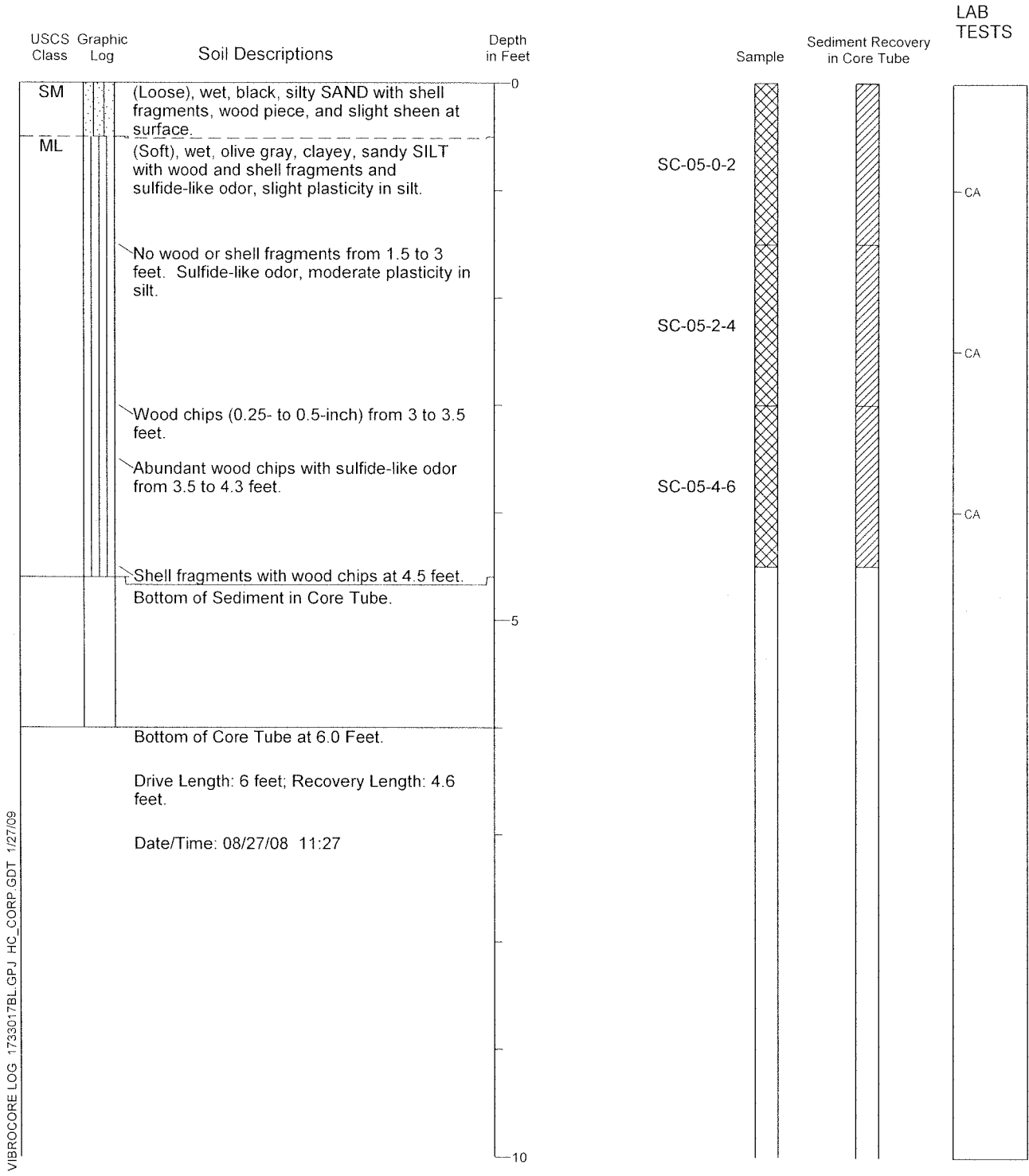
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.



# Vibrocure Log RGH-SC-05

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -3.3 Feet  
 Water Depth in Feet: 8.3 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 639800.8  
 Easting: 1240362  
 Logged By: C. Rust Reviewed By: G. Both



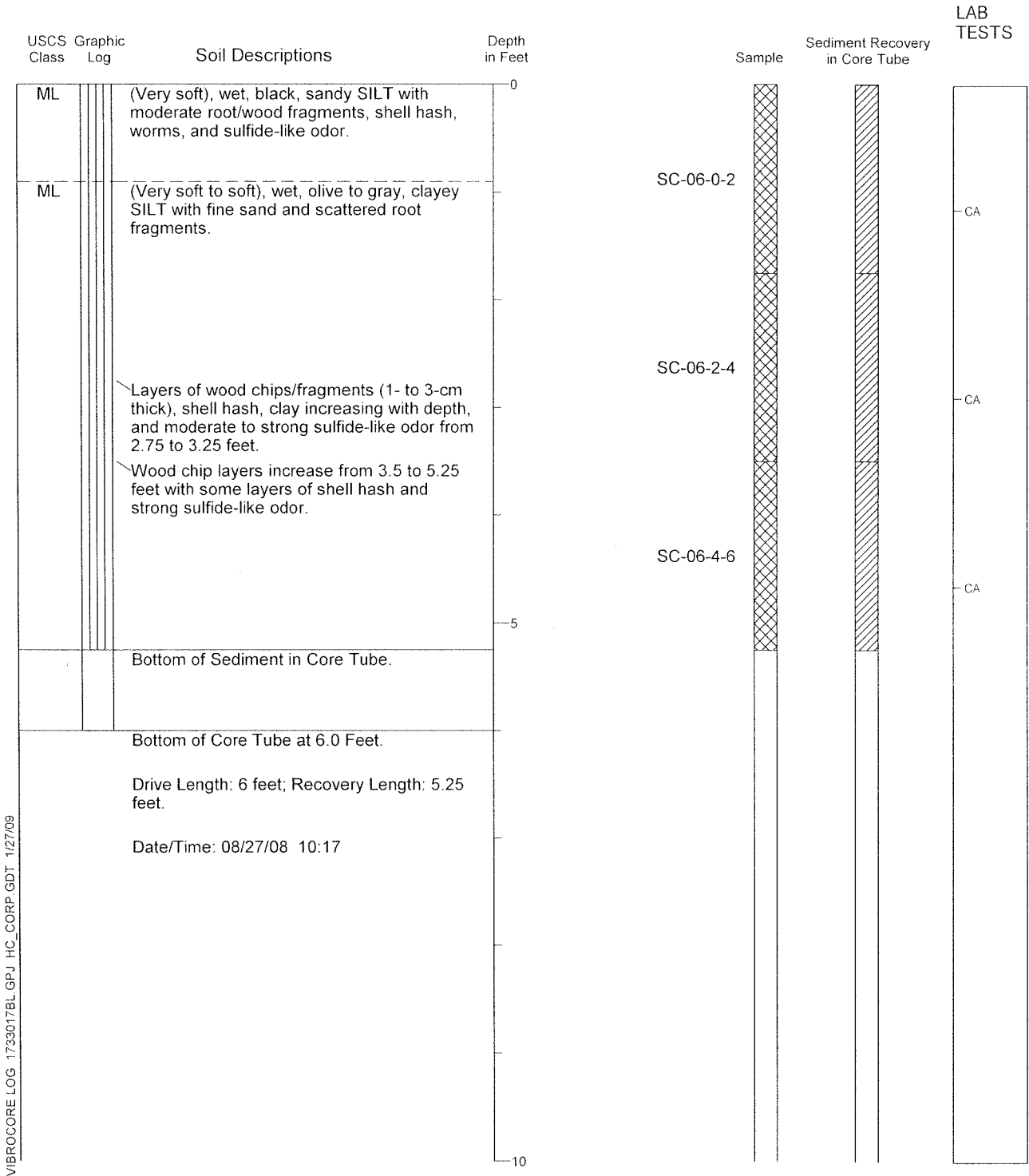
VIBROCURE LOG 1733017BL.GPJ HC\_CORP.GDT 1/27/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

# Vibrocure Log RGH-SC-06

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -1.6 Feet  
 Water Depth in Feet: 8.4 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 639777.6  
 Easting: 1240293.1  
 Logged By: M. Herrenkohl Reviewed By: G. Both



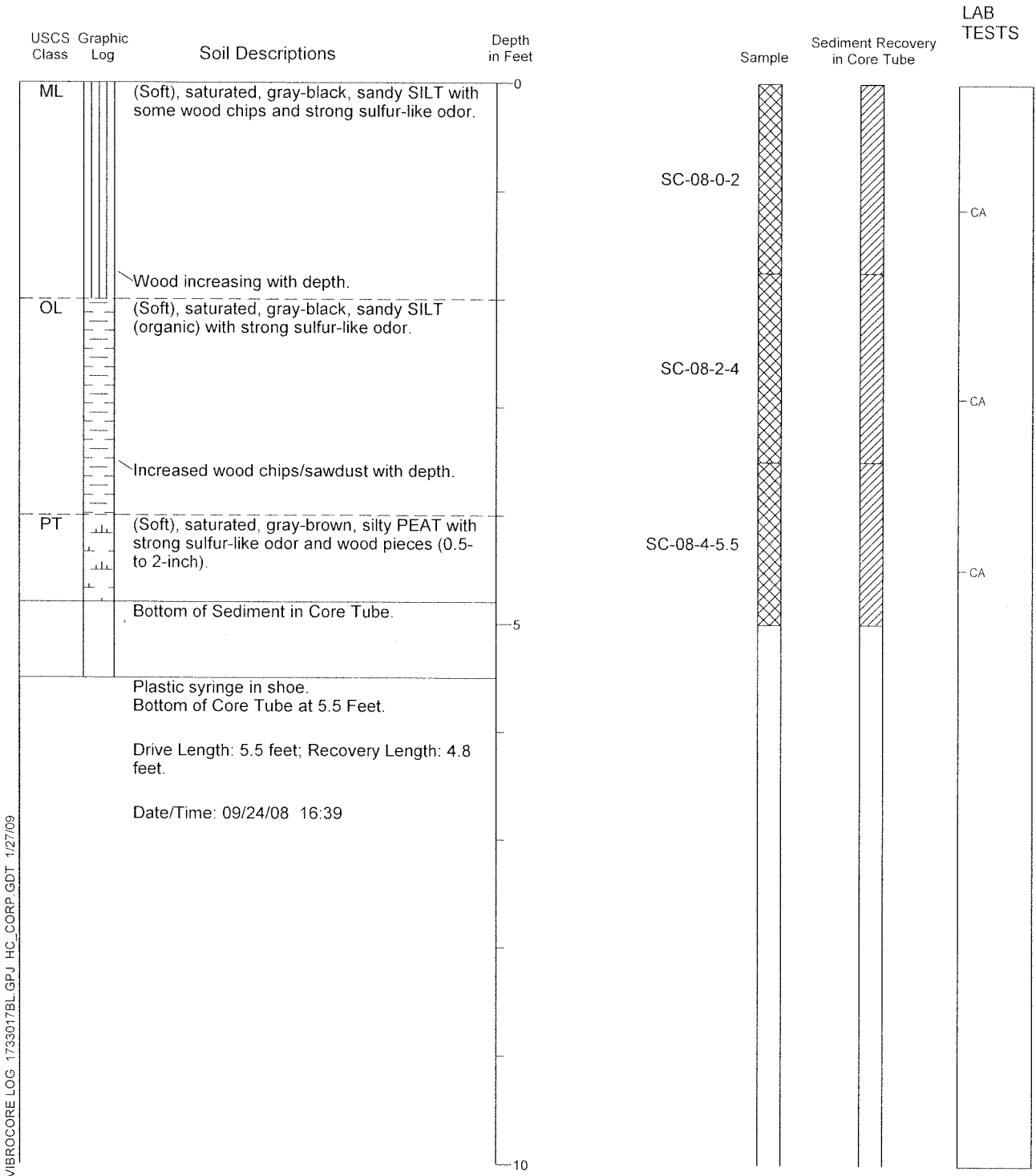
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.



# Vibrocure Log RGH-SC-08

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -5.7 Feet  
 Water Depth in Feet: 18 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 639591.4  
 Easting: 1240010.2  
 Logged By: C. Rust Reviewed By: G. Both



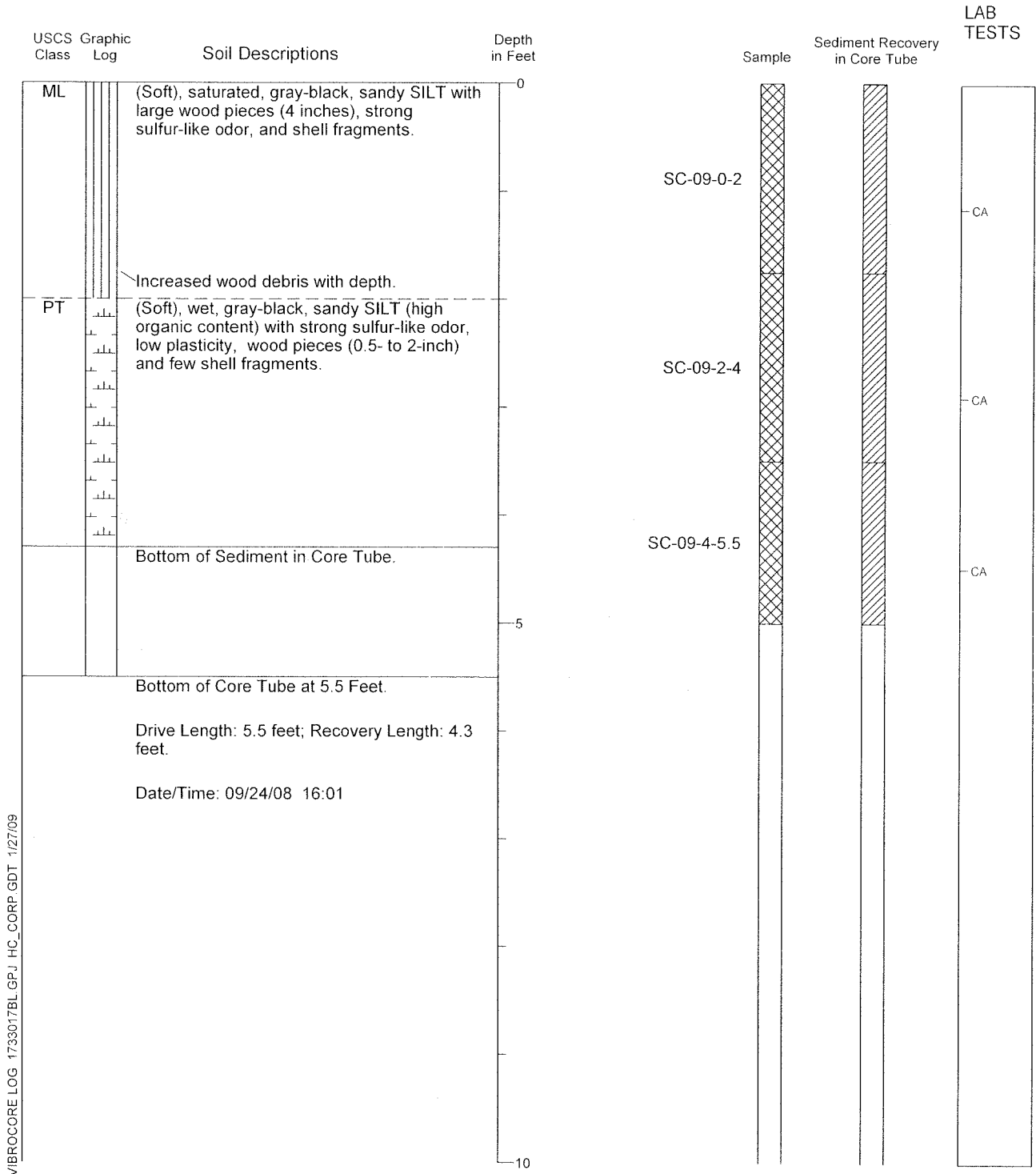
VIBROCURE LOG: 1733017BL.GPJ\_HC\_CORP.GDT 1/27/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

# Vibrocure Log RGH-SC-09

Location: See Figure 2.  
 Mudline Elevation in Feet (MLLW): -12.8 Feet  
 Water Depth in Feet: 20.5 Feet

Type of Sample: Vibrocure  
 Core Diameter: 4 inches  
 Northing: 639685.9  
 Easting: 1240225  
 Logged By: C. Rust Reviewed By: G. Both



VIBROCURE LOG 1733017BL GP.J HC\_CORP.GDT 1/27/09

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. Sample intervals for chemical analysis were corrected for percent recovery.

**APPENDIX B  
CHEMICAL DATA QUALITY REVIEW AND  
CERTIFICATES OF ANALYSIS**

## **APPENDIX B-1 CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS**

### ***Chemical Data Quality Review for R. G. Haley Site***

Three surface sediment samples and eighteen sediment core samples were collected from the R.G. Haley site on August 26 and 27, 2008. Nine sediment core samples were collected on September 24, 2008. The samples were submitted to Analytical Resources, Inc. (ARI), in Tukwila, WA for analysis. Sample identifications, laboratory job numbers, and analytical tests are summarized in Table 4.

The samples were received at the laboratory with temperatures ranging from  $-0.2^{\circ}\text{C}$  to  $6^{\circ}\text{C}$ . As sediment samples were frozen upon arrival, no results were qualified based on their temperature.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review followed the format outlined in the National Functional Guidelines for Organic Data Review (EPA 1999) and the National Functional Guidelines for Inorganic Data Review (EPA 2004) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs);
- Internal standard (IS) recoveries (where applicable);
- Calibration criteria (where applicable); and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

## **Diesel- and Motor Oil-Range Hydrocarbons**

### ***Analytical Methods***

The samples were extracted and the extracts were acid and silica gel cleaned. The samples were analyzed by gas chromatography with a flame ionization detector (GC/FID) following the NWTPH-Dx method.

### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

### ***Surrogate Recovery***

Surrogate recoveries were within laboratory control limits.

### ***Laboratory Control Sample (LCS) Recovery***

Laboratory control sample recoveries were within laboratory control limits.

### ***Matrix Spike (MS) Recovery***

MS and MSD recoveries were within laboratory control limits with the following exceptions:

- For sample RGH-SC-06-4-6', the MS exceeded the control limits, while the MSD was within the control limits, with the RPD outside of the control limits due to sample heterogeneity. No results were qualified.
- For sample RGH-SC-07-0-2', the MS exceeded the control limits, while the MSD was within the control limits, due to sample heterogeneity. No results were qualified.



### ***Laboratory Duplicate Sample Analysis***

No laboratory duplicate sample analyses were performed.

### ***Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)***

The initial calibration curves and CCVs were within acceptance criteria.

### ***Semivolatile Organic Compounds (SVOCs)***

#### ***Analytical Methods***

The samples were extracted by EPA Method 3550B (sonication) following PSEP modifications to attain lower reporting limits. The samples were analyzed by gas chromatography/mass spectrometry (GC/MS) following EPA Method 8270D.

#### ***Sample Holding Times***

The samples were prepared and analyzed within the holding time limits of 6 months for frozen samples.

#### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Reporting limits for some compounds were elevated due to matrix interferences.

#### ***Blank Contamination***

The method blank was non-detect with the following exceptions: Diethylphthalate had a detection above the RL. The associated samples were non-detect for diethylphthalate and no results were qualified.

#### ***Surrogate Recovery***

Surrogate recoveries were within laboratory control limits with the following exceptions:

Sample ID	Surrogate	Recovery in %	QC Limit in %	Qualifier	Comment
RGH-SC-01-4-6' Diluted	d14-p-terphenyl	98	21 to 97	NQ	Undiluted result in control
RGH-SC-03-2-4' Diluted	d14-p-terphenyl	98.4	21 to 97	NQ	Undiluted result in control
RGH-SC-03-4-6'	d5-nitrobenzene	23.4	29 to 87	NQ	Re-extract in control
RGH-SC-03-4-6'	2-fluorobiphenyl	26	32 to 88	NQ	Re-extract in control
RGH-SC-03-4-6'	d4-1,2-dichlorobenzene	23	25 to 82	NQ	Re-extract in control
RGH-SC-03-4-6'	d5-phenol	24.8	29 to 85	NQ	Re-extract in control
RGH-SC-03-4-6'	d4-2-chlorophenol	25.3	30 to 84	NQ	Re-extract in control
RGH-SC-04-0-2'	d14-p-terphenyl	102	21 to 97	NQ	Diluted result in control
RGH-SC-06-4-6'	d14-p-terphenyl	102	21 to 97	NQ	Diluted result in control
LCS-100808	d4-1,2-dichlorobenzene	32.2	33 to 79	NQ	All other surrogates in control

NQ - Not qualified.

### **Laboratory Control Sample (LCS) Recovery**

Laboratory control sample recoveries were within laboratory control limits with the following exceptions:

- For LCS-090308, the recovery of 1,2-dichlorobenzene was just below the control limits. The analyte was within control in the LCSD, and results were not qualified.
- For LCS-100808, the recoveries of 1,3-dichlorobenzene, 1,4-dichlorobenzene, and 1,2-dichlorobenzene were below the control limits. The recoveries of those analytes were within control in the LCSD, and no results were qualified. The recovery of hexachlorobenzene was below the Marginal Exceedance (ME) limits, but was within the control limits in the LCSD, and results were not qualified.

### **Matrix Spike (MS) Recovery**

The MS were within laboratory control limits with the following exceptions:

Sample ID	Analyte	Within CL	Within ME Limit	High or Low	Qualifier	Comment
RGH-SS-01 MSD	Pyrene	N	N	H	NQ	Within CL in MS
RGH-SS-01 MSD	Benzo(a)anthracene	N	N	H	NQ	Within CL in MS
RGH-SS-01 MSD	Chrysene	N	N	H	NQ	Within CL in MS
RGH-SS-01 MSD	Benzo(b)fluoranthene	N	N	H	NQ	Within CL in MS
RGH-SS-01 MSD	Benzo(a)pyrene	N	N	H	NQ	Within CL in MS
RGH-SS-01 MSD	Benzo(k)fluoranthene	N	Y	H	NQ	Within CL in MS
RGH-SC-06-4-6' MS/MSD	Benzoic acid	N	Y	L	NQ	Within ME limits
RGH-SC-06-4-6' MS	Acenaphthylene	N	Y	L	NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MSD	Acenaphthylene	N	N	L	NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MS/MSD	Fluorene	N	N	L	NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MS/MSD	Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(a)pyrene, Indeno(123-cd)pyrene, Benzo(ghi)perylene	NA	NA	-	NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MS	Benzo(k)fluoranthene	NA	NA		NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MSD	Benzo(k)fluoranthene	N	N	L	NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MS	Dibenz(ah)anthracene	N	N	L	NQ	High levels in source sample, insufficient spike
RGH-SC-06-4-6' MSD	Dibenz(ah)anthracene	N	Y	L	NQ	High levels in source sample, insufficient spike
RGH-SC-07-0-2' MS/MSD	Hexachloroethane, Benzoic acid	N	Y	L	NQ	Within ME limits
RGH-SC-07-0-2' MS	Naphthalene	N	Y	H	NQ	High levels in source sample, insufficient spike
RGH-SC-07-0-2' MSD	Naphthalene	N	N	H	NQ	High levels in source sample, insufficient spike

Sample ID	Analyte	Within CL	Within ME Limit	High or Low	Qualifier	Comment
RGH-SC-07-0-2' MSD	Dimethylphthalate, Benzo(a)anthracene	N	Y	L	NQ	Within CL in MS
RGH-SC-07-0-2' MS/MSD	Pyrene	N	N	L	NQ	High levels in source sample, insufficient spike
RGH-SC-07-0-2' MSD	Bis(2-ethylhexyl) phthalate	N	Y	H	NQ	Within CL in MS
RGH-SC-07-0-2' MS/MSD	Chrysene	N	N	L	J	Qualified in source sample
RGH-SC-07-0-2' MS	Benzo(a)pyrene	N	N	L	NQ	Within ME limits in MSD
RGH-SC-07-0-2' MSD	Benzo(a)pyrene	N	Y	L	NQ	Within ME limits in MSD

NQ - Not qualified.

ME - Marginal Exceedance limits

CL - Control limits

J - Estimated value

### ***Internal Standards (IS) Recovery***

Internal standards were within acceptance criteria with the following exceptions:

- For samples RGH-SC-01-4-6', RGH-SC-03-2-4', and RGH-SC-04-0-2', the internal standard perylene-d12 was outside the acceptance criteria. The samples were reanalyzed at dilution with all IS in control. The IS perylene-d12 is associated with indeno(123-cd)perylene, dibenz(ah)anthracene, and benzo(ghi)perylene. Those analytes were reported from the diluted analyses with passing IS.
- For samples RGH-SC-08-2-4', RGH-SC-08-4-5.5', RGH-SC-09-2-4', and RGH-SC-09-4-5.5', the IS chrysene-d12 and di-n-octylphthalate-d4 were outside acceptance criteria. The samples were reanalyzed at dilution with all IS in control. The IS chrysene-d12 is associated with chrysene and bis(2-ethylhexyl)phthalate. The IS di-n-octylphthalate-d4 is associated with di-n-octylphthalate, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene. Those analytes were reported from the diluted analyses with passing IS.

### ***Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)***

The initial calibration curves were within acceptance criteria. The CCVs were within acceptance criteria with the following exceptions:

- For the CCV analyzed on September 26, 2008, the analytes fluoranthene, butylbenzylphthalate, benzo(a)anthracene, and bis(2-ethylhexyl)phthalate exceeded the criteria. The results for those analytes in the associated sample, RGH-SC-03-4-6' (re-extract) were qualified as estimated (J).

### **Total Mercury**

#### ***Analytical Methods***

Sediment samples for mercury were prepared and analyzed following EPA Method 7471A.

#### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

#### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

#### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

#### ***Laboratory Control Sample (LCS) Recovery***

Laboratory control sample recoveries were within QC limits of 80 to 120 percent.

#### ***Matrix Spike (MS) Recovery***

Matrix spike recoveries met QC limits of 75 to 125 percent.

### ***Laboratory Duplicate Sample Analysis***

The RPD between replicate measurements met QC limits with the following exception. The RPD for mercury in sample RGH-SC-06-4-6' exceeded the control limits. The results for mercury in that sample were qualified as estimated (J).

### ***Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)***

The initial calibration curves and CCVs were within acceptance criteria.

### **Conventional Sediment Parameters**

#### ***Analytical Methods***

Total solids and total preserved solids were determined by modified EPA Method 160.3. Total organic carbon (TOC) was determined following Plumb (1981). Ammonia, as nitrogen, was determined by EPA Method 350.1 modified. Sulfide was determined by EPA Method 376.2.

#### ***Sample Holding Times***

The samples met holding time limits for total solids, total preserved solids, total organic carbon, ammonia, and sulfide.

#### ***Laboratory Detection Limits***

Reported detection limits were acceptable. Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

#### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

#### ***Laboratory Control Sample (LCS) Recovery***

LCS recoveries for sulfide and TOC were within QC limits.

#### ***Matrix Spike (MS) Recovery***

MS recoveries for ammonia and TOC were within QC limits.

MS recovery for sulfide was below QC limits of 75 to 125 percent. There were high concentrations of sulfide in the source sample (RGH-SS-03) compared to the amount spiked into the sample. Therefore, sulfide results in the sample were not qualified.

### ***Laboratory Duplicate Sample Analysis***

The RPD between replicate measurements met quality control limits for total solids, total preserved solids, ammonia, sulfide, and TOC.

### ***Standard Reference Material (SRM) Recovery***

SRM recoveries for ammonia and TOC were within QC limits.

### ***Dioxins/Furans***

#### ***Analytical Methods***

Sediment samples for dioxins/furans were prepared and analyzed following EPA Method 1613.

#### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

#### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. The RL for 2,3,4,8-TCDF in sample RGH-SC-06-2-4' was elevated due to matrix interference.

#### ***Blank Contamination***

The method blank was non-detect with the following exceptions. The analytes 1,2,3,4,6,7,8-HpCDD and OCDD exceeded the detection limit, but fell below the reporting limit. Total HpCDD exceeded the RL. Detections for those analytes in the associated samples were greater than ten times the amount in the method blank, and results were not qualified.

#### ***Surrogate Recovery***

Surrogate recoveries were within QC limits.

### ***Laboratory Control Sample (LCS) Recovery***

LCS recoveries were within QC limits.

### ***Internal Standard (IS) Recoveries***

IS recoveries were within QC limits with the following exceptions:

- For sample RGH-SC-01-2-4', the IS 13C-OCDD had ion abundance ratios outside of acceptance criteria. The theoretical area for the IS was used to quantitate the recoveries and associated target analytes. The results were not qualified.
- For sample RGH-SC-04-0-2', the IS 13C-OCDD had ion abundance ratios outside of acceptance criteria. The theoretical area for the IS was used to quantitate the recoveries and associated target analytes. The results were not qualified.
- For sample RGH-SC-03-0-2', the IS 13C-1,2,3,4,6,7,8-HpCDF had ion abundance ratios outside of acceptance criteria. The theoretical area for the IS was used to quantitate the recoveries and associated target analytes. The results were not qualified.

### ***Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)***

The initial calibration curves and CCVs were within acceptance criteria.

Several samples had analytes that exceeded the calibration curve, but did not saturate the detector. Per the laboratory, the samples were not reanalyzed at dilution, as historical data indicated that for the isotope dilution method, dilution and reanalysis would not produce significantly different results. Those analytes were qualified with an "E."

Several samples had ion abundance ratios outside acceptance criteria. The isomers were reported as "estimated maximum possible concentration" (EMPC) and qualified as estimated (J).

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## **APPENDIX B-2 CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS**

### ***Chemical Data Quality Review for Bellingham Bay Piling Study Area***

Five sediment samples were collected from the Bellingham Bay Piling Study area on August 26 and 27, 2008. The samples were submitted to ARI for analysis. Sample identifications, laboratory job numbers, and analytical tests are summarized in Table 4.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review followed the format outlined in the National Functional Guidelines for Organic Data Review (EPA 1999) and the National Functional Guidelines for Inorganic Data Review (EPA 2004) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs);
- Internal standard (IS) recoveries (where applicable);
- Calibration criteria (where applicable); and
- Reporting limits.

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

### **Diesel- and Motor Oil-Range Hydrocarbons**

#### ***Analytical Methods***

The sediment samples were analyzed by gas chromatography with a flame ionization detector (GC/FID) following the NWTPH-Dx method.

### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

### ***Surrogate Recovery***

Surrogate compound recoveries were within laboratory limits.

### ***Laboratory Control Sample (LCS) Recovery***

Laboratory control sample and laboratory control sample duplicate recoveries were within laboratory limits. The RPD between duplicate measurements was within laboratory criteria.

### ***Matrix Spike (MS) Recovery***

MS recovery was within laboratory limits.

### ***Laboratory Duplicate Sample Analysis***

No laboratory duplicate sample analyses were performed.

### ***Initial Calibration (ICAL) and Continuing Calibration Verifications Checks (CCVs)***

The ICAL and CCVs were within acceptance criteria.

### ***Semivolatile Organic Compounds (SVOCs)***

#### ***Analytical Methods***

Samples were analyzed by gas chromatography/mass spectrometry (GC/MS) following EPA Method 8270D.

### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. Reporting limits for hexachlorobenzene exceeded the SMS criteria in sample BBP-SS-01. Reporting limits for hexachlorobutadiene exceeded the AET criteria in samples BBP-SS-01, BBP-SS-02, BBP-SS-03, BBP-SC-01, and BBP-SC-02.

### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

### ***Surrogate Recovery***

The surrogate compound recoveries were within laboratory limits.

### ***Laboratory Control Sample (LCS) Recovery***

Laboratory control sample recoveries were within laboratory limits with the following exception: benzyl alcohol recoveries fell below the control limits in the LCS and LCSD, but were within the Marginal Exceedance (ME) limits. Benzyl alcohol recoveries were within the control limits in the MS and MSD, and results were not qualified.

### ***Matrix Spike (MS) Recovery***

MS and MSD recoveries were within laboratory limits with the following exceptions:

- The recoveries for 2-methylnaphthalene, acenaphthylene, and 1-methylnaphthalene were below the control limits in the MSD, but were within the control limits in the MS and, therefore, were not qualified.
- The recoveries for fluorene, anthracene, and indeno(1,2,3-cd)pyrene were below the ME limits in the MS, and were noted as not applicable in the MSD due to high concentrations of those analytes in the source sample compared to the spiking amount. The results were not qualified.
- The recoveries for phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and benzo(ghi)perylene were noted as not applicable in the MS and MSD due to

high concentrations of the analytes in the source sample compared to the spiking amount. The results were not qualified.

### ***Initial Calibration (ICAL) and Continuing Calibration Verifications Checks (CCVs)***

The ICAL was within acceptance criteria.

The CCVs were within acceptance criteria with the following exceptions:

- For the CCV analyzed on September 11, 2008, the recovery for benzo(ghi)perylene was below the 20 percent criteria. The results for benzo(ghi)perylene in the associated samples (BBP-SS-01, BBP-SC-01, and BBP-SC-02) were qualified as estimated (J).

### **Total Metals**

#### ***Analytical Methods***

Sediment samples for mercury analysis were prepared and analyzed following EPA Method 7471A. Sediment samples for the other metals analyses were analyzed by ICP following EPA Method 6010B.

#### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

#### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

#### ***Blank Contamination***

Zinc was detected in the method blank at the reporting limit. Results for zinc in the associated samples were greater than ten times the amount in the method blank, and no results were qualified.

#### ***Laboratory Control Sample (LCS) Recovery***

Laboratory control sample recoveries were within QC limits of 80 to 120 percent.

### ***Matrix Spike Analysis***

Matrix spike recoveries met QC limits of 75 to 125 percent.

### ***Laboratory Duplicate Sample Analysis***

The RPD between replicate measurements met quality control limits.

### ***Continuing Calibration Verifications Checks (CCVs)***

The CCVs were within QC limits.

## **Conventional Sediment Parameters**

### ***Analytical Methods***

Total solids and total preserved solids were determined by modified EPA Method 160.3. Total organic carbon (TOC) was determined following Plumb (1981). Ammonia, as nitrogen, was determined by EPA Method 350.1 modified. Sulfide was determined by EPA Method 376.2.

### ***Sample Holding Times***

The samples met holding time limits for total solids, total preserved solids, total organic carbon, ammonia, and sulfide.

### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

### ***Laboratory Control Sample (LCS) Recovery***

Laboratory control sample recoveries for TOC and Sulfide were within QC limits.

### ***Matrix Spike (MS) Recovery***

Matrix spike recoveries met QC limits for TOC, sulfide, and ammonia. The Standard Reference Material (SRM) for TOC and ammonia were within control limits.

### ***Laboratory Duplicate Sample Analysis***

The RPD between replicate measurements met quality control limits for TOC, sulfide, ammonia, total solids, and total preserved solids.

### **Dioxins/Furans**

#### ***Analytical Methods***

Sediment samples for dioxins/furans were prepared and analyzed following EPA Method 1613.

#### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

#### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

#### ***Blank Contamination***

The method blank was non-detect with the following exception. The analyte OCDD exceeded the estimated detection limit, but fell below the reporting limit. Detections for that analyte in the associated samples were greater than ten times the amount in the method blank, and results were not qualified.

#### ***Surrogate Recovery***

Surrogate recoveries were within QC limits.

#### ***Laboratory Control Sample (LCS) Recovery***

LCS recoveries were within QC limits.

***Internal Standard (IS) Recoveries***

IS recoveries were within QC limits.

***Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)***

The initial calibration curves and CCVs were within acceptance criteria.

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## **APPENDIX B-3 CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS**

### ***Chemical Data Quality Review for Bellingham Bay Dioxin Background Investigation***

Six surface sediment samples were collected from Bellingham Bay on September 18 and 19, 2008. The samples were submitted for dioxin/furan analysis to Analytical Resources, Inc., (ARI) in Tukwila, WA. ARI assigned the samples the Job No. NQ49, and subcontracted them to TestAmerica-Sacramento, in West Sacramento, CA. The samples were received with temperatures exceeding the method recommended <4°C. Sample results were not qualified due to the chemical stability of dioxins. The laboratory reported results as project number G8I240290 (Table 4).

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review followed the format outlined in the National Functional Guidelines for Organic Data Review (EPA 1999) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample (LCS) recoveries;
- Internal standard (IS) recoveries, where applicable;
- Initial calibration curves and continuing calibration verifications; and
- Reporting limits (RL).

The data were determined to be acceptable for use, as qualified. Full laboratory results are presented at the end of this appendix. Results of the data review follow.

### **Dioxins/Furans**

#### ***Analytical Methods***

Sediment samples for dioxins/furans were prepared and analyzed following EPA Method 1613.



### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

### ***Laboratory Detection Limits***

Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors. The RL for some analytes were elevated due to matrix interference.

### ***Blank Contamination***

The method blank was non-detect.

### ***Surrogate Recovery***

Surrogate recoveries were within QC limits.

### ***Laboratory Control Sample (LCS) Recovery***

LCS recoveries were within QC limits with the following exceptions. The recoveries for 1,2,3,6,7,8-HxCDF and 1,2,3,4,6,7,8-HpCDF exceeded the control limits. Associated samples which were non-detect or below the RL were not qualified. Samples BBDx-SS-02, BBDx-SS-03, BBDx-SS-04, and BBDx-SS-06 had detections for 1,2,3,4,6,7,8-HpCDF above the RL, and were qualified as estimated (J).

### ***Internal Standard (IS) Recoveries***

IS recoveries were within QC limits.

### ***Initial Calibration Curves and Continuing Calibration Verification Checks (CCVs)***

The initial calibration curves and CCVs were within acceptance criteria.

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## **APPENDIX B-4 CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS**

### ***Chemical Data Quality Review for Reference Sample***

One surface sediment sample was collected from Samish Bay on August 29, 2008. Two surface sediment samples were collected on September 30, 2008. The samples were submitted to Analytical Resources, Inc., (ARI) in Tukwila, WA for analysis.

Sample Samish Bay Ref1, collected on August 29, 2008, was received at the laboratory with the temperature slightly exceeding the method recommended temperature of 2 to 6°C. Sample results were not qualified. The sample was analyzed for total organic carbon (TOC), sulfides, ammonia, total solids, and grain size. The laboratory reported results as Job No. NN44.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. Hart Crowser performed the data review, using laboratory quality control results summary sheets and raw data, as required, to ensure they met data quality objectives for the project. Data review followed the format outlined in the National Functional Guidelines for Inorganic Data Review (EPA 2004) modified to include specific criteria of the individual analytical methods. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs); and
- Reporting limits (RL).

The data were determined to be acceptable for use without qualification. Full laboratory results are presented at the end of this appendix. Results of the data reviews, organized by analysis class, follow.

## **Conventional Sediment Analyses**

### ***Analytical Methods***

Total solids and total preserved solids were determined following EPA Method 160.3 modified. Ammonia was determined following EPA Method 350.1. Total sulfide was determined following EPA Method 376.2. TOC was determined following Plumb (1981).

### ***Sample Holding Times***

The samples were prepared and analyzed within holding time limits.

### ***Laboratory Detection Limits***

Reported detection limits were acceptable. Reported detection limits and analytical results were adjusted for moisture content and any required dilution factors.

### ***Blank Contamination***

No target analytes were detected in laboratory blanks.

### ***Laboratory Control Sample (LCS) Recovery***

LCS recoveries for sulfide and TOC were within QC limits.

### ***Matrix Spike (MS) Recovery***

MS recoveries for ammonia and TOC were within QC limits.

### ***Laboratory Duplicate Sample Analysis***

The RPD between replicate measurements met QC limits for total solids, total preserved solids, ammonia, sulfide, and TOC.

### ***Standard Reference Material (SRM) Recovery***

SRM recovery for ammonia and TOC were within QC limits.

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**CERTIFICATES OF ANALYSIS  
ANALYTICAL RESOURCES, INC.  
AND TEST AMERICA - SACRAMENTO**

**(SEE ENCLOSED CD-ROM)**



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

October 30, 2008

Mr. Roger McGinnis  
Hart Crowser, Inc.  
1700 Westlake Avenue North Suite 200  
Seattle, WA 98109-3056

**RE: Project: Bellingham Bay – 17330-17**  
**ARI Job No: NM66**

Dear Mr. McGinnis:

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and the final data package for the samples from the project referenced above.

The samples were analyzed for SVOCs, NWTPH-Dx, Total Metals, Dioxin/Furans, Grain Size, and various Conventional Parameters.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this data package and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,  
ANALYTICAL RESOURCES, INC.

A handwritten signature in black ink, appearing to read "Kelly Bottem".

Kelly Bottem  
Client Services Manager  
206-695-6211  
[kellyb@arilabs.com](mailto:kellyb@arilabs.com)  
[www.arilabs.com](http://www.arilabs.com)

Enclosures

cc: files NM66

**Chain of Custody  
Documentation**

**prepared  
for**

**HART CROWSER, INC.**

**Bellingham Bay Piles, 17330-17**

**ARI JOB NO.: NM66**

**prepared  
by**

**Analytical Resources, Inc.**

# Sample Custody Record

Samples Shipped to: ART

NM66



Hart Crowser, Inc.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581

JOB <u>17330-17</u> LAB NUMBER _____ PROJECT NAME <u>BELLINGHAM BAY FILES</u> HART CROWSER CONTACT <u>R. McGinnis,</u> <u>A. Conrad, C. Rust</u> SAMPLED BY: <u>AMC, CFR, RM</u>	REQUESTED ANALYSIS * NWTPH-DX SVOC-8270 TOTAL METALS TOC TOTAL SOLIDS AMMONIA TOTAL SULFIDES DISSOLVED GRAIN SIZE ATEXBERG LIMITS SPECIFIC GRAVITY	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
--	--	-------------------	--

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-DX	SVOC-8270	TOTAL METALS	TOC	TOTAL SOLIDS	AMMONIA	TOTAL SULFIDES	DISSOLVED	GRAIN SIZE	ATEXBERG LIMITS	SPECIFIC GRAVITY	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/COMPOSITING INSTRUCTIONS
	BBP-SS-01		8/26/08	1030	SEO	X	X	X	X	X	X	X	X	X	X	X	5	*SMS METALS - As, Cd
	BBP-SS-02		8/26/08	1142	SEO	X	X	X	X	X	X	X	X	X	X	X	5	Cr, Cu, Pb, Hg, Ni, Ag,
	BBP-SS-03		8/26/08	1329	SEO	X	X	X	X	X	X	X					5	Zn
	BBP-SC-01		8/27/08	1920	SEO	X	X	X	X	X	X	X					5	
	BBP-SC-02		8/27/08	1900	SEO	X	X	X	X	X	X						3	
Hold Extra Containers																		

RELINQUISHED BY	DATE	RECEIVED BY	DATE	SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:	TOTAL NUMBER OF CONTAINERS
<u>Royce McGinnis</u>	<u>8/26/08</u>	<u>Kimberly Rigg</u>	<u>8/28/08</u>	<u>FULL DATA PACKAGE</u> <u>SMS REPORTING LISTS</u>	SAMPLE RECEIPT INFORMATION CUSTODY SEALS: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A GOOD CONDITION <input type="checkbox"/> YES <input type="checkbox"/> NO TEMPERATURE _____ SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT
<u>Royce McGinnis</u>	<u>1610</u>	<u>Kimberly Rigg</u>	<u>1610</u>		
RELINQUISHED BY	DATE	RECEIVED BY	DATE	COOLER NO.:	STORAGE LOCATION:
SIGNATURE	TIME	SIGNATURE	TIME	See Lab Work Order No. _____	TURNAROUND TIME:
PRINT NAME		PRINT NAME		for Other Contract Requirements	<input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK <input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD <input type="checkbox"/> 72 HOURS    OTHER _____
COMPANY		COMPANY			





**Case Narrative**

**prepared  
for**

**HART CROWSER, INC.**

**Bellingham Bay Piles, 17330-17**

**ARI JOB NO.: NM66**

**prepared  
by**

**Analytical Resources, Inc.**

**Case Narrative****Hart Crowser****Bellingham Bay – 17330-17****ARI Job: NM66****October 30, 2008****Sample Receipt**

Analytical Resources Inc. (ARI) accepted five sediment samples in good condition on August 28, 2008 under the ARI job referenced above. The cooler temperatures measured by IR thermometer following ARI SOP were -0.2, 0.7, 3.5, and 5.2°C and the samples were well iced. For more details regarding sample receipt, please refer to the Coor Receipt Form. All samples were frozen to protect holding times. Please note that select sample containers were put on hold pending further client instruction.

**Semivolatile Analysis (PSDDA SW8270D):**

All samples were originally extracted and analyzed within the method recommended holding times.

***Initial calibration (s):*** All compounds of interest were within method acceptance criteria.

***Continuing calibration (s):*** All analytes of interest were within method acceptance criteria.

***Internal Standard(s):*** The internal standard areas were within the control limit.

***Method Blank (s):*** The method blank was free of contamination.

***Surrogate(s):*** The surrogate percent recoveries were within control limits.

***MS/MSD (s):*** Several matrix spike and matrix spike duplicate percent recoveries were outside the advisory control limits for sample **BBP-SS-02**. No further corrective action is required for matrix QC as the outliers are indicators of matrix characteristics.

***LCS/LCSD (s):*** The LCS and LCSD percent recoveries of Benzyl Alcohol fell outside the control limits low for **LCS-090408**. The outliers were allowed as marginal exceedances. No further corrective action was required.

**NWTPH-Dx:**

All samples were extracted and analyzed within the method recommended holding times.

***Initial calibration (s):*** All analytes were within method acceptance criteria.

***Continuing calibration (s):*** All analytes of interest were within method acceptance criteria.

***Method Blank (s):*** The method blanks were free of contamination.

***Surrogate(s):*** All surrogate percent recoveries were within control limits.



**Case Narrative**  
**Hart Crowser**  
**Bellingham Bay – 17330-17**  
**ARI Job: NM66**  
**October 30, 2008**

*MS/MSD (s):* The matrix spike and matrix spike duplicate percent recoveries were within the advisory control limits.

*LCS/LCSD (s):* The LCS and LCSD percent recoveries were within control limits.

**Total Metals (Mercury):**

All samples were prepared and analyzed within the method recommended holding times.

*Initial calibration (s):* All analytes were within method acceptance criteria.

*Continuing calibration (s):* All analytes of interest were within method acceptance criteria.

*Method Blank (s):* Zinc was present in the method blank at a level that was greater than the reporting limit. All associated samples contained concentrations of zinc that were greater than ten times the concentration found in the method blank. No further corrective action was required.

*MS(s):* All matrix spike percent recoveries were within control limits.

*Duplicate(s):* The duplicate RPD were within the control limit.

*LCS(s):* All LCS percent recoveries were within control limits.

**Conventional Parameters:**

All samples were prepared and analyzed within the method recommended holding times.

*Method Blank (s):* All method blanks were free of contamination.

*MS(s):* The matrix spike percent recoveries were within control limits.

*Replicate(s):* All replicate RPD/RSDs were within control limits.

*LCS(s):* All LCS percent recoveries were within control limits.

*SRM(s):* All SRM percent recoveries were within control limits.

**Geotechnical Parameters:**

A laboratory-specific Case Narrative follows.



**Case Narrative**  
**Hart Crowser**  
**Bellingham Bay – 17330-17**  
**ARI Job: NM66**  
**October 30, 2008**

**Dioxin/Furans:**

The Dioxin/Furans analyses were subcontracted to Test America in Sacramento, CA. The subcontracted data have been included at the end of this data package.



**Client:** Hart Crowser, Inc.

**ARI Project No.:** NM66

**Client Project:** Bellingham Bay Piles

**Client Project No.:** 17330-17

### Case Narrative

1. Two samples were received on August 28, 2008, and were in good condition.
2. The samples were submitted for grain size analysis, Atterberg limits determination, specific gravity testing and moisture content determination on July 29, 2008.
3. The samples submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology.
4. The samples for grains size analysis were run in a single batch and one sample from this another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
5. Atterberg limits determination was run according to ASTM D4318. Both of the samples were non-plastic.
6. Moisture content determination was run according to ASTM D2216.
7. Specific gravity determination was run according to ASTM D854.
8. The data is provided in summary tables and plots.
9. There were no other noted anomalies in this project.

Approved by:

*Guerra Smith*  
Laboratory Supervisor

Date:

10/9/08

# Data Reporting Qualifiers

Effective 12/28/04

## Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is  $\leq 5$  times the Reporting Limit and the replicate control limit defaults to  $\pm 1$  RL instead of the normal 20% RPD

## Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- NR Spiked compound recovery is not reported due to chromatographic interference
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NS The flagged analyte was not spiked into the sample

- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by  $\geq 40\%$  RPD with no obvious chromatographic interference

### **Geotechnical Data**

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting

# LCS SOLUTIONS

9/4/2008

LABEL	SOLN IC	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1534-5	PCB	20	MEOH	08/26/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1515-1	LOW PEST	0.2/0.4/2	ACETONE	01/24/09
5	1537-1	EPH	1500	MECL2	08/16/09
6*	1456-3	PCP	12.5	ACETONE	04/18/09
7	1537-3	ABN	100	ACETONE	08/01/09
8	1487-2	TBT	10	MECL2	12/15/08
9	1493-3	PORE TBT	.25/.5	MECL2	12/15/08
10	1537-2	ABN ACID	100/200	MEOH	04/10/09
11	1526-1	TPHD	15000	ACETONE	06/25/09
12	1533-1	ABN BASE	200	ACETONE	07/01/09
13*	1427-3	LOW PCB	2	ACETONE	10/11/08
14	1480-2	LOW ABN ACID	10/20	MEOH	10/09/08
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1490-4	PNA	100	MEOH	01/10/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1539-1	HERB	12.5/12500	MEOH	08/31/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1504-4	LOW ABN	10	ACETONE	10/01/08
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1522-2	OP-PEST	30	MEOH	11/30/08
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09





# SURR SOLUTIONS

9/4/2008

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1525-4	ABN	100/150	MEOH	03/13/09
B	1513-1	SIM PNA	15/75	MEOH	04/15/09
C*	1443-1	SIM ABN	10/15	MEOH	04/03/09
D	1516-3	LOW PCB	0.2	ACETONE	05/09/09
E	1478-1	HERB	62.5	MEOH	09/21/08
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1502-3	1,4DIOXANE	100	MEOH	02/20/09
H	1504-2	OP-PEST	25	MEOH	03/20/09
I*	1458-1	LOW S. PNA	03/15	MEOH	06/05/09
J	1493-2	TBT-PORE	0.25	MECL2	12/15/08
K	1490-3	MED PCB	20	ACETONE	01/14/09
L	1486-5	TBT	10	MECL2	12/15/08
M	1518-3	EPH	1500	MECL2	05/10/09
N	1518-4	PCB	2	ACETONE	05/29/09
O	1521-3	TPH	450	MECL2	12/29/08
P	1518-2	HCID	2250	MECL2	12/29/08
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	*RE-VERIFIED SOLUTION				
T					
U					
V					
W					
X					
Y					
Z					

**Data Summary Package**

**prepared  
for**

**HART CROWSER, INC.**


**Bellingham Bay Piles, 17330-17**

**ARI JOB NO.: NM66**

**prepared  
by**

**Analytical Resources, Inc.**

## **SEMIVOLATILES**

Lab Sample ID: NM66A  
LIMS ID: 08-21963  
Matrix: Sediment  
Data Release Authorized:   
Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/04/08  
Date Analyzed: 09/11/08 22:31  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: Yes

Sample Amount: 26.2 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 34.5%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	19	48
541-73-1	1,3-Dichlorobenzene	19	< 19 U
106-46-7	1,4-Dichlorobenzene	19	< 19 U
100-51-6	Benzyl Alcohol	19	< 19 U
95-50-1	1,2-Dichlorobenzene	19	< 19 U
95-48-7	2-Methylphenol	19	< 19 U
106-44-5	4-Methylphenol	19	< 19 U
67-72-1	Hexachloroethane	19	< 19 U
105-67-9	2,4-Dimethylphenol	19	< 19 U
65-85-0	Benzoic Acid	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	19	< 19 U
91-20-3	Naphthalene	19	25
87-68-3	Hexachlorobutadiene	19	< 19 U
91-57-6	2-Methylnaphthalene	19	12 J
131-11-3	Dimethylphthalate	19	< 19 U
208-96-8	Acenaphthylene	19	42
83-32-9	Acenaphthene	19	13 J
132-64-9	Dibenzofuran	19	< 19 U
84-66-2	Diethylphthalate	19	< 19 U
86-73-7	Fluorene	19	12 J
86-30-6	N-Nitrosodiphenylamine	19	< 19 U
118-74-1	Hexachlorobenzene	19	< 19 U
87-86-5	Pentachlorophenol	96	< 96 U
85-01-8	Phenanthrene	19	130
120-12-7	Anthracene	19	53
84-74-2	Di-n-Butylphthalate	19	< 19 U
206-44-0	Fluoranthene	19	350
129-00-0	Pyrene	19	390
85-68-7	Butylbenzylphthalate	19	< 19 U
56-55-3	Benzo (a) anthracene	19	220
117-81-7	bis (2-Ethylhexyl) phthalate	19	11 J
218-01-9	Chrysene	19	280
117-84-0	Di-n-Octyl phthalate	19	< 19 U
205-99-2	Benzo (b) fluoranthene	19	180
207-08-9	Benzo (k) fluoranthene	19	140
50-32-8	Benzo (a) pyrene	19	190
193-39-5	Indeno (1,2,3-cd) pyrene	19	56
53-70-3	Dibenz (a,h) anthracene	19	11 J
191-24-2	Benzo (g,h,i) perylene	19	52

Sample ID: BBP-SS-01  
SAMPLE

Lab Sample ID: NM66A  
LIMS ID: 08-21963  
Matrix: Sediment  
Date Analyzed: 09/11/08 22:31

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	19	17 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	55.6%	2-Fluorobiphenyl	59.6%
d14-p-Terphenyl	63.2%	d4-1,2-Dichlorobenzene	53.6%
d5-Phenol	72.5%	2-Fluorophenol	55.5%
2,4,6-Tribromophenol	73.6%	d4-2-Chlorophenol	61.9%

Sample ID: BBP-SS-02  
 SAMPLE

Lab Sample ID: NM66B  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted: 09/04/08  
 Date Analyzed: 09/11/08 23:06  
 Instrument/Analyst: NT6/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 38.7%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	15 J
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
67-72-1	Hexachloroethane	20	< 20 U
105-67-9	2,4-Dimethylphenol	20	< 20 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	80
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	99
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	170
83-32-9	Acenaphthene	20	110
132-64-9	Dibenzofuran	20	93
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	380
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	98	< 98 U
85-01-8	Phenanthrene	20	2,100 E
120-12-7	Anthracene	20	430
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	2,500 E
129-00-0	Pyrene	20	2,700 E
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo (a) anthracene	20	1,100
117-81-7	bis (2-Ethylhexyl) phthalate	20	35
218-01-9	Chrysene	20	1,200
117-84-0	Di-n-Octyl phthalate	20	< 20 U
205-99-2	Benzo (b) fluoranthene	20	1,100
207-08-9	Benzo (k) fluoranthene	20	1,100
50-32-8	Benzo (a) pyrene	20	1,200
193-39-5	Indeno (1,2,3-cd) pyrene	20	400
53-70-3	Dibenz (a, h) anthracene	20	76
191-24-2	Benzo (g, h, i) perylene	20	360

Sample ID: BBP-SS-02  
SAMPLE

Lab Sample ID: NM66B  
LIMS ID: 08-21964  
Matrix: Sediment  
Date Analyzed: 09/11/08 23:06

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	20	140

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.8%	2-Fluorobiphenyl	65.2%
d14-p-Terphenyl	72.8%	d4-1,2-Dichlorobenzene	57.6%
d5-Phenol	77.1%	2-Fluorophenol	57.9%
2,4,6-Tribromophenol	82.4%	d4-2-Chlorophenol	65.9%



Sample ID: BBP-SS-02  
 DILUTION

Lab Sample ID: NM66B  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted: 09/04/08  
 Date Analyzed: 09/15/08 17:58  
 Instrument/Analyst: NT6/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 3.00  
 Percent Moisture: 38.7%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	59	< 59 U
541-73-1	1,3-Dichlorobenzene	59	< 59 U
106-46-7	1,4-Dichlorobenzene	59	< 59 U
100-51-6	Benzyl Alcohol	59	< 59 U
95-50-1	1,2-Dichlorobenzene	59	< 59 U
95-48-7	2-Methylphenol	59	< 59 U
106-44-5	4-Methylphenol	59	< 59 U
67-72-1	Hexachloroethane	59	< 59 U
105-67-9	2,4-Dimethylphenol	59	< 59 U
65-85-0	Benzoic Acid	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	59	< 59 U
91-20-3	Naphthalene	59	72
87-68-3	Hexachlorobutadiene	59	< 59 U
91-57-6	2-Methylnaphthalene	59	83
131-11-3	Dimethylphthalate	59	< 59 U
208-96-8	Acenaphthylene	59	140
83-32-9	Acenaphthene	59	98
132-64-9	Dibenzofuran	59	82
84-66-2	Diethylphthalate	59	< 59 U
86-73-7	Fluorene	59	320
86-30-6	N-Nitrosodiphenylamine	59	< 59 U
118-74-1	Hexachlorobenzene	59	< 59 U
87-86-5	Pentachlorophenol	300	< 300 U
85-01-8	Phenanthrene	59	2,000
120-12-7	Anthracene	59	380
84-74-2	Di-n-Butylphthalate	59	< 59 U
206-44-0	Fluoranthene	59	2,400
129-00-0	Pyrene	59	2,000
85-68-7	Butylbenzylphthalate	59	< 59 U
56-55-3	Benzo (a) anthracene	59	1,200
117-81-7	bis(2-Ethylhexyl)phthalate	59	< 59 U
218-01-9	Chrysene	59	1,200
117-84-0	Di-n-Octyl phthalate	59	< 59 U
205-99-2	Benzo (b) fluoranthene	59	840
207-08-9	Benzo (k) fluoranthene	59	850
50-32-8	Benzo (a) pyrene	59	1,100
193-39-5	Indeno (1,2,3-cd) pyrene	59	590
53-70-3	Dibenz (a, h) anthracene	59	120
191-24-2	Benzo (g, h, i) perylene	59	640

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: BBP-SS-02  
DILUTION

Lab Sample ID: NM66B  
LIMS ID: 08-21964  
Matrix: Sediment  
Date Analyzed: 09/15/08 17:58

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	59	120

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	52.2%	2-Fluorobiphenyl	63.6%
d14-p-Terphenyl	62.8%	d4-1,2-Dichlorobenzene	44.3%
d5-Phenol	56.2%	2-Fluorophenol	50.7%
2,4,6-Tribromophenol	61.8%	d4-2-Chlorophenol	51.8%

Lab Sample ID: NM66C  
LIMS ID: 08-21965  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/04/08  
Date Analyzed: 09/12/08 00:50  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: Yes

Sample Amount: 25.3 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 79.4%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	23
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	63
67-72-1	Hexachloroethane	20	< 20 U
105-67-9	2,4-Dimethylphenol	20	< 20 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	170
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	44
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	200
83-32-9	Acenaphthene	20	44
132-64-9	Dibenzofuran	20	48
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	50
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	99	< 99 U
85-01-8	Phenanthrene	20	860
120-12-7	Anthracene	20	270
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	2,500 E
129-00-0	Pyrene	20	2,000 E
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo (a) anthracene	20	1,000
117-81-7	bis (2-Ethylhexyl) phthalate	20	290
218-01-9	Chrysene	20	1,200
117-84-0	Di-n-Octyl phthalate	20	< 20 U
205-99-2	Benzo (b) fluoranthene	20	1,300
207-08-9	Benzo (k) fluoranthene	20	2,400 E
50-32-8	Benzo (a) pyrene	20	1,400
193-39-5	Indeno (1,2,3-cd) pyrene	20	340
53-70-3	Dibenz (a, h) anthracene	20	65
191-24-2	Benzo (g, h, i) perylene	20	310



Sample ID: BBP-SS-03  
SAMPLE

Lab Sample ID: NM66C  
LIMS ID: 08-21965  
Matrix: Sediment  
Date Analyzed: 09/12/08 00:50

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	20	39

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	62.4%	2-Fluorobiphenyl	58.8%
d14-p-Terphenyl	62.0%	d4-1,2-Dichlorobenzene	54.8%
d5-Phenol	79.2%	2-Fluorophenol	58.4%
2,4,6-Tribromophenol	77.1%	d4-2-Chlorophenol	67.7%



Sample ID: BBP-SS-03  
 DILUTION

Lab Sample ID: NM66C  
 LIMS ID: 08-21965  
 Matrix: Sediment  
 Data Release Authorized: *[Signature]*  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted: 09/04/08  
 Date Analyzed: 09/15/08 18:33  
 Instrument/Analyst: NT6/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.3 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 3.00  
 Percent Moisture: 79.4%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	59	< 59 U
541-73-1	1,3-Dichlorobenzene	59	< 59 U
106-46-7	1,4-Dichlorobenzene	59	< 59 U
100-51-6	Benzyl Alcohol	59	< 59 U
95-50-1	1,2-Dichlorobenzene	59	< 59 U
95-48-7	2-Methylphenol	59	< 59 U
106-44-5	4-Methylphenol	59	43 J
67-72-1	Hexachloroethane	59	< 59 U
105-67-9	2,4-Dimethylphenol	59	< 59 U
65-85-0	Benzoic Acid	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	59	< 59 U
91-20-3	Naphthalene	59	130
87-68-3	Hexachlorobutadiene	59	< 59 U
91-57-6	2-Methylnaphthalene	59	31 J
131-11-3	Dimethylphthalate	59	< 59 U
208-96-8	Acenaphthylene	59	180
83-32-9	Acenaphthene	59	34 J
132-64-9	Dibenzofuran	59	33 J
84-66-2	Diethylphthalate	59	< 59 U
86-73-7	Fluorene	59	57 J
86-30-6	N-Nitrosodiphenylamine	59	< 59 U
118-74-1	Hexachlorobenzene	59	< 59 U
87-86-5	Pentachlorophenol	300	< 300 U
85-01-8	Phenanthrene	59	700
120-12-7	Anthracene	59	220
84-74-2	Di-n-Butylphthalate	59	< 59 U
206-44-0	Fluoranthene	59	1,500
129-00-0	Pyrene	59	1,500
85-68-7	Butylbenzylphthalate	59	< 59 U
56-55-3	Benzo (a) anthracene	59	940
117-81-7	bis (2-Ethylhexyl) phthalate	59	210
218-01-9	Chrysene	59	1,100
117-84-0	Di-n-Octyl phthalate	59	< 59 U
205-99-2	Benzo (b) fluoranthene	59	950
207-08-9	Benzo (k) fluoranthene	59	940
50-32-8	Benzo (a) pyrene	59	1,100
193-39-5	Indeno (1,2,3-cd) pyrene	59	490
53-70-3	Dibenz (a, h) anthracene	59	100
191-24-2	Benzo (g, h, i) perylene	59	480

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: BBP-SS-03  
DILUTION

Lab Sample ID: NM66C  
LIMS ID: 08-21965  
Matrix: Sediment  
Date Analyzed: 09/15/08 18:33

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	59	< 59 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	48.5%	2-Fluorobiphenyl	51.4%
d14-p-Terphenyl	52.7%	d4-1,2-Dichlorobenzene	37.4%
d5-Phenol	50.6%	2-Fluorophenol	45.5%
2,4,6-Tribromophenol	53.8%	d4-2-Chlorophenol	47.0%

Sample ID: BBP-SC-01  
SAMPLE

Lab Sample ID: NM66D  
LIMS ID: 08-21966  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/04/08  
Date Analyzed: 09/12/08 01:25  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 38.6%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	16 J
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	27
67-72-1	Hexachloroethane	20	< 20 U
105-67-9	2,4-Dimethylphenol	20	< 20 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	37
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	21
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	120
83-32-9	Acenaphthene	20	14 J
132-64-9	Dibenzofuran	20	10 J
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	14 J
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	99	< 99 U
85-01-8	Phenanthrene	20	280
120-12-7	Anthracene	20	160
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	960
129-00-0	Pyrene	20	1,000
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo (a) anthracene	20	720
117-81-7	bis(2-Ethylhexyl)phthalate	20	< 20 U
218-01-9	Chrysene	20	820
117-84-0	Di-n-Octyl phthalate	20	< 20 U
205-99-2	Benzo (b) fluoranthene	20	660
207-08-9	Benzo (k) fluoranthene	20	660
50-32-8	Benzo (a) pyrene	20	740
193-39-5	Indeno (1, 2, 3-cd) pyrene	20	130
53-70-3	Dibenz (a, h) anthracene	20	29
191-24-2	Benzo (g, h, i) perylene	20	110

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: BBP-SC-01  
SAMPLE

Lab Sample ID: NM66D  
LIMS ID: 08-21966  
Matrix: Sediment  
Date Analyzed: 09/12/08 01:25

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	20	20

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.0%	2-Fluorobiphenyl	62.0%
d14-p-Terphenyl	67.2%	d4-1,2-Dichlorobenzene	58.4%
d5-Phenol	74.1%	2-Fluorophenol	58.1%
2,4,6-Tribromophenol	78.7%	d4-2-Chlorophenol	64.5%



Sample ID: BBP-SC-02  
 SAMPLE

Lab Sample ID: NM66E  
 LIMS ID: 08-21967  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/04/08  
 Date Analyzed: 09/12/08 02:00  
 Instrument/Analyst: NT6/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 53.1%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	40
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	33
67-72-1	Hexachloroethane	20	< 20 U
105-67-9	2,4-Dimethylphenol	20	< 20 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	88
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	40
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	53
83-32-9	Acenaphthene	20	26
132-64-9	Dibenzofuran	20	13 J
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	22
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	98	< 98 U
85-01-8	Phenanthrene	20	210
120-12-7	Anthracene	20	200
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	1,100
129-00-0	Pyrene	20	940
85-68-7	Butylbenzylphthalate	20	71
56-55-3	Benzo (a) anthracene	20	670
117-81-7	bis(2-Ethylhexyl)phthalate	20	< 20 U
218-01-9	Chrysene	20	700
117-84-0	Di-n-Octyl phthalate	20	< 20 U
205-99-2	Benzo (b) fluoranthene	20	760
207-08-9	Benzo (k) fluoranthene	20	870
50-32-8	Benzo (a) pyrene	20	840
193-39-5	Indeno (1,2,3-cd) pyrene	20	160
53-70-3	Dibenz (a, h) anthracene	20	32
191-24-2	Benzo (g, h, i) perylene	20	140

Sample ID: BBP-SC-02  
SAMPLE

Lab Sample ID: NM66E  
LIMS ID: 08-21967  
Matrix: Sediment  
Date Analyzed: 09/12/08 02:00

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	20	38

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.6%	2-Fluorobiphenyl	64.4%
d14-p-Terphenyl	67.2%	d4-1,2-Dichlorobenzene	60.0%
d5-Phenol	76.3%	2-Fluorophenol	60.3%
2,4,6-Tribromophenol	80.8%	d4-2-Chlorophenol	68.3%

**SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT	OUT
BBP-SS-01	55.6%	59.6%	63.2%	53.6%	72.5%	55.5%	73.6%	61.9%	0	
MB-090408	63.2%	64.0%	70.8%	65.2%	80.0%	62.1%	63.5%	69.6%	0	
LCS-090408	53.6%	59.6%	66.4%	52.4%	66.7%	52.5%	76.0%	57.1%	0	
LCSD-090408	56.8%	62.0%	67.2%	55.6%	69.6%	55.5%	76.8%	60.3%	0	
BBP-SS-02	60.8%	65.2%	72.8%	57.6%	77.1%	57.9%	82.4%	65.9%	0	
BBP-SS-02 DL	52.2%	63.6%	62.8%	44.3%	56.2%	50.7%	61.8%	51.8%	0	
BBP-SS-02 MS	59.6%	64.4%	72.8%	54.8%	78.7%	58.9%	86.1%	65.9%	0	
BBP-SS-02 MSD	54.0%	59.2%	67.2%	48.0%	72.3%	54.1%	83.2%	59.7%	0	
BBP-SS-03	62.4%	58.8%	62.0%	54.8%	79.2%	58.4%	77.1%	67.7%	0	
BBP-SS-03 DL	48.5%	51.4%	52.7%	37.4%	50.6%	45.5%	53.8%	47.0%	0	
BBP-SC-01	60.0%	62.0%	67.2%	58.4%	74.1%	58.1%	78.7%	64.5%	0	
BBP-SC-02	61.6%	64.4%	67.2%	60.0%	76.3%	60.3%	80.8%	68.3%	0	

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(37-85)	(29-87)
(FBP) = 2-Fluorobiphenyl	(39-82)	(32-88)
(TPH) = d14-p-Terphenyl	(38-105)	(21-97)
(DCB) = d4-1,2-Dichlorobenzene	(33-79)	(25-82)
(PHL) = d5-Phenol	(40-85)	(29-85)
(2FP) = 2-Fluorophenol	(20-93)	(10-114)
(TBP) = 2,4,6-Tribromophenol	(40-96)	(25-103)
(2CP) = d4-2-Chlorophenol	(41-81)	(30-84)

Prep Method: SW3550B  
Log Number Range: 08-21963 to 08-21967

Sample ID: BBP-SS-02  
 MS/MSD

Lab Sample ID: NM66B  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted MS/MSD: 09/04/08

Sample Amount MS: 25.3 g-dry-wt  
 MSD: 25.7 g-dry-wt

Date Analyzed MS: 09/11/08 23:40  
 MSD: 09/12/08 00:15

Final Extract Volume MS: 0.5 mL  
 MSD: 0.5 mL

Instrument/Analyst MS: NT6/LJR  
 MSD: NT6/LJR

Dilution Factor MS: 1.00  
 MSD: 1.00

GPC Cleanup: YES

Percent Moisture: 38.7 %


Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	14.6	317	494	61.2%	281	486	54.8%	12.0%
1,3-Dichlorobenzene	< 19.7	267	494	54.0%	236	486	48.6%	12.3%
1,4-Dichlorobenzene	< 19.7	273	494	55.3%	240	486	49.4%	12.9%
Benzyl Alcohol	< 19.7	421	988	42.6%	420	972	43.2%	0.2%
1,2-Dichlorobenzene	< 19.7	283	494	57.3%	252	486	51.9%	11.6%
2-Methylphenol	< 19.7	316	494	64.0%	270	486	55.6%	15.7%
4-Methylphenol	< 19.7	629	988	63.7%	573	972	59.0%	9.3%
Hexachloroethane	< 19.7	268	494	54.3%	238	486	49.0%	11.9%
2,4-Dimethylphenol	< 19.7	312	494	63.2%	279	486	57.4%	11.2%
Benzoic Acid	< 19.7	493	1480	33.3%	878	1460	60.1%	56.2%
1,2,4-Trichlorobenzene	< 19.7	297	494	60.1%	267	486	54.9%	10.6%
Naphthalene	79.6	347	494	54.1%	291	486	43.5%	17.6%
Hexachlorobutadiene	< 19.7	285	494	57.7%	257	486	52.9%	10.3%
2-Methylnaphthalene	99.1	350	494	50.8%	305	486	42.4%	13.7%
Dimethylphthalate	< 19.7	357	494	72.3%	335	486	68.9%	6.4%
Acenaphthylene	169	463	494	59.5%	379	486	43.2%	20.0%
Acenaphthene	106	351	494	49.6%	316	486	43.2%	10.5%
Dibenzofuran	92.8	380	494	58.1%	345	486	51.9%	9.7%
Diethylphthalate	< 19.7	388	494	78.5%	365	486	75.1%	6.1%
Fluorene	383	433	494	10.1%	382	486	NA	12.5%
N-Nitrosodiphenylamine	< 19.7	483	494	97.8%	454	486	93.4%	6.2%
Hexachlorobenzene	< 19.7	352	494	71.3%	325	486	66.9%	8.0%
Pentachlorophenol	< 98.5	409	494	82.8%	435	486	89.5%	6.2%
Phenanthrene	2140	611	494	NA	483	486	NA	23.4%
Anthracene	426	500	494	15.0%	404	486	NA	21.2%
Di-n-Butylphthalate	< 19.7	429	494	86.8%	400	486	82.3%	7.0%
Fluoranthene	2530	1310	494	NA	865	486	NA	40.9%
Pyrene	2670	1240	494	NA	780	486	NA	45.5%
Butylbenzylphthalate	< 19.7	409	494	82.8%	382	486	78.6%	6.8%
Benzo(a)anthracene	1140	887	494	NA	643	486	NA	31.9%
bis(2-Ethylhexyl)phthalate	35.1	324	494	58.5%	306	486	55.7%	5.7%
Chrysene	1220	894	494	NA	666	486	NA	29.2%
Di-n-Octyl phthalate	< 19.7	261	494	52.8%	250	486	51.4%	4.3%
Benzo(b)fluoranthene	1090	1000	494	NA	780	486	NA	24.7%
Benzo(k)fluoranthene	1090	1050	494	NA	669	486	NA	44.3%
Benzo(a)pyrene	1200	943	494	NA	663	486	NA	34.9%
Indeno(1,2,3-cd)pyrene	405	414	494	1.8%	318	486	NA	26.2%
Dibenz(a,h)anthracene	75.5	323	494	50.1%	264	486	38.8%	20.1%
Benzo(g,h,i)perylene	356	332	494	NA	255	486	NA	26.2%
1-Methylnaphthalene	135	374	494	48.4%	332	486	40.5%	11.9%

Results reported in µg/kg

RPD calculated using sample concentrations per SW846.

NA-No recovery due to high concentration of analyte in original sample and/or calculated negative recovery.

Sample ID: BBP-SS-02  
MATRIX SPIKE

Lab Sample ID: NM66B  
LIMS ID: 08-21964  
Matrix: Sediment  
Data Release Authorized:   
Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/04/08  
Date Analyzed: 09/11/08 23:40  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: Yes

Sample Amount: 25.3 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 38.7%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	---
541-73-1	1,3-Dichlorobenzene	20	---
106-46-7	1,4-Dichlorobenzene	20	---
100-51-6	Benzyl Alcohol	20	---
95-50-1	1,2-Dichlorobenzene	20	---
95-48-7	2-Methylphenol	20	---
106-44-5	4-Methylphenol	20	---
67-72-1	Hexachloroethane	20	---
105-67-9	2,4-Dimethylphenol	20	---
65-85-0	Benzoic Acid	200	---
120-82-1	1,2,4-Trichlorobenzene	20	---
91-20-3	Naphthalene	20	---
87-68-3	Hexachlorobutadiene	20	---
91-57-6	2-Methylnaphthalene	20	---
131-11-3	Dimethylphthalate	20	---
208-96-8	Acenaphthylene	20	---
83-32-9	Acenaphthene	20	---
132-64-9	Dibenzofuran	20	---
84-66-2	Diethylphthalate	20	---
86-73-7	Fluorene	20	---
86-30-6	N-Nitrosodiphenylamine	20	---
118-74-1	Hexachlorobenzene	20	---
87-86-5	Pentachlorophenol	99	---
85-01-8	Phenanthrene	20	---
120-12-7	Anthracene	20	---
84-74-2	Di-n-Butylphthalate	20	---
206-44-0	Fluoranthene	20	---
129-00-0	Pyrene	20	---
85-68-7	Butylbenzylphthalate	20	---
56-55-3	Benzo (a) anthracene	20	---
117-81-7	bis (2-Ethylhexyl) phthalate	20	---
218-01-9	Chrysene	20	---
117-84-0	Di-n-Octyl phthalate	20	---
205-99-2	Benzo (b) fluoranthene	20	---
207-08-9	Benzo (k) fluoranthene	20	---
50-32-8	Benzo (a) pyrene	20	---
193-39-5	Indeno (1,2,3-cd) pyrene	20	---
53-70-3	Dibenz (a,h) anthracene	20	---
191-24-2	Benzo (g,h,i) perylene	20	---

Sample ID: BBP-SS-02  
MATRIX SPIKE

Lab Sample ID: NM66B  
LIMS ID: 08-21964  
Matrix: Sediment  
Date Analyzed: 09/11/08 23:40

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17


CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	20	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	59.6%	2-Fluorobiphenyl	64.4%
d14-p-Terphenyl	72.8%	d4-1,2-Dichlorobenzene	54.8%
d5-Phenol	78.7%	2-Fluorophenol	58.9%
2,4,6-Tribromophenol	86.1%	d4-2-Chlorophenol	65.9%

Sample ID: BBP-SS-02  
MATRIX SPIKE DUPLICATE

Lab Sample ID: NM66B  
LIMS ID: 08-21964  
Matrix: Sediment  
Data Release Authorized:   
Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/04/08  
Date Analyzed: 09/12/08 00:15  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: Yes

Sample Amount: 25.7 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 38.7%

CAS Number	Analyte	RL	Result
108-95-2	Phenol	19	---
541-73-1	1,3-Dichlorobenzene	19	---
106-46-7	1,4-Dichlorobenzene	19	---
100-51-6	Benzyl Alcohol	19	---
95-50-1	1,2-Dichlorobenzene	19	---
95-48-7	2-Methylphenol	19	---
106-44-5	4-Methylphenol	19	---
67-72-1	Hexachloroethane	19	---
105-67-9	2,4-Dimethylphenol	19	---
65-85-0	Benzoic Acid	190	---
120-82-1	1,2,4-Trichlorobenzene	19	---
91-20-3	Naphthalene	19	---
87-68-3	Hexachlorobutadiene	19	---
91-57-6	2-Methylnaphthalene	19	---
131-11-3	Dimethylphthalate	19	---
208-96-8	Acenaphthylene	19	---
83-32-9	Acenaphthene	19	---
132-64-9	Dibenzofuran	19	---
84-66-2	Diethylphthalate	19	---
86-73-7	Fluorene	19	---
86-30-6	N-Nitrosodiphenylamine	19	---
118-74-1	Hexachlorobenzene	19	---
87-86-5	Pentachlorophenol	97	---
85-01-8	Phenanthrene	19	---
120-12-7	Anthracene	19	---
84-74-2	Di-n-Butylphthalate	19	---
206-44-0	Fluoranthene	19	---
129-00-0	Pyrene	19	---
85-68-7	Butylbenzylphthalate	19	---
56-55-3	Benzo (a) anthracene	19	---
117-81-7	bis (2-Ethylhexyl) phthalate	19	---
218-01-9	Chrysene	19	---
117-84-0	Di-n-Octyl phthalate	19	---
205-99-2	Benzo (b) fluoranthene	19	---
207-08-9	Benzo (k) fluoranthene	19	---
50-32-8	Benzo (a) pyrene	19	---
193-39-5	Indeno (1,2,3-cd) pyrene	19	---
53-70-3	Dibenz (a, h) anthracene	19	---
191-24-2	Benzo (g, h, i) perylene	19	---

ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2



Sample ID: BBP-SS-02  
 MATRIX SPIKE DUPLICATE

Lab Sample ID: NM66B  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Date Analyzed: 09/12/08 00:15

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	19	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.0%	2-Fluorobiphenyl	59.2%
d14-p-Terphenyl	67.2%	d4-1,2-Dichlorobenzene	48.0%
d5-Phenol	72.3%	2-Fluorophenol	54.1%
2,4,6-Tribromophenol	83.2%	d4-2-Chlorophenol	59.7%



Sample ID: LCS-090408  
 LCS/LCSD

Lab Sample ID: LCS-090408  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted LCS/LCSD: 09/04/08

Sample Amount LCS: 25.0 g

Date Analyzed LCS: 09/11/08 19:36  
 LCSD: 09/11/08 20:11

Final Extract Volume LCS: 0.5 mL  
 LCSD: 0.5 mL

Instrument/Analyst LCS: NT6/LJR  
 LCSD: NT6/LJR

Dilution Factor LCS: 1.00  
 LCSD: 1.00

GPC Cleanup: YES

Percent Moisture: NA

Analyte	LCS			LCSD			RPD
	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	
Phenol	266	500	53.2%	280	500	56.0%	5.1%
1,3-Dichlorobenzene	259	500	51.8%	272	500	54.4%	4.9%
1,4-Dichlorobenzene	256	500	51.2%	276	500	55.2%	7.5%
Benzyl Alcohol	172	1000	17.2%	158	1000	15.8%	8.5%
1,2-Dichlorobenzene	263	500	52.6%	281	500	56.2%	6.6%
2-Methylphenol	262	500	52.4%	310	500	62.0%	16.8%
4-Methylphenol	554	1000	55.4%	575	1000	57.5%	3.7%
Hexachloroethane	245	500	49.0%	266	500	53.2%	8.2%
2,4-Dimethylphenol	221	500	44.2%	241	500	48.2%	8.7%
Benzoic Acid	1060	1500	70.7%	1150	1500	76.7%	8.1%
1,2,4-Trichlorobenzene	270	500	54.0%	286	500	57.2%	5.8%
Naphthalene	275	500	55.0%	294	500	58.8%	6.7%
Hexachlorobutadiene	268	500	53.6%	285	500	57.0%	6.1%
2-Methylnaphthalene	289	500	57.8%	303	500	60.6%	4.7%
Dimethylphthalate	341	500	68.2%	351	500	70.2%	2.9%
Acenaphthylene	296	500	59.2%	250	500	50.0%	16.8%
Acenaphthene	301	500	60.2%	314	500	62.8%	4.2%
Dibenzofuran	340	500	68.0%	353	500	70.6%	3.8%
Diethylphthalate	369	500	73.8%	378	500	75.6%	2.4%
Fluorene	348	500	69.6%	358	500	71.6%	2.8%
N-Nitrosodiphenylamine	428	500	85.6%	430	500	86.0%	0.5%
Hexachlorobenzene	323	500	64.6%	333	500	66.6%	3.0%
Pentachlorophenol	411	500	82.2%	427	500	85.4%	3.8%
Phenanthrene	352	500	70.4%	365	500	73.0%	3.6%
Anthracene	312	500	62.4%	267	500	53.4%	15.5%
Di-n-Butylphthalate	419	500	83.8%	433	500	86.6%	3.3%
Fluoranthene	422	500	84.4%	430	500	86.0%	1.9%
Pyrene	308	500	61.6%	315	500	63.0%	2.2%
Butylbenzylphthalate	385	500	77.0%	393	500	78.6%	2.1%
Benzo(a)anthracene	344	500	68.8%	339	500	67.8%	1.5%
bis(2-Ethylhexyl)phthalate	294	500	58.8%	299	500	59.8%	1.7%
Chrysene	353	500	70.6%	360	500	72.0%	2.0%
Di-n-Octyl phthalate	239	500	47.8%	247	500	49.4%	3.3%
Benzo(b)fluoranthene	460	500	92.0%	476	500	95.2%	3.4%



Sample ID: LCSD-090408  
 LCS/LCSD

Lab Sample ID: LCS-090408  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Date Analyzed LCS: 09/11/08 19:36  
 LCSD: 09/11/08 20:11

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzo(k)fluoranthene	403	500	80.6%	396	500	79.2%	1.8%
Benzo(a)pyrene	296	500	59.2%	260	500	52.0%	12.9%
Indeno(1,2,3-cd)pyrene	310	500	62.0%	314	500	62.8%	1.3%
Dibenz(a,h)anthracene	298	500	59.6%	304	500	60.8%	2.0%
Benzo(g,h,i)perylene	290	500	58.0%	294	500	58.8%	1.4%
1-Methylnaphthalene	305	500	61.0%	327	500	65.4%	7.0%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	53.6%	56.8%
2-Fluorobiphenyl	59.6%	62.0%
d14-p-Terphenyl	66.4%	67.2%
d4-1,2-Dichlorobenzene	52.4%	55.6%
d5-Phenol	66.7%	69.6%
2-Fluorophenol	52.5%	55.5%
2,4,6-Tribromophenol	76.0%	76.8%
d4-2-Chlorophenol	57.1%	60.3%

Results reported in  $\mu\text{g}/\text{kg}$   
 RPD calculated using sample concentrations per SW846.

4B  
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

NM66MBS1

Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

ARI Job No: NM66

Project: BELLINGHAM BAY PILES

Lab File ID: NM66MB

Date Extracted: 09/04/08

Instrument ID: NT6

Date Analyzed: 09/11/08

Matrix: SOLID

Time Analyzed: 1901

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	NM66LCSS1	NM66LCSS1	NM66SB	09/11/08
02	NM66LCSDS1	NM66LCSDS1	NM66SBD	09/11/08
03	BBP-SS-01	NM66A	NM66A	09/11/08
04	BBP-SS-02	NM66B	NM66B	09/11/08
05	BBP-SS-02 MS	NM66BMS	NM66BMS	09/11/08
06	BBP-SS-02 MSD	NM66BMSD	NM66BMD	09/12/08
07	BBP-SS-03	NM66C	NM66C	09/12/08
08	BBP-SC-01	NM66D	NM66D	09/12/08
09	BBP-SC-02	NM66E	NM66E	09/12/08
10	BBP-SS-02	NM66B	NM66BDL	09/15/08
11	BBP-SS-03	NM66C	NM66CDL	09/15/08
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2


Sample ID: MB-090408

METHOD BLANK

Lab Sample ID: MB-090408

LIMS ID: 08-21964

Matrix: Sediment

Data Release Authorized: 

Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles

17330-17

Date Sampled: NA

Date Received: NA

Date Extracted: 09/04/08

Date Analyzed: 09/11/08 19:01

Instrument/Analyst: NT6/LJR

GPC Cleanup: Yes

Sample Amount: 25.0 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	RL	Result
108-95-2	Phenol	20	< 20 U
541-73-1	1,3-Dichlorobenzene	20	< 20 U
106-46-7	1,4-Dichlorobenzene	20	< 20 U
100-51-6	Benzyl Alcohol	20	< 20 U
95-50-1	1,2-Dichlorobenzene	20	< 20 U
95-48-7	2-Methylphenol	20	< 20 U
106-44-5	4-Methylphenol	20	< 20 U
67-72-1	Hexachloroethane	20	< 20 U
105-67-9	2,4-Dimethylphenol	20	< 20 U
65-85-0	Benzoic Acid	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	20	< 20 U
91-20-3	Naphthalene	20	< 20 U
87-68-3	Hexachlorobutadiene	20	< 20 U
91-57-6	2-Methylnaphthalene	20	< 20 U
131-11-3	Dimethylphthalate	20	< 20 U
208-96-8	Acenaphthylene	20	< 20 U
83-32-9	Acenaphthene	20	< 20 U
132-64-9	Dibenzofuran	20	< 20 U
84-66-2	Diethylphthalate	20	< 20 U
86-73-7	Fluorene	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	20	< 20 U
118-74-1	Hexachlorobenzene	20	< 20 U
87-86-5	Pentachlorophenol	100	< 100 U
85-01-8	Phenanthrene	20	< 20 U
120-12-7	Anthracene	20	< 20 U
84-74-2	Di-n-Butylphthalate	20	< 20 U
206-44-0	Fluoranthene	20	< 20 U
129-00-0	Pyrene	20	< 20 U
85-68-7	Butylbenzylphthalate	20	< 20 U
56-55-3	Benzo(a)anthracene	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	20	< 20 U
218-01-9	Chrysene	20	< 20 U
117-84-0	Di-n-Octyl phthalate	20	< 20 U
205-99-2	Benzo(b)fluoranthene	20	< 20 U
207-08-9	Benzo(k)fluoranthene	20	< 20 U
50-32-8	Benzo(a)pyrene	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	20	< 20 U

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2

Sample ID: MB-090408  
METHOD BLANK

Lab Sample ID: MB-090408  
LIMS ID: 08-21964  
Matrix: Sediment  
Date Analyzed: 09/11/08 19:01

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

CAS Number	Analyte	RL	Result
90-12-0	1-Methylnaphthalene	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	63.2%	2-Fluorobiphenyl	64.0%
d14-p-Terphenyl	70.8%	d4-1,2-Dichlorobenzene	65.2%
d5-Phenol	80.0%	2-Fluorophenol	62.1%
2,4,6-Tribromophenol	63.5%	d4-2-Chlorophenol	69.6%

**NWTPHDx**

ORGANICS ANALYSIS DATA SHEET  
 TOTAL DIESEL RANGE HYDROCARBONS  
 NWTPHD by GC/FID-Silica and Acid Cleaned  
 Page 1 of 1  
 Matrix: Sediment



QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17

Data Release Authorized:  
 Reported: 09/16/08

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	RL	Result
MB-090808 08-21963	Method Blank HC ID: ---	09/08/08	09/12/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	5.0 10	< 5.0 U < 10 U 77.8%
NM66A 08-21963	BBP-SS-01 HC ID: DRO/RRO	09/08/08	09/12/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	7.3 15	10 15 81.1%
NM66B 08-21964	BBP-SS-02 HC ID: DRO	09/08/08	09/12/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	8.1 16	15 < 16 U 74.0%
NM66C 08-21965	BBP-SS-03 HC ID: DRO/MOTOR OIL	09/08/08	09/12/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	24 48	61 180 73.3%
NM66D 08-21966	BBP-SC-01 HC ID: DRO/RRO	09/08/08	09/12/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	8.0 16	22 20 72.0%
NM66E 08-21967	BBP-SC-02 HC ID: DRO/RRO	09/08/08	09/12/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	10 21	41 36 70.9%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.  
 DL-Dilution of extract prior to analysis.  
 RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.  
 Motor Oil quantitation on total peaks in the range from C24 to C38.  
 HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.

**CLEANED TPHD SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
MB-090808	77.8%	0
LCS-090808	79.8%	0
LCSD-090808	75.8%	0
BBP-SS-01	81.1%	0
BBP-SS-01 MS	73.6%	0
BBP-SS-01 MSD	78.2%	0
BBP-SS-02	74.0%	0
BBP-SS-03	73.3%	0
BBP-SC-01	72.0%	0
BBP-SC-02	70.9%	0

**LCS/MB LIMITS            QC LIMITS**

(OTER) = o-Terphenyl

(62-118)

(49-125)

Prep Method: SW3546  
Log Number Range: 08-21963 to 08-21967



**ORGANICS ANALYSIS DATA SHEET**

NWTPHD by GC/FID-Silica and Acid Cleaned

Page 1 of 1

Sample ID: BBP-SS-01  
MS/MSD

Lab Sample ID: NM66A

LIMS ID: 08-21963

Matrix: Sediment

Data Release Authorized: *AB*

Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Date Extracted MS/MSD: 09/08/08

Sample Amount MS: 6.77 g-dry-wt

MSD: 6.80 g-dry-wt

Date Analyzed MS: 09/12/08 00:56

Final Extract Volume MS: 1.0 mL

MSD: 09/12/08 01:12

MSD: 1.0 mL

Instrument/Analyst MS: FID/MS

Dilution Factor MS: 1.0

MSD: FID/MS

MSD: 1.0

Percent Moisture: 34.5%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	10.5	142	222	59.2%	151	221	63.6%	6.1%

**TPHD Surrogate Recovery**

	MS	MSD
o-Terphenyl	73.6%	78.2%

Results reported in mg/kg

RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**  
 NWTPHD by GC/FID-Silica and Acid Cleaned  
 Page 1 of 1

Sample ID: LCS-090808  
 LCS/LCSD

Lab Sample ID: LCS-090808  
 LIMS ID: 08-21963  
 Matrix: Sediment  
 Data Release Authorized: *[Signature]*  
 Reported: 09/16/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted LCS/LCSD: 09/08/08  
 Date Analyzed LCS: 09/11/08 23:54  
 LCSD: 09/12/08 00:10  
 Instrument/Analyst LCS: FID/MS  
 LCSD: FID/MS

Sample Amount LCS: 10.0 g  
 LCSD: 10.0 g  
 Final Extract Volume LCS: 1.0 mL  
 LCSD: 1.0 mL  
 Dilution Factor LCS: 1.0  
 LCSD: 1.0

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	100	150	66.7%	95.8	150	63.9%	4.3%

**TPHD Surrogate Recovery**

	LCS	LCSD
o-Terphenyl	79.8%	75.8%

Results reported in mg/kg  
 RPD calculated using sample concentrations per SW846.

4  
TPH METHOD BLANK SUMMARY

BLANK NO.

NM66MBS1

Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

SDG No.: NM66

Project No.: BELLINGHAM BAY PILES

Date Extracted: 09/08/08

Matrix: SOLID

Date Analyzed : 09/12/08

Instrument ID : FID3A

Time Analyzed : 0025

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
	=====	=====	=====
01	NM66LCSS1	NM66LCSS1	09/11/08
02	NM66LCSDS1	NM66LCSDS1	09/12/08
03	BBP-SS-01	NM66A	09/12/08
04	BBP-SS-01 MS	NM66AMS	09/12/08
05	BBP-SS-01 MS	NM66AMSD	09/12/08
06	BBP-SS-02	NM66B	09/12/08
07	BBP-SS-03	NM66C	09/12/08
08	BBP-SC-01	NM66D	09/12/08
09	BBP-SC-02	NM66E	09/12/08
10			

## **METALS**

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: BBP-SS-01  
SAMPLE

Lab Sample ID: NM66A

LIMS ID: 08-21963

Matrix: Sediment

Data Release Authorized: 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles  
17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 70.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	09/12/08	6010B	09/25/08	7440-38-2	Arsenic	7	7	U
3050B	09/12/08	6010B	09/25/08	7440-43-9	Cadmium	0.3	0.3	
3050B	09/12/08	6010B	09/25/08	7440-47-3	Chromium	0.7	22.9	
3050B	09/12/08	6010B	09/25/08	7440-50-8	Copper	0.3	12.7	
3050B	09/12/08	6010B	09/25/08	7439-92-1	Lead	3	5	
CLP	09/15/08	7471A	09/19/08	7439-97-6	Mercury	0.06	0.08	
3050B	09/12/08	6010B	09/25/08	7440-02-0	Nickel	1	26	
3050B	09/12/08	6010B	09/25/08	7440-22-4	Silver	0.4	0.4	U
3050B	09/12/08	6010B	09/25/08	7440-66-6	Zinc	1	43	

U-Analyte undetected at given RL


RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

Sample ID: BBP-SS-01  
DUPLICATE

Lab Sample ID: NM66A  
LIMS ID: 08-21963  
Matrix: Sediment  
Data Release Authorized   
Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

**MATRIX DUPLICATE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	6010B	7 U	7 U	0.0%	+/- 7	L
Cadmium	6010B	0.3	0.3	0.0%	+/- 0.3	L
Chromium	6010B	22.9	24.4	6.3%	+/- 20%	
Copper	6010B	12.7	14.0	9.7%	+/- 20%	
Lead	6010B	5	5	0.0%	+/- 3	L
Mercury	7471A	0.08	0.08	0.0%	+/- 0.06	L
Nickel	6010B	26	29	10.9%	+/- 20%	
Silver	6010B	0.4 U	0.4 U	0.0%	+/- 0.4	L
Zinc	6010B	43	47	8.9%	+/- 20%	

Reported in mg/kg-dry

\*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: BBP-SS-01  
MATRIX SPIKE

Lab Sample ID: NM66A

LIMS ID: 08-21963

Matrix: Sediment

Data Release Authorized: 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

**MATRIX SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	6010B	7 U	299	278	108%	
Cadmium	6010B	0.3	63.7	69.4	91.4%	
Chromium	6010B	22.9	87.7	69.4	93.4%	
Copper	6010B	12.7	79.1	69.4	95.7%	
Lead	6010B	5	264	278	93.2%	
Mercury	7471A	0.08	0.68	0.579	104%	
Nickel	6010B	26	91	69.4	93.7%	
Silver	6010B	0.4 U	68.3	69.4	98.4%	
Zinc	6010B	43	110	69.4	96.5%	

Reported in mg/kg-dry

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: BBP-SS-02

SAMPLE

Lab Sample ID: NM66B

LIMS ID: 08-21964

Matrix: Sediment

Data Release Authorized 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 65.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	09/12/08	6010B	09/25/08	7440-38-2	Arsenic	8	8	U
3050B	09/12/08	6010B	09/25/08	<b>7440-43-9</b>	Cadmium	0.3	0.3	
3050B	09/12/08	6010B	09/25/08	<b>7440-47-3</b>	Chromium	0.8	25.2	
3050B	09/12/08	6010B	09/25/08	<b>7440-50-8</b>	Copper	0.3	14.5	
3050B	09/12/08	6010B	09/25/08	<b>7439-92-1</b>	Lead	3	8	
CLP	09/15/08	7471A	09/19/08	<b>7439-97-6</b>	Mercury	0.07	0.11	
3050B	09/12/08	6010B	09/25/08	<b>7440-02-0</b>	Nickel	2	30	
3050B	09/12/08	6010B	09/25/08	7440-22-4	Silver	0.5	0.5	U
3050B	09/12/08	6010B	09/25/08	<b>7440-66-6</b>	Zinc	2	46	

U-Analyte undetected at given RL

RL-Reporting Limit



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

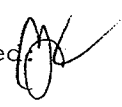
Page 1 of 1

Sample ID: BBP-SS-03  
SAMPLE

Lab Sample ID: NM66C

LIMS ID: 08-21965

Matrix: Sediment

Data Release Authorized: 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles  
17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 19.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	09/12/08	6010B	09/25/08	7440-38-2	Arsenic	20	20	U
3050B	09/12/08	6010B	09/25/08	7440-43-9	Cadmium	1	2	
3050B	09/12/08	6010B	09/25/08	7440-47-3	Chromium	2	15	
3050B	09/12/08	6010B	09/25/08	7440-50-8	Copper	1	32	
3050B	09/12/08	6010B	09/25/08	7439-92-1	Lead	10	30	
CLP	09/15/08	7471A	09/19/08	7439-97-6	Mercury	0.2	0.2	U
3050B	09/12/08	6010B	09/25/08	7440-02-0	Nickel	5	19	
3050B	09/12/08	6010B	09/25/08	7440-22-4	Silver	1	1	U
3050B	09/12/08	6010B	09/25/08	7440-66-6	Zinc	5	84	

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

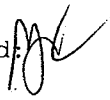
Page 1 of 1

Sample ID: BBP-SC-01  
SAMPLE

Lab Sample ID: NM66D

LIMS ID: 08-21966

Matrix: Sediment

Data Release Authorized: 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles  
17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 68.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	09/12/08	6010B	09/25/08	7440-38-2	Arsenic	7	7	
3050B	09/12/08	6010B	09/25/08	7440-43-9	Cadmium	0.3	0.4	
3050B	09/12/08	6010B	09/25/08	7440-47-3	Chromium	0.7	26.5	
3050B	09/12/08	6010B	09/25/08	7440-50-8	Copper	0.3	18.1	
3050B	09/12/08	6010B	09/25/08	7439-92-1	Lead	3	7	
CLP	09/15/08	7471A	09/19/08	7439-97-6	Mercury	0.06	0.11	
3050B	09/12/08	6010B	09/25/08	7440-02-0	Nickel	1	36	
3050B	09/12/08	6010B	09/25/08	7440-22-4	Silver	0.4	0.4	U
3050B	09/12/08	6010B	09/25/08	7440-66-6	Zinc	1	48	

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: **BBP-SC-02**  
SAMPLE

Lab Sample ID: NM66E

LIMS ID: 08-21967

Matrix: Sediment

Data Release Authorized: 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles  
17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 46.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	09/12/08	6010B	09/25/08	7440-38-2	Arsenic	10	10	U
3050B	09/12/08	6010B	09/25/08	7440-43-9	Cadmium	0.4	0.4	U
3050B	09/12/08	6010B	09/25/08	<b>7440-47-3</b>	<b>Chromium</b>	1	28	
3050B	09/12/08	6010B	09/25/08	<b>7440-50-8</b>	<b>Copper</b>	0.4	18.2	
3050B	09/12/08	6010B	09/25/08	<b>7439-92-1</b>	<b>Lead</b>	4	7	
CLP	09/15/08	7471A	09/19/08	7439-97-6	Mercury	0.08	0.08	U
3050B	09/12/08	6010B	09/25/08	<b>7440-02-0</b>	<b>Nickel</b>	2	38	
3050B	09/12/08	6010B	09/25/08	7440-22-4	Silver	0.6	0.6	U
3050B	09/12/08	6010B	09/25/08	<b>7440-66-6</b>	<b>Zinc</b>	2	57	

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: NM66MB

LIMS ID: 08-21964

Matrix: Sediment

Data Release Authorized: 

Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.

Project: Bellingham Bay Piles

17330-17

Date Sampled: NA

Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	09/12/08	6010B	09/25/08	7440-38-2	Arsenic	5	5	U
3050B	09/12/08	6010B	09/25/08	7440-43-9	Cadmium	0.2	0.2	U
3050B	09/12/08	6010B	09/25/08	7440-47-3	Chromium	0.5	0.5	U
3050B	09/12/08	6010B	09/25/08	7440-50-8	Copper	0.2	0.2	U
3050B	09/12/08	6010B	09/25/08	7439-92-1	Lead	2	2	U
CLP	09/15/08	7471A	09/19/08	7439-97-6	Mercury	0.05	0.05	U
3050B	09/12/08	6010B	09/25/08	7440-02-0	Nickel	1	1	U
3050B	09/12/08	6010B	09/25/08	7440-22-4	Silver	0.3	0.3	U
3050B	09/12/08	6010B	09/25/08	<b>7440-66-6</b>	<b>Zinc</b>	1	1	

U-Analyte undetected at given RL

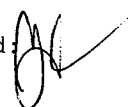
RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**  
**TOTAL METALS**  
 Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: NM66LCS  
 LIMS ID: 08-21964  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/29/08

QC Report No: NM66-Hart Crowser, Inc.  
 Project: Bellingham Bay Piles  
 17330-17  
 Date Sampled: NA  
 Date Received: NA



**BLANK SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	6010B	215	200	108%	
Cadmium	6010B	48.2	50.0	96.4%	
Chromium	6010B	48.6	50.0	97.2%	
Copper	6010B	49.2	50.0	98.4%	
Lead	6010B	207	200	104%	
Mercury	7471A	1.09	1.00	109%	
Nickel	6010B	49	50	98.0%	
Silver	6010B	50.3	50.0	101%	
Zinc	6010B	50	50	100%	

Reported in mg/kg-dry

N-Control limit not met  
 NA-Not Applicable, Analyte Not Spiked  
 Control Limits: 80-120%

# **GENERAL CHEMISTRY**

SAMPLE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/17/08

Project: Bellingham Bay Files  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: BBP-SS-01  
ARI ID: 08-21963 NM66A

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/02/08 090208#2	EPA 160.3	Percent	0.01	65.30
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	69.50
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.15	10.4
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	13.3	212
Total Organic Carbon	10/15/08 101508#1	Plumb, 1981	Percent	0.020	2.40

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

SAMPLE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: BBP-SS-02  
ARI ID: 08-21964 NM66B

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/02/08 090208#2	EPA 160.3	Percent	0.01	62.20
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	50.90
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.16	6.93
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	18.6	265
Total Organic Carbon	10/15/08 101508#1	Plumb, 1981	Percent	0.182	4.10

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.



SAMPLE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: BBP-SS-03  
ARI ID: 08-21965 NM66C

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/02/08 090208#2	EPA 160.3	Percent	0.01	20.40
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	18.80
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.48	2.82
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	26.5	290
Total Organic Carbon	10/15/08 101508#1	Plumb, 1981	Percent	0.198	86.5

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

SAMPLE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: BBP-SC-01  
ARI ID: 08-21966 NM66D

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/02/08 090208#2	EPA 160.3	Percent	0.01	67.00
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	64.40
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.14	2.88
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	14.7	234
Total Organic Carbon	10/15/08 101508#1	Plumb, 1981	Percent	0.212	9.49

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

SAMPLE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: BBP-SC-02  
ARI ID: 08-21967 NM66E

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/02/08 090208#2	EPA 160.3	Percent	0.01	48.10
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	38.40
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.20	3.79
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	25.9	393
Total Organic Carbon	10/15/08 101508#1	Plumb, 1981	Percent	0.174	10.1

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

METHOD BLANK RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *ML*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: NA  
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	09/02/08	Percent	< 0.01 U
	09/02/08		< 0.01 U
Preserved Total Solids	09/01/08	Percent	< 0.01 U
N-Ammonia	09/01/08	mg-N/kg	< 0.10 U
Sulfide	09/01/08	mg/kg	< 1.00 U
Total Organic Carbon	10/15/08	Percent	< 0.020 U

LAB CONTROL RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 10/17/08

A handwritten signature in black ink, appearing to be 'JC' or similar, written over the text 'Data Release Authorized'.

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: NA  
Date Received: NA

Analyte	Date	Units	LCS	Spike Added	Recovery
Sulfide	09/01/08	mg/kg	6.91	7.20	96.0%
Total Organic Carbon	10/15/08	Percent	0.522	0.500	104.4%

STANDARD REFERENCE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *mi*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: NA  
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
N-Ammonia SPEX 28-24AS	09/01/08	mg-N/kg	9.79	10.0	97.9%
Total Organic Carbon NIST #8704	10/15/08	Percent	3.41	3.35	101.8%

REPLICATE RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 10/17/08

A handwritten signature in black ink, appearing to be 'JK' or similar, written over the 'Data Release Authorized' text.

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: NM66A Client ID: BBP-SS-01					
Total Solids	09/02/08	Percent	65.30	65.10 63.30	1.7%
Preserved Total Solids	09/01/08	Percent	69.50	69.70 69.30	0.3%
N-Ammonia	09/01/08	mg-N/kg	10.4	9.29	11.3%
Sulfide	09/01/08	mg/kg	212	257	19.2%
Total Organic Carbon	10/15/08	Percent	2.40	2.17 2.25	5.1%

MS/MSD RESULTS-CONVENTIONALS  
NM66-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/17/08

Project: Bellingham Bay Piles  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: NM66A    Client ID: BBP-SS-01						
N-Ammonia	09/01/08	mg-N/kg	10.4	153	152	94.0%
Sulfide	09/01/08	mg/kg	212	562	410	85.4%
Total Organic Carbon	10/15/08	Percent	2.40	4.97	2.70	95.2%



**GEOTECH**

GEOTECHNICAL ANALYSIS DATA SHEET  
Moisture Content by Method ASTM D2216



Data Release Authorized: *gs*  
Reported: 10/09/08  
Date Received: 08/28/08  
Page 1 of 1

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

Client/ ARI ID	Date Sampled	Matrix	Analysis Date	Result
BBP-SS-01 NM66A 08-21963	08/26/08	Sediment	10/08/08 11:11	48.61
BBP-SS-02 NM66B 08-21964	08/26/08	Sediment	10/08/08 11:11	59.92

Reported in Percent

GEOTECHNICAL ANALYSIS DATA SHEET  
Specific Gravity by Method ASTM D854



Data Release Authorized: *gs*  
Reported: 10/09/08  
Date Received: 08/28/08  
Page 1 of 1

QC Report No: NM66-Hart Crowser, Inc.  
Project: Bellingham Bay Piles  
17330-17

Client/ ARI ID	Date Sampled	Matrix	Analysis Date	Result
BBP-SS-01 NM66A 08-21963	08/26/08	Sediment	10/08/08 11:11	2.66
BBP-SS-02 NM66B 08-21964	08/26/08	Sediment	10/08/08 11:11	2.65

Reported in Std Units

Hart Crowser, Inc.  
 Bellingham Bay Piles 17330-17

Apparent Grain Size Distribution Summary  
 Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
											9 to 10	8 to 9	7 to 8	
Phi Size	> -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	< 10	< 4
Sieve Size (microns)	> #10 (2000)	10 to 18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	< 1.0	< 230 (< 62)
NJ29 E-1	4.7	3.1	6.2	12.1	9.1	10.3	8.0	10.8	10.8	7.0	4.4	3.9	9.5	54.5
NJ29 E-2	4.8	3.6	6.6	12.0	9.2	10.2	7.2	10.7	10.4	7.3	4.6	4.2	9.2	53.5
NJ29 E-3	4.5	3.4	6.6	12.4	9.6	10.7	7.7	9.9	10.7	7.2	4.0	4.0	9.4	52.8
BBP-SS-01	11.6	5.3	5.4	16.0	34.7	12.9	4.3	4.9	1.1	0.5	0.5	0.9	1.9	14.1
BBP-SS-02	9.1	8.2	6.9	19.7	30.6	9.2	1.7	3.8	2.6	1.5	1.5	1.7	3.5	16.2

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Hart Crowser, Inc.  
 Bellingham Bay Piles 17330-17

Apparent Grain Size Distribution Summary  
 Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt					Clay					
	-3	-2	-1						0	1	2	3	4	5	6	7	8	9	10
Sieve Size (microns)	3/8"	#4	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (62)											
NJ29 E-1	100.0	99.2	95.3	92.2	86.0	73.9	64.8	54.5	31.00	15.60	7.80	3.90	2.00	1.00					
NJ29 E-2	100.0	100.0	95.2	91.6	85.0	73.0	63.8	53.5	46.4	35.6	24.8	17.8	13.5	9.5					
NJ29 E-3	100.0	99.6	95.5	92.1	85.5	73.2	63.5	52.8	45.2	35.3	25.2	18.0	13.4	9.2					
BBP-SS-01	100.0	93.9	88.4	83.1	77.8	61.7	27.0	14.1	9.8	4.9	3.8	3.3	2.8	1.9					
BBP-SS-02	100.0	99.4	90.9	82.7	75.8	56.1	25.5	16.2	14.5	10.7	8.1	6.6	5.1	3.5					

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

NM66

QA SUMMARY

PROJECT:	Hart Crowser, Inc.	Project No.:	Bellingham Bay Piles 17330-17
ARI Triplicate Sample ID:	NJ29 E	Batch No.:	NM66 -1
Client Triplicate Sample ID:	NJ29 E-1	Page:	1 of 1

Sample ID	Relative Standard Deviation, By Phi Size													
	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
NJ29 E-1	100.0	99.2	95.3	92.2	86.0	73.9	64.8	54.5	46.4	35.6	24.8	17.8	13.5	9.5
NJ29 E-2	100.0	100.0	95.2	91.6	85.0	73.0	63.8	53.5	46.4	35.7	25.2	18.0	13.4	9.2
NJ29 E-3	100.0	99.6	95.5	92.1	85.5	73.2	63.5	52.8	45.2	35.3	24.6	17.4	13.4	9.4
AVE	NA	99.60	95.32	91.98	85.51	73.33	64.04	53.62	46.00	35.53	24.88	17.73	13.41	9.35
STDEV	NA	0.40	0.14	0.30	0.49	0.47	0.67	0.82	0.70	0.20	0.32	0.31	0.04	0.18
%RSD	NA	0.40	0.14	0.33	0.58	0.64	1.05	1.53	1.52	0.56	1.29	1.73	0.32	1.94

The Triplicate Applies To The Following Samples						
Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
NJ29 E-1	8/1/2008	9/18/2008	9/25/2008	97.8		11.7
NJ29 E-2	8/1/2008	9/18/2008	9/25/2008	98.3		11.3
NJ29 E-3	8/1/2008	9/18/2008	9/25/2008	98.4		11.3
BBP-SS-01	8/26/2008	9/18/2008	10/1/2008	101.1		14.5
BBP-SS-02	8/26/2008	9/18/2008	10/1/2008	99.5		5.9

\* ARI Internal QA limits = 95-105%

Notes to the Testing:

- Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

**TOTAL SOLIDS**

Extractions Total Solids-extts  
Data By: Jim Hawk  
Created: 9/ 3/08

Worklist: 7185  
Analyst: JBH  
Comments:

ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1. NM66A 08-21963 BBP-SS-01	1.16	14.36	9.80	65.5	NR
2. NM66B 08-21964 BBP-SS-02	1.16	14.28	9.20	61.3	NR
3. NM66C 08-21965 BBP-SS-03	1.16	12.42	3.48	20.6	NR
4. NM66D 08-21966 BBP-SC-01	1.16	11.94	7.78	61.4	NR
5. NM66E 08-21967 BBP-SC-02	1.16	11.36	5.94	46.9	NR

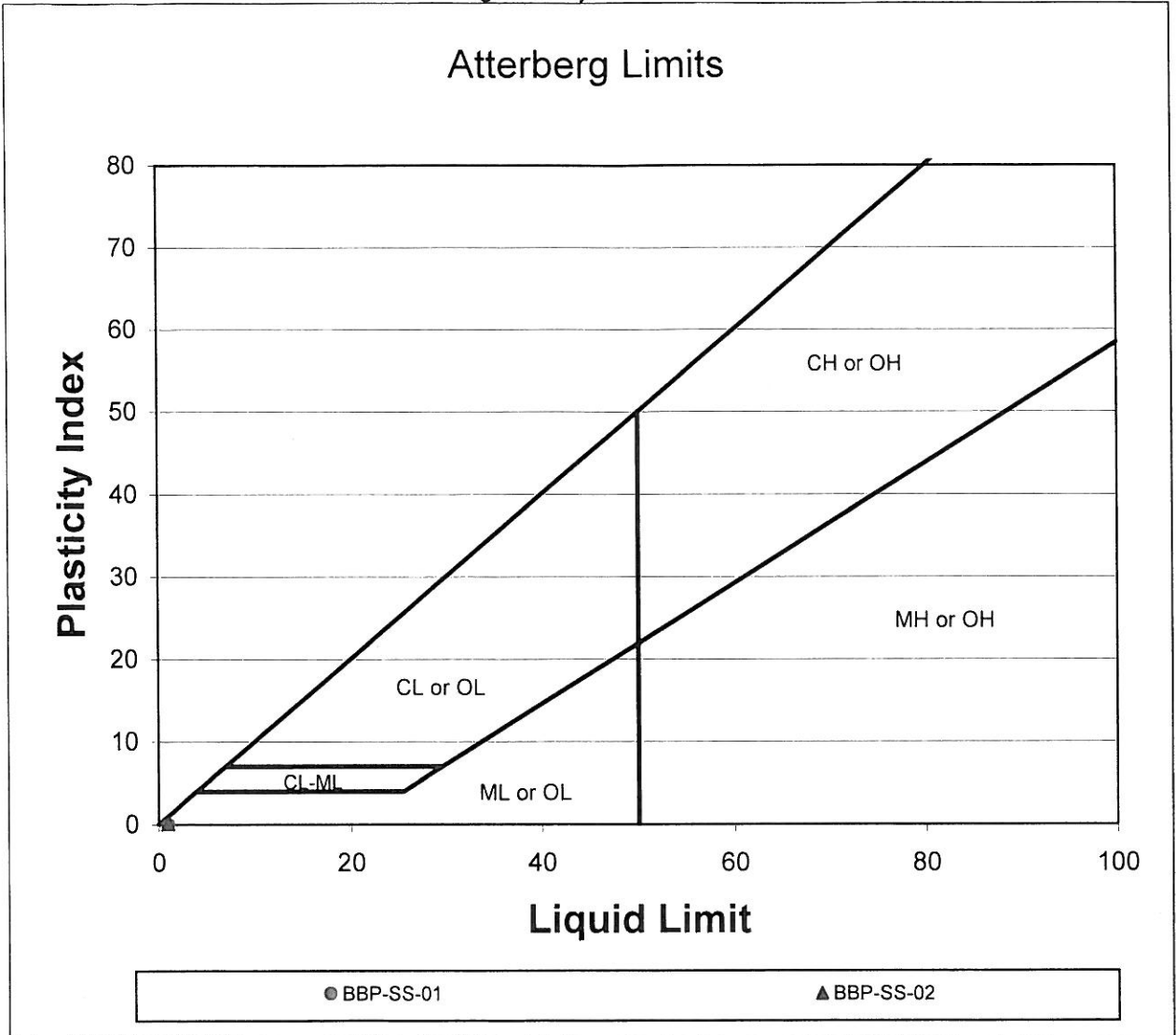


Solids Data Entry Report  
Date: 09/16/08

Checked by: KM Date: 9/16/08  
Data Analyst: DM

Solids Determination performed on 09/15/08 by DM

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
NM66	A	BBP-SS-01	1.022	10.318	7.553	70.26
NM66	B	BBP-SS-02	1.024	10.513	7.256	65.68
NM66	C	BBP-SS-03	1.026	10.107	2.780	19.32
NM66	D	BBP-SC-01	1.030	10.528	7.574	68.90
NM66	E	BBP-SC-02	1.027	10.239	5.262	45.97



Boring Number	As-Received Moisture Content	Plasticity Index	Liquid Limit	Plastic Limit	USCS
BBP-SS-01	48.62	NA	NA	NA	Non-Plastic
BBP-SS-02	59.92	NA	NA	NA	Non-Plastic

NM66



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

October 25, 2008

Mr. Roger McGinnis  
Hart Crowser, Inc.  
1910 Fairview Avenue East  
Seattle, WA 98102

**RE: Project: R. G. Haley – 17330-17**  
**ARI Job No: NM56**

Dear Mr. McGinnis:

Please find enclosed the original Chain-of-Custody record, sample receipt documentation, and the final data package for the samples from the project referenced above.

The samples were analyzed for SVOCs, NWTPH-Dx, Total Metals, Dioxin/Furans, Grain Size, and various Conventional Parameters.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this data package and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,  
ANALYTICAL RESOURCES, INC.

Kelly Bottem  
Client Services Manager  
206-695-6211  
[kellyb@arilabs.com](mailto:kellyb@arilabs.com)  
[www.arilabs.com](http://www.arilabs.com)

Enclosures

cc: files NM56

**Chain of Custody  
Documentation**

**prepared  
for**

**HART CROWSER, INC.**

**Project: R. G. HALEY, 17330-17**

**ARI JOB NO.: NM56**

**prepared  
by**

**Analytical Resources, Inc.**

# Sample Custody Record

1 of 2



Hart Crowser, Inc.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581

Samples Shipped to: ART

NM56

JOB <u>17330-17</u> LAB NUMBER _____	REQUESTED ANALYSIS NH <sub>4</sub> PH-DX 8270-SPOC MERCURY TOC TOTAL SOLIDS AMMONIA TOTAL SULFIDES DOXYS / FLUOR GRAIN SIZE	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
PROJECT NAME <u>R. G. HALEY</u>			
HART CROWSER CONTACT <u>R. MCGINNIS</u>			
SAMPLED BY: <u>AMC, CFR, RM</u>			

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NH <sub>4</sub> PH-DX	8270-SPOC	MERCURY	TOC	TOTAL SOLIDS	AMMONIA	TOTAL SULFIDES	DOXYS / FLUOR	GRAIN SIZE	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/COMPOSITING INSTRUCTIONS
	RGH-SS-01		8/26/08	1550	SED	X	X	X	X	X	X	X	X	X	5	HOLD ERM
	RGH-SS-02		8/26/08	1510	SED	X	X	X	X	X	X	X	X	X	5	CONTAINER
	RGH-SS-03		8/26/08	1425	SED	X	X	X	X	X	X	X	X	X	5	
	RGH-SC-01-0-2'		8/26/08	1732	SED	X	X	X	X				X		5	
	RGH-SC-01-2-4'		8/26/08	1742		X	X	X	X				X		4	
	RGH-SC-01-4-6'		8/26/08	1751		X	X	X	X						3	
	RGH-SC-02-0-2'		8/26/08	1830		X	X	X	X				X		4	
	RGH-SC-02-2-4'		8/26/08	1840		X	X	X	X				X		4	
	RGH-SC-02-4-6'		8/26/08	1850		X	X	X	X						3	
	RGH-SC-03-0-2'		8/27/08	1820		X	X	X	X				X		4	
	RGH-SC-03-2-4'		8/27/08	1830		X	X	X	X						3	
	RGH-SC-03-4-6'		8/27/08	1840	✓	X	X	X	X						3	

RELINQUISHED BY <u>Ray McGinnis</u> SIGNATURE <u>Ray McGinnis</u> PRINT NAME <u>Hart Crowser</u> COMPANY	DATE <u>8/28/08</u> TIME <u>16:10</u>	RECEIVED BY <u>Kimberly Riggs</u> SIGNATURE <u>Kimberly Riggs</u> PRINT NAME <u>ART</u> COMPANY	DATE <u>8/28/08</u> TIME <u>1610</u>	SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS: <u>Full Data Package</u> <u>SMS Reporting Limits</u>	TOTAL NUMBER OF CONTAINERS <u>5</u>
RELINQUISHED BY	DATE	RECEIVED BY	DATE	COOLER NO.:	STORAGE LOCATION:
SIGNATURE	TIME	SIGNATURE	TIME	See Lab Work Order No. _____	TURNAROUND TIME:
PRINT NAME		PRINT NAME		for Other Contract Requirements	<input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK
COMPANY		COMPANY			<input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD
					<input type="checkbox"/> 72 HOURS    OTHER _____





# Cooler Receipt Form

ARI Client: Hart Crowser

Project Name: R.G. Haley

COC No: \_\_\_\_\_

Delivered by: hand

Assigned ARI Job No: NM 56

Tracking No: \_\_\_\_\_

### Preliminary Examination Phase:

- Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO
- Were custody papers included with the cooler? ..... YES  NO
- Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO
- Record cooler temperature (recommended 2.0-6.0 °C for chemistry) ..... -0.2, 5.2, 13.2, 0.2

Cooler Accepted by: KR Date: 8/28/08 Time: 1610

**Complete custody forms and attach all shipping documents**

### Log-In Phase:

- Was a temperature blank included in the cooler? ..... YES  NO
- What kind of packing material was used? ..... LC5
- Was sufficient ice used (if appropriate)? ..... YES  NO
- Were all bottles sealed in individual plastic bags? ..... YES  NO
- Did all bottle arrive in good condition (unbroken)? ..... YES  NO
- Were all bottle labels complete and legible? ..... YES  NO
- Did all bottle labels and tags agree with custody papers? ..... YES  NO
- Were all bottles used correct for the requested analyses? ..... YES  NO
- Do any of the analyses (bottles) require preservation? (attach preservation checklist) ..... YES  NO
- Were all VOC vials free of air bubbles? ..... NA YES  NO
- Was sufficient amount of sample sent in each bottle? ..... YES  NO

Samples Logged by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

**\*\* Notify Project Manager of discrepancies or concerns \*\***

Explain discrepancies or negative responses:

By: \_\_\_\_\_

Date: \_\_\_\_\_

**Case Narrative**

**prepared  
for**

**HART CROWSER, INC.**

**Project: R. G. HALEY, 17330-17**

**ARI JOB NO.: NM56**

**prepared  
by**

**Analytical Resources, Inc.**



Case Narrative

Hart Crowser

R. G. Haley – 17330-17

ARI Job: NM56

October 25, 2008

Sample Receipt

Analytical Resources Inc. (ARI) accepted twenty-one sediment samples in good condition on August 28, 2008 under the ARI job referenced above. The cooler temperatures measured by IR thermometer following ARI SOP were -0.2, 0.7, 3.5, and 5.2°C and the samples were well iced. For more details regarding sample receipt, please refer to the Coor Receipt Form. All samples were frozen to protect the holding times. Please note that select sample containers were put on hold pending further client instruction.

Semivolatile Analysis (PSDDA SW8270D):

All samples were originally extracted and analyzed within the method recommended holding times for samples that were frozen.

**Initial calibration (s):** All compounds of interest were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**Internal Standard(s):** The internal standard recovery of Perylene-d12 was outside the control limits for samples **RGH-SC-01-4-6'**, **RGH-SC-03-2-4'**, **RGH-SC-04-0-2'**. The samples were re-analyzed at a dilution and the internal standard percent recoveries were within control limits. No further corrective action was required.

**Method Blank (s):** Diethylphthalate was present in the method blank **MB-090308** at a concentration that was greater than the reporting limit. All associated samples were undetected for this compound. No further corrective action was required.

**Surrogate(s):** The surrogate percent recovery of d14-p-Terphenyl was outside the control limits high for dilution sample **RGH-SC-01-4-6'**. All other surrogate percent recoveries for both the dilution and the straight sample were within control limits. Both sets of data have been included in this data package for review. No further corrective action was required.

The surrogate percent recoveries of d14-p-Terphenyl were outside the control limits for sample **RGH-SC-03-2-4'** and **RGH-SC-04-0-2'**. The samples were re-analyzed at a dilution and the surrogate percent recoveries were within control limits. Both sets of data have been included in this data package for review. No further corrective action was required.

The surrogate percent recoveries of d5-Nitrobenzene, 2-Fluorobiphenyl, d4-1,2-Dichlorobenzene, d5-Phenol, and d4-2-Chlorophenol were outside the control limits for sample **RGH-SC-03-4-6'**. The sample was re-analyzed at a dilution and the surrogate percent recoveries were comparable to the original analysis. The sample was then re-extracted and re-analyzed. The re-extraction surrogate percent recoveries were within control limits. All data sets for this sample have been included in this data package for review. No further corrective action was required.

**Case Narrative****Hart Crowser****R. G. Haley – 17330-17****ARI Job: NM56****October 25, 2008**

**MS/MSD (s):** Several matrix spike duplicate percent recoveries were outside the advisory control limits for sample **RGH-SS-01**. The matrix spike and percent recoveries were within advisory control limits and the LCS and LCSD percent recoveries were within control limits. No further corrective action was required.

Several matrix spike and matrix spike duplicate percent recoveries were outside the advisory control limits for sample **RGH-SC-06-4-6'** due to lack of sample homogeneity. All LCS and LCSD percent recoveries were within control limits. No further corrective action was required.

**LCS/LCSD (s):** The LCS percent recovery of 1,2-Dichlorobenzene was outside the control limits for **LCS-090308**. The LCSD percent recovery was within control limits. No further corrective action was required.

**NWTPH-Dx:**

All samples were extracted and analyzed within the method recommended holding times.

**Initial calibration (s):** All analytes were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**Method Blank (s):** The method blanks were free of contamination.

**Surrogate(s):** All surrogate percent recoveries were within control limits.

**MS/MSD (s):** The matrix spike percent recovery of Diesel was outside the advisory control limits high for sample **RGH-SC-06-4-6'** due to lack of sample homogeneity. The matrix spike duplicate percent recovery and all LCS and LCSD percent recoveries were within control limits. No further corrective action was required.

**LCS/LCSD (s):** The LCS and LCSD percent recoveries were within control limits.

**Total Metals (Mercury):**

All samples were prepared and analyzed within the method recommended holding times.

**Initial calibration (s):** All analytes were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**Method Blank (s):** All method blanks were free of contamination.

**MS(s):** All matrix spike percent recoveries were within control limits.



**Case Narrative**

**Hart Crowser**

**R. G. Haley – 17330-17**

**ARI Job: NM56**

**October 25, 2008**

***Duplicate(s):*** The duplicate relative percent difference of mercury was outside the control limit for sample **RGH-SC-06-4-6'**. All other quality control parameters were met for mercury. All appropriate data have been flagged with an "\*"qualifier on the appropriate Form V's. No further corrective action was required.

***LCS(s):*** All LCS percent recoveries were within control limits.

**Conventional Parameters:**

All samples were prepared and analyzed within the method recommended holding times.

***Method Blank (s):*** All method blanks were free of contamination.

***MS(s):*** The matrix spike percent recovery of sulfide fell outside the control limits low for sample **RGH-SS-03**. All other quality control parameters were met for sulfide. No further corrective action was required.

***Replicate(s):*** All replicate RPD/RSDs were within control limits.

***LCS(s):*** All LCS percent recoveries were within control limits.

***SRM(s):*** All SRM percent recoveries were within control limits.

**Geotechnical Parameters:**

A laboratory-specific Case Narrative follows.

**Dioxin/Furans:**

The Dioxin/Furans analyses were subcontracted to Test America in Sacramento, CA. The subcontracted data have been included at the end of this data package.



**Client:** Hart Crowser, Inc.

**ARI Project No.:** NM56

**Client Project:** R.G. Haley

**Client Project No.:** 17330-17

### Case Narrative

1. Three samples were submitted for grain size analysis according to Puget Sound Estuary Protocol (PSEP) methodology on August 28, 2008.
2. The samples were run in a single batch and one sample from another job was chosen for triplicate analysis. The triplicate data is reported on the QA summary.
3. Two samples did not contain the required 5 grams of fines for the pipette portion of the analysis. The analytical balance has a capacity of about 200 g (by 0.0001) and a sample that would yield 5 grams of fines could not be split and stay within the capacity of the balance.
4. Sample RGH-SS-01 contained woody or other organic matter, which may have broken down during the sieving process, affecting grain size analysis.
5. Sample RGH-SS-01 and RGH-SS-02 contained some shell and glass fragments.
6. The data is provided in summary tables and plots.
7. There were no other noted anomalies in this project.

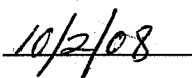
Approved by:



Title:

Lead Technician

Date:



## Data Reporting Qualifiers

Effective 12/28/04

### Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is  $\leq 5$  times the Reporting Limit and the replicate control limit defaults to  $\pm 1$  RL instead of the normal 20% RPD

### Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- NR Spiked compound recovery is not reported due to chromatographic interference
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NS The flagged analyte was not spiked into the sample

- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by  $\geq 40\%$  RPD with no obvious chromatographic interference

### **Geotechnical Data**

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting

# LCS SOLUTIONS

9/4/2008

LABEL	SOLN IC	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1534-5	PCB	20	MEOH	08/26/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1515-1	LOW PEST	0.2/0.4/2	ACETONE	01/24/09
5	1537-1	EPH	1500	MECL2	08/16/09
6*	1456-3	PCP	12.5	ACETONE	04/18/09
7	1537-3	ABN	100	ACETONE	08/01/09
8	1487-2	TBT	10	MECL2	12/15/08
9	1493-3	PORE TBT	.25/.5	MECL2	12/15/08
10	1537-2	ABN ACID	100/200	MEOH	04/10/09
11	1526-1	TPHD	15000	ACETONE	06/25/09
12	1533-1	ABN BASE	200	ACETONE	07/01/09
13*	1427-3	LOW PCB	2	ACETONE	10/11/08
14	1480-2	LOW ABN ACID	10/20	MEOH	10/09/08
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1490-4	PNA	100	MEOH	01/10/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1539-1	HERB	12.5/12500	MEOH	08/31/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1504-4	LOW ABN	10	ACETONE	10/01/08
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1522-2	OP-PEST	30	MEOH	11/30/08
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09





# SURR SOLUTIONS

9/4/2008

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1525-4	ABN	100/150	MEOH	03/13/09
B	1513-1	SIM PNA	15/75	MEOH	04/15/09
C*	1443-1	SIM ABN	10/15	MEOH	04/03/09
D	1516-3	LOW PCB	0.2	ACETONE	05/09/09
E	1478-1	HERB	62.5	MEOH	09/21/08
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1502-3	1,4DIOXANE	100	MEOH	02/20/09
H	1504-2	OP-PEST	25	MEOH	03/20/09
I*	1458-1	LOW S. PNA	03/15	MEOH	06/05/09
J	1493-2	TBT-PORE	0.25	MECL2	12/15/08
K	1490-3	MED PCB	20	ACETONE	01/14/09
L	1486-5	TBT	10	MECL2	12/15/08
M	1518-3	EPH	1500	MECL2	05/10/09
N	1518-4	PCB	2	ACETONE	05/29/09
O	1521-3	TPH	450	MECL2	12/29/08
P	1518-2	HCID	2250	MECL2	12/29/08
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	*RE-VERIFIED SOLUTION				
T					
U					
V					
W					
X					
Y					
Z					

**Data Summary Package**

**prepared  
for**

**HART CROWSER, INC.**

**Project: R. G. HALEY, 17330-17**

**ARI JOB NO.: NM56**


**prepared  
by**

**Analytical Resources, Inc.**

## **SEMIVOLATILES**

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 1 of 2

Sample ID: **RGH-SS-01**  
**SAMPLE**

Lab Sample ID: **NM56A**  
 LIMS ID: **08-21861**  
 Matrix: **Sediment**  
 Data Release Authorized:   
 Reported: **09/16/08**

QC Report No: **NM56-Hart Crowser, Inc.**  
 Project: **R.G. Haley**  
**17330-17**  
 Date Sampled: **08/26/08**  
 Date Received: **08/28/08**

Date Extracted: **09/03/08**  
 Date Analyzed: **09/11/08 16:23**  
 Instrument/Analyst: **NT4/LJR**  
 GPC Cleanup: **Yes**

Sample Amount: **25.8 g-dry-wt**  
 Final Extract Volume: **0.5 mL**  
 Dilution Factor: **1.00**  
 Percent Moisture: **23.5%**

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	30
541-73-1	1,3-Dichlorobenzene	7.2	19	< 19 U
106-46-7	1,4-Dichlorobenzene	7.1	19	< 19 U
100-51-6	Benzyl Alcohol	14	19	< 19 U
95-50-1	1,2-Dichlorobenzene	7.6	19	< 19 U
95-48-7	2-Methylphenol	14	19	< 19 U
106-44-5	4-Methylphenol	12	19	< 19 U
67-72-1	Hexachloroethane	7.0	19	< 19 U
105-67-9	2,4-Dimethylphenol	14	19	< 19 U
65-85-0	Benzoic Acid	110	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	8.8	19	< 19 U
91-20-3	Naphthalene	8.4	19	15 J
87-68-3	Hexachlorobutadiene	7.9	19	< 19 U
91-57-6	2-Methylnaphthalene	8.0	19	15 J
131-11-3	Dimethylphthalate	7.5	19	< 19 U
208-96-8	Acenaphthylene	8.4	19	9.9 J
83-32-9	Acenaphthene	8.0	19	10 J
132-64-9	Dibenzofuran	7.3	19	< 19 U
84-66-2	Diethylphthalate	16	19	< 19 U
86-73-7	Fluorene	8.7	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	8.4	19	< 19 U
118-74-1	Hexachlorobenzene	7.8	19	< 19 U
87-86-5	Pentachlorophenol	46	97	83 J
85-01-8	Phenanthrene	8.1	19	100
120-12-7	Anthracene	7.5	19	23
84-74-2	Di-n-Butylphthalate	12	19	< 19 U
206-44-0	Fluoranthene	7.7	19	180
129-00-0	Pyrene	7.5	19	160
85-68-7	Butylbenzylphthalate	11	19	< 19 U
56-55-3	Benzo(a)anthracene	5.7	19	55
117-81-7	bis(2-Ethylhexyl)phthalate	11	19	140
218-01-9	Chrysene	6.4	19	86
117-84-0	Di-n-Octyl phthalate	8.1	19	< 19 U
205-99-2	Benzo(b)fluoranthene	9.2	19	68
207-08-9	Benzo(k)fluoranthene	9.0	19	62
50-32-8	Benzo(a)pyrene	7.9	19	63
193-39-5	Indeno(1,2,3-cd)pyrene	8.3	19	28
53-70-3	Dibenz(a,h)anthracene	8.3	19	< 19 U
191-24-2	Benzo(g,h,i)perylene	6.6	19	33

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2



Sample ID: RGH-SS-01  
SAMPLE

Lab Sample ID: NM56A  
LIMS ID: 08-21861  
Matrix: Sediment  
Date Analyzed: 09/11/08 16:23


QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	19	15 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	47.6%	2-Fluorobiphenyl	51.6%
d14-p-Terphenyl	53.2%	d4-1,2-Dichlorobenzene	43.2%
d5-Phenol	48.5%	2-Fluorophenol	43.2%
2,4,6-Tribromophenol	63.5%	d4-2-Chlorophenol	47.7%

Lab Sample ID: NM56B  
LIMS ID: 08-21862  
Matrix: Sediment  
Data Release Authorized:   
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 18:03  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.8 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 17.6%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	32
541-73-1	1,3-Dichlorobenzene	7.2	19	< 19 U
106-46-7	1,4-Dichlorobenzene	7.1	19	< 19 U
100-51-6	Benzyl Alcohol	14	19	< 19 U
95-50-1	1,2-Dichlorobenzene	7.6	19	< 19 U
95-48-7	2-Methylphenol	14	19	< 19 U
106-44-5	4-Methylphenol	12	19	< 19 U
67-72-1	Hexachloroethane	7.0	19	< 19 U
105-67-9	2,4-Dimethylphenol	14	19	< 19 U
65-85-0	Benzoic Acid	110	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	8.8	19	< 19 U
91-20-3	Naphthalene	8.4	19	< 19 U
87-68-3	Hexachlorobutadiene	7.9	19	< 19 U
91-57-6	2-Methylnaphthalene	8.0	19	28
131-11-3	Dimethylphthalate	7.5	19	< 19 U
208-96-8	Acenaphthylene	8.4	19	< 19 U
83-32-9	Acenaphthene	8.0	19	10 J
132-64-9	Dibenzofuran	7.3	19	< 19 U
84-66-2	Diethylphthalate	16	19	< 19 U
86-73-7	Fluorene	8.7	19	12 J
86-30-6	N-Nitrosodiphenylamine	8.4	19	< 19 U
118-74-1	Hexachlorobenzene	7.8	19	< 19 U
87-86-5	Pentachlorophenol	46	97	51 J
85-01-8	Phenanthrene	8.2	19	120
120-12-7	Anthracene	7.5	19	22
84-74-2	Di-n-Butylphthalate	12	19	< 19 U
206-44-0	Fluoranthene	7.7	19	150
129-00-0	Pyrene	7.5	19	130
85-68-7	Butylbenzylphthalate	11	19	< 19 U
56-55-3	Benzo (a) anthracene	5.7	19	57
117-81-7	bis (2-Ethylhexyl) phthalate	11	19	25
218-01-9	Chrysene	6.4	19	75
117-84-0	Di-n-Octyl phthalate	8.1	19	< 19 U
205-99-2	Benzo (b) fluoranthene	9.2	19	69
207-08-9	Benzo (k) fluoranthene	9.0	19	67
50-32-8	Benzo (a) pyrene	7.9	19	79
193-39-5	Indeno (1,2,3-cd) pyrene	8.3	19	24
53-70-3	Dibenz (a, h) anthracene	8.3	19	< 19 U
191-24-2	Benzo (g, h, i) perylene	6.6	19	26

Sample ID: RGH-SS-02  
SAMPLE

Lab Sample ID: NM56B  
LIMS ID: 08-21862  
Matrix: Sediment  
Date Analyzed: 09/11/08 18:03

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	19	26

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	61.6%	2-Fluorobiphenyl	62.8%
d14-p-Terphenyl	73.6%	d4-1,2-Dichlorobenzene	62.4%
d5-Phenol	66.1%	2-Fluorophenol	60.0%
2,4,6-Tribromophenol	89.1%	d4-2-Chlorophenol	64.0%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2


Sample ID: RGH-SS-03

SAMPLE

Lab Sample ID: NM56C

LIMS ID: 08-21863

Matrix: Sediment

Data Release Authorized: 

Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Date Analyzed: 09/11/08 18:37

Instrument/Analyst: NT4/LJR

GPC Cleanup: Yes

Sample Amount: 25.8 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 27.6%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	< 19 U
541-73-1	1,3-Dichlorobenzene	7.2	19	< 19 U
106-46-7	1,4-Dichlorobenzene	7.1	19	< 19 U
100-51-6	Benzyl Alcohol	14	19	< 19 U
95-50-1	1,2-Dichlorobenzene	7.6	19	< 19 U
95-48-7	2-Methylphenol	14	19	< 19 U
106-44-5	4-Methylphenol	12	19	29
67-72-1	Hexachloroethane	7.0	19	< 19 U
105-67-9	2,4-Dimethylphenol	14	19	< 19 U
65-85-0	Benzoic Acid	110	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	8.8	19	< 19 U
91-20-3	Naphthalene	8.4	19	25
87-68-3	Hexachlorobutadiene	7.9	19	< 19 U
91-57-6	2-Methylnaphthalene	7.9	19	25
131-11-3	Dimethylphthalate	7.5	19	< 19 U
208-96-8	Acenaphthylene	8.4	19	21
83-32-9	Acenaphthene	8.0	19	17 J
132-64-9	Dibenzofuran	7.3	19	14 J
84-66-2	Diethylphthalate	16	19	< 19 U
86-73-7	Fluorene	8.7	19	23
86-30-6	N-Nitrosodiphenylamine	8.4	19	< 19 U
118-74-1	Hexachlorobenzene	7.8	19	< 19 U
87-86-5	Pentachlorophenol	46	97	180
85-01-8	Phenanthrene	8.1	19	190
120-12-7	Anthracene	7.5	19	47
84-74-2	Di-n-Butylphthalate	12	19	< 19 U
206-44-0	Fluoranthene	7.7	19	350
129-00-0	Pyrene	7.5	19	300
85-68-7	Butylbenzylphthalate	11	19	< 19 U
56-55-3	Benzo (a) anthracene	5.7	19	140
117-81-7	bis(2-Ethylhexyl)phthalate	11	19	86
218-01-9	Chrysene	6.4	19	210
117-84-0	Di-n-Octyl phthalate	8.1	19	< 19 U
205-99-2	Benzo (b) fluoranthene	9.2	19	200
207-08-9	Benzo (k) fluoranthene	9.0	19	150
50-32-8	Benzo (a) pyrene	7.9	19	180
193-39-5	Indeno (1,2,3-cd) pyrene	8.3	19	45
53-70-3	Dibenz (a, h) anthracene	8.3	19	10 J
191-24-2	Benzo (g, h, i) perylene	6.5	19	51



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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SS-03  
SAMPLE



Lab Sample ID: NM56C  
LIMS ID: 08-21863  
Matrix: Sediment  
Date Analyzed: 09/11/08 18:37

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	19	25

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	63.6%	2-Fluorobiphenyl	64.8%
d14-p-Terphenyl	77.2%	d4-1,2-Dichlorobenzene	59.2%
d5-Phenol	65.9%	2-Fluorophenol	59.2%
2,4,6-Tribromophenol	92.8%	d4-2-Chlorophenol	63.7%

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-01-0-2'  
SAMPLE

Lab Sample ID: NM56D  
LIMS ID: 08-21864  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 19:11  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 26.2 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 30.9%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	41
541-73-1	1,3-Dichlorobenzene	7.1	19	< 19 U
106-46-7	1,4-Dichlorobenzene	7.0	19	< 19 U
100-51-6	Benzyl Alcohol	14	19	< 19 U
95-50-1	1,2-Dichlorobenzene	7.5	19	< 19 U
95-48-7	2-Methylphenol	14	19	< 19 U
106-44-5	4-Methylphenol	12	19	< 19 U
67-72-1	Hexachloroethane	6.9	19	< 19 U
105-67-9	2,4-Dimethylphenol	14	19	< 19 U
65-85-0	Benzoic Acid	110	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	8.7	19	< 19 U
91-20-3	Naphthalene	8.3	19	20
87-68-3	Hexachlorobutadiene	7.8	19	< 19 U
91-57-6	2-Methylnaphthalene	7.8	19	26
131-11-3	Dimethylphthalate	7.4	19	< 19 U
208-96-8	Acenaphthylene	8.3	19	21
83-32-9	Acenaphthene	7.9	19	14 J
132-64-9	Dibenzofuran	7.2	19	16 J
84-66-2	Diethylphthalate	16	19	< 19 U
86-73-7	Fluorene	8.6	19	16 J
86-30-6	N-Nitrosodiphenylamine	8.3	19	< 19 U
118-74-1	Hexachlorobenzene	7.7	19	< 19 U
87-86-5	Pentachlorophenol	45	96	380
85-01-8	Phenanthrene	8.0	19	200
120-12-7	Anthracene	7.4	19	53
84-74-2	Di-n-Butylphthalate	12	19	< 19 U
206-44-0	Fluoranthene	7.6	19	530
129-00-0	Pyrene	7.4	19	510
85-68-7	Butylbenzylphthalate	11	19	< 19 U
56-55-3	Benzo(a)anthracene	5.7	19	150
117-81-7	bis(2-Ethylhexyl)phthalate	11	19	170
218-01-9	Chrysene	6.3	19	270
117-84-0	Di-n-Octyl phthalate	8.0	19	< 19 U
205-99-2	Benzo(b)fluoranthene	9.1	19	200
207-08-9	Benzo(k)fluoranthene	8.8	19	220
50-32-8	Benzo(a)pyrene	7.8	19	210
193-39-5	Indeno(1,2,3-cd)pyrene	8.2	19	49
53-70-3	Dibenz(a,h)anthracene	8.2	19	19 J
191-24-2	Benzo(g,h,i)perylene	6.5	19	45

Sample ID: RGH-SC-01-0-2'  
SAMPLE

Lab Sample ID: NM56D  
LIMS ID: 08-21864  
Matrix: Sediment  
Date Analyzed: 09/11/08 19:11

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	6.9	19	22

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.4%	2-Fluorobiphenyl	63.2%
d14-p-Terphenyl	77.2%	d4-1,2-Dichlorobenzene	58.8%
d5-Phenol	61.6%	2-Fluorophenol	59.2%
2,4,6-Tribromophenol	91.7%	d4-2-Chlorophenol	63.7%

ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS

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Sample ID: RGH-SC-01-2-4'

SAMPLE

Lab Sample ID: NM56E

LIMS ID: 08-21865

Matrix: Sediment

Data Release Authorized: *[Signature]*

Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Date Analyzed: 09/11/08 19:44

Instrument/Analyst: NT4/LJR

GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 26.1%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	82
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	95
131-11-3	Dimethylphthalate	7.6	20	14 J
208-96-8	Acenaphthylene	8.5	20	26
83-32-9	Acenaphthene	8.1	20	110
132-64-9	Dibenzofuran	7.4	20	84
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	160
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	270
85-01-8	Phenanthrene	8.3	20	1,100
120-12-7	Anthracene	7.6	20	310
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	1,600
129-00-0	Pyrene	7.6	20	1,400
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo(a)anthracene	5.8	20	480
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	130
218-01-9	Chrysene	6.5	20	660
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo(b)fluoranthene	9.4	20	600
207-08-9	Benzo(k)fluoranthene	9.1	20	430
50-32-8	Benzo(a)pyrene	8.0	20	610
193-39-5	Indeno(1,2,3-cd)pyrene	8.4	20	130
53-70-3	Dibenz(a,h)anthracene	8.4	20	61
191-24-2	Benzo(g,h,i)perylene	6.6	20	130

Sample ID: RGH-SC-01-2-4'  
SAMPLE

Lab Sample ID: NM56E  
LIMS ID: 08-21865  
Matrix: Sediment  
Date Analyzed: 09/11/08 19:44

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	84

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.8%	2-Fluorobiphenyl	62.8%
d14-p-Terphenyl	80.0%	d4-1,2-Dichlorobenzene	54.8%
d5-Phenol	60.8%	2-Fluorophenol	56.5%
2,4,6-Tribromophenol	91.2%	d4-2-Chlorophenol	59.2%

ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-01-4-6'  
SAMPLE

Lab Sample ID: NM56F  
LIMS ID: 08-21866  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 20:18  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.6 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 22.7%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	11 J
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	16 J
67-72-1	Hexachloroethane	7.0	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	37
87-68-3	Hexachlorobutadiene	7.9	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	130
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	13 J
83-32-9	Acenaphthene	8.0	20	89
132-64-9	Dibenzofuran	7.4	20	31
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	120
86-30-6	N-Nitrosodiphenylamine	8.5	120	< 120 Y
118-74-1	Hexachlorobenzene	7.8	20	< 20 U
87-86-5	Pentachlorophenol	47	98	530
85-01-8	Phenanthrene	8.2	20	680
120-12-7	Anthracene	7.6	20	290
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.7	20	720
129-00-0	Pyrene	7.6	20	700
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	160
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	190
218-01-9	Chrysene	6.5	20	230
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	160
207-08-9	Benzo (k) fluoranthene	9.1	20	160
50-32-8	Benzo (a) pyrene	8.0	20	130
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	36
53-70-3	Dibenz (a,h) anthracene	8.4	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.6	20	42

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-01-4-6'  
SAMPLE

Lab Sample ID: NM56F  
LIMS ID: 08-21866  
Matrix: Sediment  
Date Analyzed: 09/11/08 20:18

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	140

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.8%	2-Fluorobiphenyl	67.6%
d14-p-Terphenyl	94.4%	d4-1,2-Dichlorobenzene	61.6%
d5-Phenol	60.8%	2-Fluorophenol	56.5%
2,4,6-Tribromophenol	87.7%	d4-2-Chlorophenol	63.5%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

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Sample ID: RGH-SC-01-4-6'

DILUTION

Lab Sample ID: NM56F

QC Report No: NM56-Hart Crowser, Inc.

LIMS ID: 08-21866

Project: R.G. Haley

Matrix: Sediment

17330-17

Data Release Authorized:

Date Sampled: 08/26/08

Reported: 09/16/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Sample Amount: 25.6 g-dry-wt

Date Analyzed: 09/12/08 23:51

Final Extract Volume: 0.5 mL

Instrument/Analyst: NT4/LJR

Dilution Factor: 3.00

GPC Cleanup: Yes

Percent Moisture: 22.7%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	40	59	< 59 U
541-73-1	1,3-Dichlorobenzene	22	59	< 59 U
106-46-7	1,4-Dichlorobenzene	22	59	< 59 U
100-51-6	Benzyl Alcohol	43	59	< 59 U
95-50-1	1,2-Dichlorobenzene	23	59	< 59 U
95-48-7	2-Methylphenol	42	59	< 59 U
106-44-5	4-Methylphenol	38	59	< 59 U
67-72-1	Hexachloroethane	21	59	< 59 U
105-67-9	2,4-Dimethylphenol	43	59	< 59 U
65-85-0	Benzoic Acid	340	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	27	59	< 59 U
91-20-3	Naphthalene	25	59	40 J
87-68-3	Hexachlorobutadiene	24	59	< 59 U
91-57-6	2-Methylnaphthalene	24	59	140
131-11-3	Dimethylphthalate	23	59	< 59 U
208-96-8	Acenaphthylene	25	59	< 59 U
83-32-9	Acenaphthene	24	59	110
132-64-9	Dibenzofuran	22	59	57 J
84-66-2	Diethylphthalate	48	59	< 59 U
86-73-7	Fluorene	26	59	120
86-30-6	N-Nitrosodiphenylamine	25	160	< 160 Y
118-74-1	Hexachlorobenzene	24	59	< 59 U
87-86-5	Pentachlorophenol	140	290	510
85-01-8	Phenanthrene	25	59	650
120-12-7	Anthracene	23	59	120
84-74-2	Di-n-Butylphthalate	36	59	< 59 U
206-44-0	Fluoranthene	23	59	730
129-00-0	Pyrene	23	59	840
85-68-7	Butylbenzylphthalate	33	59	< 59 U
56-55-3	Benzo (a) anthracene	17	59	170
117-81-7	bis (2-Ethylhexyl) phthalate	32	59	160
218-01-9	Chrysene	19	59	260
117-84-0	Di-n-Octyl phthalate	24	59	< 59 U
205-99-2	Benzo (b) fluoranthene	28	59	150
207-08-9	Benzo (k) fluoranthene	27	59	120
50-32-8	Benzo (a) pyrene	24	59	140
193-39-5	Indeno (1,2,3-cd) pyrene	25	59	56 J
53-70-3	Dibenz (a, h) anthracene	25	59	< 59 U
191-24-2	Benzo (g, h, i) perylene	20	59	71



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PSDDA Semivolatiles by SW8270D GC/MS

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Sample ID: RGH-SC-01-4-6'

DILUTION

Lab Sample ID: NM56F

LIMS ID: 08-21866

Matrix: Sediment

Date Analyzed: 09/12/08 23:51

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	150

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	62.5%	2-Fluorobiphenyl	70.0%
d14-p-Terphenyl	98.0%	d4-1,2-Dichlorobenzene	64.0%
d5-Phenol	74.6%	2-Fluorophenol	64.8%
2,4,6-Tribromophenol	82.4%	d4-2-Chlorophenol	73.5%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

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Sample ID: RGH-SC-02-0-2'

SAMPLE

Lab Sample ID: NM56G

LIMS ID: 08-21867

Matrix: Sediment

Data Release Authorized:

Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Date Analyzed: 09/11/08 20:52

Instrument/Analyst: NT4/LJR

GPC Cleanup: Yes

Sample Amount: 25.7 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 27.8%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.2	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	12	20	< 20 U
67-72-1	Hexachloroethane	7.0	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.8	20	< 20 U
91-20-3	Naphthalene	8.5	20	48
87-68-3	Hexachlorobutadiene	7.9	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	63
131-11-3	Dimethylphthalate	7.6	20	17 J
208-96-8	Acenaphthylene	8.4	20	< 20 U
83-32-9	Acenaphthene	8.0	20	48
132-64-9	Dibenzofuran	7.4	20	42
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.7	20	68
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.8	20	< 20 U
87-86-5	Pentachlorophenol	46	97	230
85-01-8	Phenanthrene	8.2	20	490
120-12-7	Anthracene	7.5	20	120
84-74-2	Di-n-Butylphthalate	12	20	19 J
206-44-0	Fluoranthene	7.7	20	550
129-00-0	Pyrene	7.6	20	550
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	250
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	390
218-01-9	Chrysene	6.5	20	270
117-84-0	Di-n-Octyl phthalate	8.1	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	280
207-08-9	Benzo (k) fluoranthene	9.0	20	230
50-32-8	Benzo (a) pyrene	8.0	20	270
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	56
53-70-3	Dibenz (a, h) anthracene	8.3	20	17 J
191-24-2	Benzo (g, h, i) perylene	6.6	20	56

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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-02-0-2'  
SAMPLE

Lab Sample ID: NM56G  
LIMS ID: 08-21867  
Matrix: Sediment  
Date Analyzed: 09/11/08 20:52

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	60

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	46.0%	2-Fluorobiphenyl	49.2%
d14-p-Terphenyl	54.4%	d4-1,2-Dichlorobenzene	46.8%
d5-Phenol	48.0%	2-Fluorophenol	44.5%
2,4,6-Tribromophenol	69.3%	d4-2-Chlorophenol	49.6%

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**PSDDA Semivolatiles by SW8270D GC/MS**  
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Sample ID: **RGH-SC-02-2-4'**  
**SAMPLE**

Lab Sample ID: **NM56H**  
 LIMS ID: **08-21868**  
 Matrix: **Sediment**  
 Data Release Authorized:  
 Reported: **09/16/08**

QC Report No: **NM56-Hart Crowser, Inc.**  
 Project: **R.G. Haley**  
**17330-17**  
 Date Sampled: **08/26/08**  
 Date Received: **08/28/08**

Date Extracted: **09/03/08**  
 Date Analyzed: **09/11/08 21:26**  
 Instrument/Analyst: **NT4/LJR**  
 GPC Cleanup: **Yes**

Sample Amount: **26.1 g-dry-wt**  
 Final Extract Volume: **0.5 mL**  
 Dilution Factor: **1.00**  
 Percent Moisture: **14.6%**

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	< 19 U
541-73-1	1,3-Dichlorobenzene	7.1	19	< 19 U
106-46-7	1,4-Dichlorobenzene	7.1	19	< 19 U
100-51-6	Benzyl Alcohol	14	19	< 19 U
95-50-1	1,2-Dichlorobenzene	7.6	19	< 19 U
95-48-7	2-Methylphenol	14	19	< 19 U
106-44-5	4-Methylphenol	12	19	< 19 U
67-72-1	Hexachloroethane	6.9	19	< 19 U
105-67-9	2,4-Dimethylphenol	14	19	< 19 U
65-85-0	Benzoic Acid	110	190	< 190 U
120-82-1	1,2,4-Trichlorobenzene	8.7	19	< 19 U
<b>91-20-3</b>	<b>Naphthalene</b>	<b>8.3</b>	<b>19</b>	<b>31</b>
87-68-3	Hexachlorobutadiene	7.8	19	< 19 U
91-57-6	2-Methylnaphthalene	7.9	19	< 19 U
131-11-3	Dimethylphthalate	7.4	19	< 19 U
208-96-8	Acenaphthylene	8.3	19	< 19 U
83-32-9	Acenaphthene	7.9	19	< 19 U
132-64-9	Dibenzofuran	7.2	19	< 19 U
84-66-2	Diethylphthalate	16	19	< 19 U
86-73-7	Fluorene	8.6	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	8.3	19	< 19 U
118-74-1	Hexachlorobenzene	7.7	19	< 19 U
87-86-5	Pentachlorophenol	46	96	< 96 U
<b>85-01-8</b>	<b>Phenanthrene</b>	<b>8.1</b>	<b>19</b>	<b>22</b>
120-12-7	Anthracene	7.4	19	< 19 U
84-74-2	Di-n-Butylphthalate	12	19	< 19 U
<b>206-44-0</b>	<b>Fluoranthene</b>	<b>7.6</b>	<b>19</b>	<b>27</b>
<b>129-00-0</b>	<b>Pyrene</b>	<b>7.4</b>	<b>19</b>	<b>59</b>
85-68-7	Butylbenzylphthalate	11	19	< 19 U
56-55-3	Benzo (a) anthracene	5.7	19	< 19 U
117-81-7	bis (2-Ethylhexyl) phthalate	11	19	< 19 U
218-01-9	Chrysene	6.4	19	< 19 U
117-84-0	Di-n-Octyl phthalate	8.0	19	< 19 U
205-99-2	Benzo (b) fluoranthene	9.1	19	< 19 U
207-08-9	Benzo (k) fluoranthene	8.9	19	< 19 U
50-32-8	Benzo (a) pyrene	7.8	19	< 19 U
193-39-5	Indeno (1,2,3-cd) pyrene	8.2	19	< 19 U
53-70-3	Dibenz (a,h) anthracene	8.2	19	< 19 U
191-24-2	Benzo (g,h,i) perylene	6.5	19	< 19 U

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Sample ID: **RGH-SC-02-2-4'**  
**SAMPLE**

Lab Sample ID: **NM56H**  
 LIMS ID: **08-21868**  
 Matrix: **Sediment**  
 Date Analyzed: **09/11/08 21:26**

QC Report No: **NM56-Hart Crowser, Inc.**  
 Project: **R.G. Haley**  
**17330-17**

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	6.9	19	< 19 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	57.6%	2-Fluorobiphenyl	56.4%
d14-p-Terphenyl	73.2%	d4-1,2-Dichlorobenzene	58.4%
d5-Phenol	52.3%	2-Fluorophenol	53.6%
2,4,6-Tribromophenol	82.1%	d4-2-Chlorophenol	55.5%

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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-02-4-6'  
SAMPLE

Lab Sample ID: NM56I  
LIMS ID: 08-21869  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 21:59  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 26.2 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 22.9%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	< 19 U
541-73-1	1,3-Dichlorobenzene	7.1	19	< 19 U
106-46-7	1,4-Dichlorobenzene	7.0	19	< 19 U
100-51-6	BenzyI Alcohol	14	19	18 J
95-50-1	1,2-Dichlorobenzene	7.5	19	< 19 U
95-48-7	2-Methylphenol	14	19	< 19 U
106-44-5	4-Methylphenol	12	19	< 19 U
67-72-1	Hexachloroethane	6.9	19	< 19 U
105-67-9	2,4-Dimethylphenol	14	19	< 19 U
65-85-0	Benzoic Acid	110	190	250
120-82-1	1,2,4-Trichlorobenzene	8.7	19	< 19 U
91-20-3	Naphthalene	8.3	19	14 J
87-68-3	Hexachlorobutadiene	7.8	19	< 19 U
91-57-6	2-Methylnaphthalene	7.8	19	16 J
131-11-3	Dimethylphthalate	7.4	19	590
208-96-8	Acenaphthylene	8.3	19	< 19 U
83-32-9	Acenaphthene	7.9	19	< 19 U
132-64-9	Dibenzofuran	7.2	19	< 19 U
84-66-2	Diethylphthalate	16	19	< 19 U
86-73-7	Fluorene	8.6	19	< 19 U
86-30-6	N-Nitrosodiphenylamine	8.3	19	< 19 U
118-74-1	Hexachlorobenzene	7.7	19	< 19 U
87-86-5	Pentachlorophenol	45	96	170
85-01-8	Phenanthrene	8.0	19	39
120-12-7	Anthracene	7.4	19	11 J
84-74-2	Di-n-Butylphthalate	12	19	< 19 U
206-44-0	Fluoranthene	7.6	19	98
129-00-0	Pyrene	7.4	19	120
85-68-7	Butylbenzylphthalate	11	19	< 19 U
56-55-3	Benzo (a) anthracene	5.7	19	28
117-81-7	bis (2-Ethylhexyl) phthalate	11	19	270
218-01-9	Chrysene	6.3	19	46
117-84-0	Di-n-Octyl phthalate	8.0	19	< 19 U
205-99-2	Benzo (b) fluoranthene	9.1	19	52
207-08-9	Benzo (k) fluoranthene	8.8	19	52
50-32-8	Benzo (a) pyrene	7.8	19	47
193-39-5	Indeno (1,2,3-cd) pyrene	8.2	19	9.7 J
53-70-3	Dibenz (a,h) anthracene	8.2	19	< 19 U
191-24-2	Benzo (g,h,i) perylene	6.5	19	14 J

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 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-02-4-6'  
 SAMPLE

Lab Sample ID: NM56I  
 LIMS ID: 08-21869  
 Matrix: Sediment  
 Date Analyzed: 09/11/08 21:59

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	6.9	19	12 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	52.4%	2-Fluorobiphenyl	55.2%
d14-p-Terphenyl	58.8%	d4-1,2-Dichlorobenzene	52.4%
d5-Phenol	54.7%	2-Fluorophenol	51.2%
2,4,6-Tribromophenol	77.6%	d4-2-Chlorophenol	55.5%

Lab Sample ID: NM56J  
LIMS ID: 08-21870  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 22:33  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 54.7%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.8	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	<b>Naphthalene</b>	<b>8.6</b>	<b>20</b>	<b>23</b>
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	<b>2-Methylnaphthalene</b>	<b>8.1</b>	<b>20</b>	<b>29</b>
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	<b>Acenaphthylene</b>	<b>8.5</b>	<b>20</b>	<b>25</b>
83-32-9	<b>Acenaphthene</b>	<b>8.1</b>	<b>20</b>	<b>24</b>
132-64-9	<b>Dibenzofuran</b>	<b>7.4</b>	<b>20</b>	<b>21</b>
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	<b>Fluorene</b>	<b>8.8</b>	<b>20</b>	<b>31</b>
86-30-6	N-Nitrosodiphenylamine	8.6	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	<b>Pentachlorophenol</b>	<b>47</b>	<b>98</b>	<b>220</b>
85-01-8	<b>Phenanthrene</b>	<b>8.3</b>	<b>20</b>	<b>350</b>
120-12-7	<b>Anthracene</b>	<b>7.6</b>	<b>20</b>	<b>70</b>
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	<b>Fluoranthene</b>	<b>7.8</b>	<b>20</b>	<b>520</b>
129-00-0	<b>Pyrene</b>	<b>7.6</b>	<b>20</b>	<b>550</b>
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	<b>Benzo(a)anthracene</b>	<b>5.8</b>	<b>20</b>	<b>160</b>
117-81-7	<b>bis(2-Ethylhexyl)phthalate</b>	<b>11</b>	<b>20</b>	<b>190</b>
218-01-9	<b>Chrysene</b>	<b>6.5</b>	<b>20</b>	<b>340</b>
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	<b>Benzo(b)fluoranthene</b>	<b>9.4</b>	<b>20</b>	<b>210</b>
207-08-9	<b>Benzo(k)fluoranthene</b>	<b>9.1</b>	<b>20</b>	<b>290</b>
50-32-8	<b>Benzo(a)pyrene</b>	<b>8.0</b>	<b>20</b>	<b>220</b>
193-39-5	<b>Indeno(1,2,3-cd)pyrene</b>	<b>8.5</b>	<b>20</b>	<b>48</b>
53-70-3	Dibenz(a,h)anthracene	8.4	20	< 20 U
191-24-2	<b>Benzo(g,h,i)perylene</b>	<b>6.7</b>	<b>20</b>	<b>44</b>



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Sample ID: RGH-SC-03-0-2'  
SAMPLE

Lab Sample ID: NM56J  
LIMS ID: 08-21870  
Matrix: Sediment  
Date Analyzed: 09/11/08 22:33

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	30

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	55.2%	2-Fluorobiphenyl	59.2%
d14-p-Terphenyl	75.2%	d4-1,2-Dichlorobenzene	51.6%
d5-Phenol	55.2%	2-Fluorophenol	53.9%
2,4,6-Tribromophenol	77.1%	d4-2-Chlorophenol	58.1%

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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-2-4'  
SAMPLE

Lab Sample ID: NM56K  
LIMS ID: 08-21871  
Matrix: Sediment  
Data Release Authorized: *AB*  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 23:07  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 61.2%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	18 J
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	26
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	40
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	33
131-11-3	Dimethylphthalate	7.6	20	19 J
208-96-8	Acenaphthylene	8.5	20	68
83-32-9	Acenaphthene	8.1	20	37
132-64-9	Dibenzofuran	7.4	20	25
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	60
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	720
85-01-8	Phenanthrene	8.2	20	670
120-12-7	Anthracene	7.6	20	260
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	3,500 E
129-00-0	Pyrene	7.6	20	3,500 E
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	340
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	640
218-01-9	Chrysene	6.5	20	1,500
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	740
207-08-9	Benzo (k) fluoranthene	9.1	20	830
50-32-8	Benzo (a) pyrene	8.0	20	490
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	140
53-70-3	Dibenz (a, h) anthracene	8.4	20	43
191-24-2	Benzo (g, h, i) perylene	6.6	20	150

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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-2-4'  
SAMPLE

Lab Sample ID: NM56K  
LIMS ID: 08-21871  
Matrix: Sediment  
Date Analyzed: 09/11/08 23:07

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	24

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	57.2%	2-Fluorobiphenyl	62.0%
d14-p-Terphenyl	98.4%	d4-1,2-Dichlorobenzene	54.4%
d5-Phenol	61.9%	2-Fluorophenol	57.3%
2,4,6-Tribromophenol	81.6%	d4-2-Chlorophenol	61.3%

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 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-2-4'  
 DILUTION

Lab Sample ID: NM56K  
 LIMS ID: 08-21871  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/13/08 00:25  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 3.00  
 Percent Moisture: 61.2%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	40	59	< 59 U
541-73-1	1,3-Dichlorobenzene	22	59	< 59 U
106-46-7	1,4-Dichlorobenzene	22	59	< 59 U
100-51-6	Benzyl Alcohol	43	59	< 59 U
95-50-1	1,2-Dichlorobenzene	23	59	< 59 U
95-48-7	2-Methylphenol	42	59	< 59 U
106-44-5	4-Methylphenol	38	59	< 59 U
67-72-1	Hexachloroethane	21	59	< 59 U
105-67-9	2,4-Dimethylphenol	44	59	< 59 U
65-85-0	Benzoic Acid	340	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	27	59	< 59 U
91-20-3	<b>Naphthalene</b>	<b>26</b>	<b>59</b>	<b>41 J</b>
87-68-3	Hexachlorobutadiene	24	59	< 59 U
91-57-6	<b>2-Methylnaphthalene</b>	<b>24</b>	<b>59</b>	<b>35 J</b>
131-11-3	Dimethylphthalate	23	59	< 59 U
208-96-8	<b>Acenaphthylene</b>	<b>26</b>	<b>59</b>	<b>69</b>
83-32-9	<b>Acenaphthene</b>	<b>24</b>	<b>59</b>	<b>36 J</b>
132-64-9	<b>Dibenzofuran</b>	<b>22</b>	<b>59</b>	<b>30 J</b>
84-66-2	Diethylphthalate	48	59	< 59 U
86-73-7	<b>Fluorene</b>	<b>26</b>	<b>59</b>	<b>50 J</b>
86-30-6	N-Nitrosodiphenylamine	26	59	< 59 U
118-74-1	Hexachlorobenzene	24	59	< 59 U
87-86-5	<b>Pentachlorophenol</b>	<b>140</b>	<b>300</b>	<b>600</b>
85-01-8	<b>Phenanthrene</b>	<b>25</b>	<b>59</b>	<b>790</b>
120-12-7	<b>Anthracene</b>	<b>23</b>	<b>59</b>	<b>230</b>
84-74-2	Di-n-Butylphthalate	37	59	< 59 U
206-44-0	<b>Fluoranthene</b>	<b>23</b>	<b>59</b>	<b>4,000</b>
129-00-0	<b>Pyrene</b>	<b>23</b>	<b>59</b>	<b>4,000</b>
85-68-7	Butylbenzylphthalate	33	59	< 59 U
56-55-3	<b>Benzo (a) anthracene</b>	<b>17</b>	<b>59</b>	<b>650</b>
117-81-7	<b>bis (2-Ethylhexyl) phthalate</b>	<b>32</b>	<b>59</b>	<b>600</b>
218-01-9	<b>Chrysene</b>	<b>20</b>	<b>59</b>	<b>1,400</b>
117-84-0	Di-n-Octyl phthalate	25	59	< 59 U
205-99-2	<b>Benzo (b) fluoranthene</b>	<b>28</b>	<b>59</b>	<b>720</b>
207-08-9	<b>Benzo (k) fluoranthene</b>	<b>27</b>	<b>59</b>	<b>550</b>
50-32-8	<b>Benzo (a) pyrene</b>	<b>24</b>	<b>59</b>	<b>580</b>
193-39-5	<b>Indeno (1,2,3-cd) pyrene</b>	<b>25</b>	<b>59</b>	<b>170</b>
53-70-3	Dibenz (a,h) anthracene	25	59	< 59 U
191-24-2	<b>Benzo (g,h,i) perylene</b>	<b>20</b>	<b>59</b>	<b>170</b>

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-2-4'  
DILUTION

Lab Sample ID: NM56K  
LIMS ID: 08-21871  
Matrix: Sediment  
Date Analyzed: 09/13/08 00:25

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	< 59 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	58.6%	2-Fluorobiphenyl	66.1%
d14-p-Terphenyl	96.1%	d4-1,2-Dichlorobenzene	54.6%
d5-Phenol	73.0%	2-Fluorophenol	61.3%
2,4,6-Tribromophenol	79.2%	d4-2-Chlorophenol	71.8%

ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS

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Sample ID: RGH-SC-03-4-6'  
SAMPLE

Lab Sample ID: NM56L

LIMS ID: 08-21872

Matrix: Sediment

Data Release Authorized: *[Signature]*

Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Date Analyzed: 09/11/08 23:41

Instrument/Analyst: NT4/LJR

GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 57.8%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	20
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	24
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	790
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	490
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	110
83-32-9	Acenaphthene	8.0	20	500
132-64-9	Dibenzofuran	7.4	20	900
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	630
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	210
85-01-8	Phenanthrene	8.2	20	4,300 E
120-12-7	Anthracene	7.6	20	250
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	3,300 E
129-00-0	Pyrene	7.6	20	1,900 E
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	280
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	540
218-01-9	Chrysene	6.5	20	650
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	390
207-08-9	Benzo (k) fluoranthene	9.1	20	300
50-32-8	Benzo (a) pyrene	8.0	20	180
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	30
53-70-3	Dibenz (a,h) anthracene	8.4	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.6	20	30

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-4-6'  
SAMPLE

Lab Sample ID: NM56L  
LIMS ID: 08-21872  
Matrix: Sediment  
Date Analyzed: 09/11/08 23:41

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	340

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	23.4%	2-Fluorobiphenyl	26.0%
d14-p-Terphenyl	33.8%	d4-1,2-Dichlorobenzene	23.0%
d5-Phenol	24.8%	2-Fluorophenol	23.0%
2,4,6-Tribromophenol	34.9%	d4-2-Chlorophenol	25.3%

ORGANICS ANALYSIS DATA SHEET  
 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-4-6'  
 DILUTION

Lab Sample ID: NM56L  
 LIMS ID: 08-21872  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/13/08 17:46  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 10.0  
 Percent Moisture: 57.8%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	130	200	< 200 U
541-73-1	1,3-Dichlorobenzene	73	200	< 200 U
106-46-7	1,4-Dichlorobenzene	72	200	< 200 U
100-51-6	Benzyl Alcohol	140	200	< 200 U
95-50-1	1,2-Dichlorobenzene	77	200	< 200 U
95-48-7	2-Methylphenol	140	200	< 200 U
106-44-5	4-Methylphenol	130	200	< 200 U
67-72-1	Hexachloroethane	71	200	< 200 U
105-67-9	2,4-Dimethylphenol	140	200	< 200 U
65-85-0	Benzoic Acid	1100	2,000	< 2,000 U
120-82-1	1,2,4-Trichlorobenzene	89	200	< 200 U
91-20-3	<b>Naphthalene</b>	<b>85</b>	<b>200</b>	<b>950</b>
87-68-3	Hexachlorobutadiene	80	200	< 200 U
91-57-6	<b>2-Methylnaphthalene</b>	<b>80</b>	<b>200</b>	<b>550</b>
131-11-3	Dimethylphthalate	76	200	< 200 U
208-96-8	<b>Acenaphthylene</b>	<b>85</b>	<b>200</b>	<b>140 J</b>
83-32-9	<b>Acenaphthene</b>	<b>80</b>	<b>200</b>	<b>610</b>
132-64-9	<b>Dibenzofuran</b>	<b>74</b>	<b>200</b>	<b>1,100</b>
84-66-2	Diethylphthalate	160	200	< 200 U
86-73-7	<b>Fluorene</b>	<b>88</b>	<b>200</b>	<b>650</b>
86-30-6	N-Nitrosodiphenylamine	85	200	< 200 U
118-74-1	Hexachlorobenzene	79	200	< 200 U
87-86-5	Pentachlorophenol	470	980	< 980 U
85-01-8	<b>Phenanthrene</b>	<b>82</b>	<b>200</b>	<b>6,900</b>
120-12-7	<b>Anthracene</b>	<b>76</b>	<b>200</b>	<b>240</b>
84-74-2	Di-n-Butylphthalate	120	200	< 200 U
206-44-0	<b>Fluoranthene</b>	<b>78</b>	<b>200</b>	<b>4,200</b>
129-00-0	<b>Pyrene</b>	<b>76</b>	<b>200</b>	<b>2,500</b>
85-68-7	Butylbenzylphthalate	110	200	< 200 U
56-55-3	<b>Benzo (a) anthracene</b>	<b>58</b>	<b>200</b>	<b>340</b>
117-81-7	<b>bis (2-Ethylhexyl) phthalate</b>	<b>110</b>	<b>200</b>	<b>540</b>
218-01-9	<b>Chrysene</b>	<b>65</b>	<b>200</b>	<b>750</b>
117-84-0	Di-n-Octyl phthalate	82	200	< 200 U
205-99-2	<b>Benzo (b) fluoranthene</b>	<b>93</b>	<b>200</b>	<b>320</b>
207-08-9	<b>Benzo (k) fluoranthene</b>	<b>91</b>	<b>200</b>	<b>220</b>
50-32-8	<b>Benzo (a) pyrene</b>	<b>80</b>	<b>200</b>	<b>160 J</b>
193-39-5	Indeno (1,2,3-cd) pyrene	84	200	< 200 U
53-70-3	Dibenz (a,h) anthracene	84	200	< 200 U
191-24-2	Benzo (g,h,i) perylene	66	200	< 200 U



ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-03-4-6'  
DILUTION

Lab Sample ID: NM56L  
LIMS ID: 08-21872  
Matrix: Sediment  
Date Analyzed: 09/13/08 17:46

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	71	200	370

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	24.0%	2-Fluorobiphenyl	27.2%
d14-p-Terphenyl	34.8%	d4-1,2-Dichlorobenzene	25.6%
d5-Phenol	22.1%	2-Fluorophenol	24.8%
2,4,6-Tribromophenol	26.7%	d4-2-Chlorophenol	24.5%

Sample ID: RGH-SC-04-0-2'  
SAMPLE

Lab Sample ID: NM56M  
LIMS ID: 08-21873  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/12/08 00:15  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 41.3%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	22
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	46
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	130
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	54
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	95
83-32-9	Acenaphthene	8.1	20	110
132-64-9	Dibenzofuran	7.4	20	160
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	180
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	130
85-01-8	Phenanthrene	8.2	20	2,200 E
120-12-7	Anthracene	7.6	20	370
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	2,600 E
129-00-0	Pyrene	7.6	20	2,600 E
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	140
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	59
218-01-9	Chrysene	6.5	20	1,200
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	750
207-08-9	Benzo (k) fluoranthene	9.1	20	570
50-32-8	Benzo (a) pyrene	8.0	20	550
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	170
53-70-3	Dibenz (a, h) anthracene	8.4	20	33
191-24-2	Benzo (g, h, i) perylene	6.6	20	180

Sample ID: RGH-SC-04-0-2'  
SAMPLE

Lab Sample ID: NM56M  
LIMS ID: 08-21873  
Matrix: Sediment  
Date Analyzed: 09/12/08 00:15

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	55

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	60.0%	2-Fluorobiphenyl	66.4%
d14-p-Terphenyl	102%	d4-1,2-Dichlorobenzene	56.0%
d5-Phenol	60.8%	2-Fluorophenol	57.6%
2,4,6-Tribromophenol	85.9%	d4-2-Chlorophenol	62.9%

Sample ID: RGH-SC-04-0-2'  
 DILUTION

Lab Sample ID: NM56M  
 LIMS ID: 08-21873  
 Matrix: Sediment  
 Data Release Authorized: *AS*  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/13/08 01:32  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 3.00  
 Percent Moisture: 41.3%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	40	59	< 59 U
541-73-1	1,3-Dichlorobenzene	22	59	< 59 U
106-46-7	1,4-Dichlorobenzene	22	59	< 59 U
100-51-6	Benzyl Alcohol	43	59	< 59 U
95-50-1	1,2-Dichlorobenzene	23	59	< 59 U
95-48-7	2-Methylphenol	42	59	< 59 U
106-44-5	4-Methylphenol	38	59	55 J
67-72-1	Hexachloroethane	21	59	< 59 U
105-67-9	2,4-Dimethylphenol	44	59	< 59 U
65-85-0	Benzoic Acid	340	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	27	59	< 59 U
91-20-3	Naphthalene	26	59	140
87-68-3	Hexachlorobutadiene	24	59	< 59 U
91-57-6	2-Methylnaphthalene	24	59	49 J
131-11-3	Dimethylphthalate	23	59	< 59 U
208-96-8	Acenaphthylene	25	59	100
83-32-9	Acenaphthene	24	59	110
132-64-9	Dibenzofuran	22	59	160
84-66-2	Diethylphthalate	48	59	< 59 U
86-73-7	Fluorene	26	59	180
86-30-6	N-Nitrosodiphenylamine	26	59	< 59 U
118-74-1	Hexachlorobenzene	24	59	< 59 U
87-86-5	Pentachlorophenol	140	290	< 290 U
85-01-8	Phenanthrene	25	59	2,700
120-12-7	Anthracene	23	59	180
84-74-2	Di-n-Butylphthalate	36	59	< 59 U
206-44-0	Fluoranthene	23	59	2,300
129-00-0	Pyrene	23	59	2,500
85-68-7	Butylbenzylphthalate	33	59	< 59 U
56-55-3	Benzo (a) anthracene	17	59	450
117-81-7	bis (2-Ethylhexyl) phthalate	32	59	69
218-01-9	Chrysene	20	59	940
117-84-0	Di-n-Octyl phthalate	25	59	< 59 U
205-99-2	Benzo (b) fluoranthene	28	59	570
207-08-9	Benzo (k) fluoranthene	27	59	570
50-32-8	Benzo (a) pyrene	24	59	540
193-39-5	Indeno (1,2,3-cd) pyrene	25	59	190
53-70-3	Dibenz (a, h) anthracene	25	59	31 J
191-24-2	Benzo (g, h, i) perylene	20	59	190

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
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Sample ID: **RGH-SC-04-0-2'**  
**DILUTION**

Lab Sample ID: **NM56M**  
 LIMS ID: **08-21873**  
 Matrix: **Sediment**  
 Date Analyzed: **09/13/08 01:32**

QC Report No: **NM56-Hart Crowser, Inc.**  
 Project: **R.G. Haley**  
**17330-17**


CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	58 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	59.4%	2-Fluorobiphenyl	65.4%
d14-p-Terphenyl	93.6%	d4-1,2-Dichlorobenzene	54.8%
d5-Phenol	72.1%	2-Fluorophenol	62.9%
2,4,6-Tribromophenol	79.8%	d4-2-Chlorophenol	71.8%

Sample ID: RGH-SC-04-2-4'  
 SAMPLE

Lab Sample ID: NM56N  
 LIMS ID: 08-21874  
 Matrix: Sediment  
 Data Release Authorized:   
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/12/08 00:49  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.3 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 49.9%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.3	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.8	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.0	20	< 20 U
91-20-3	<b>Naphthalene</b>	<b>8.6</b>	<b>20</b>	<b>27</b>
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	< 20 U
131-11-3	Dimethylphthalate	7.7	20	< 20 U
208-96-8	Acenaphthylene	8.6	20	< 20 U
83-32-9	Acenaphthene	8.1	20	< 20 U
132-64-9	Dibenzofuran	7.5	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.9	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.6	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	99	< 99 U
85-01-8	<b>Phenanthrene</b>	<b>8.3</b>	<b>20</b>	<b>34</b>
120-12-7	<b>Anthracene</b>	<b>7.7</b>	<b>20</b>	<b>10 J</b>
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	<b>Fluoranthene</b>	<b>7.8</b>	<b>20</b>	<b>53</b>
129-00-0	<b>Pyrene</b>	<b>7.7</b>	<b>20</b>	<b>48</b>
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	<b>Benzo (a) anthracene</b>	<b>5.9</b>	<b>20</b>	<b>13 J</b>
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	< 20 U
218-01-9	<b>Chrysene</b>	<b>6.6</b>	<b>20</b>	<b>20</b>
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	<b>Benzo (b) fluoranthene</b>	<b>9.4</b>	<b>20</b>	<b>18 J</b>
207-08-9	<b>Benzo (k) fluoranthene</b>	<b>9.2</b>	<b>20</b>	<b>21</b>
50-32-8	<b>Benzo (a) pyrene</b>	<b>8.1</b>	<b>20</b>	<b>18 J</b>
193-39-5	Indeno (1,2,3-cd)pyrene	8.5	20	< 20 U
53-70-3	Dibenz (a,h)anthracene	8.5	20	< 20 U
191-24-2	Benzo (g,h,i)perylene	6.7	20	< 20 U

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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-04-2-4'  
SAMPLE

Lab Sample ID: NM56N  
LIMS ID: 08-21874  
Matrix: Sediment  
Date Analyzed: 09/12/08 00:49

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	52.4%	2-Fluorobiphenyl	51.2%
d14-p-Terphenyl	67.2%	d4-1,2-Dichlorobenzene	50.0%
d5-Phenol	49.9%	2-Fluorophenol	50.9%
2,4,6-Tribromophenol	79.2%	d4-2-Chlorophenol	53.3%

Sample ID: RGH-SC-04-4-6'  
 SAMPLE

Lab Sample ID: NM560  
 LIMS ID: 08-21875  
 Matrix: Sediment  
 Data Release Authorized: *[Signature]*  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/12/08 01:23  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 46.7%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
<b>91-20-3</b>	<b>Naphthalene</b>	<b>8.5</b>	<b>20</b>	<b>14 J</b>
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	< 20 U
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	< 20 U
83-32-9	Acenaphthene	8.0	20	< 20 U
132-64-9	Dibenzofuran	7.4	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	< 98 U
<b>85-01-8</b>	<b>Phenanthrene</b>	<b>8.2</b>	<b>20</b>	<b>28</b>
120-12-7	Anthracene	7.6	20	< 20 U
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
<b>206-44-0</b>	<b>Fluoranthene</b>	<b>7.8</b>	<b>20</b>	<b>31</b>
<b>129-00-0</b>	<b>Pyrene</b>	<b>7.6</b>	<b>20</b>	<b>26</b>
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo(a)anthracene	5.8	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	< 20 U
<b>218-01-9</b>	<b>Chrysene</b>	<b>6.5</b>	<b>20</b>	<b>11 J</b>
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
<b>205-99-2</b>	<b>Benzo(b)fluoranthene</b>	<b>9.3</b>	<b>20</b>	<b>14 J</b>
207-08-9	Benzo(k)fluoranthene	9.1	20	< 20 U
<b>50-32-8</b>	<b>Benzo(a)pyrene</b>	<b>8.0</b>	<b>20</b>	<b>11 J</b>
193-39-5	Indeno(1,2,3-cd)pyrene	8.4	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	8.4	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	6.6	20	< 20 U



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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-04-4-6'  
SAMPLE

Lab Sample ID: NM560  
LIMS ID: 08-21875  
Matrix: Sediment  
Date Analyzed: 09/12/08 01:23

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	54.4%	2-Fluorobiphenyl	57.6%
d14-p-Terphenyl	71.2%	d4-1,2-Dichlorobenzene	54.4%
d5-Phenol	53.1%	2-Fluorophenol	54.9%
2,4,6-Tribromophenol	82.4%	d4-2-Chlorophenol	56.5%

ORGANICS ANALYSIS DATA SHEET  
 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-05-0-2'  
 SAMPLE

Lab Sample ID: NM56P  
 LIMS ID: 08-21876  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/12/08 01:57  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 58.8%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.3	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.8	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	19 J
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.0	20	< 20 U
91-20-3	Naphthalene	8.6	20	50
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	14 J
131-11-3	Dimethylphthalate	7.7	20	< 20 U
208-96-8	Acenaphthylene	8.6	20	37
83-32-9	Acenaphthene	8.2	20	43
132-64-9	Dibenzofuran	7.5	20	21
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.9	20	43
86-30-6	N-Nitrosodiphenylamine	8.6	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	Pentachlorophenol	47	99	< 99 U
85-01-8	Phenanthrene	8.3	20	480
120-12-7	Anthracene	7.7	20	150
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.9	20	730
129-00-0	Pyrene	7.7	20	640
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.9	20	280
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	11 J
218-01-9	Chrysene	6.6	20	340
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.5	20	340
207-08-9	Benzo (k) fluoranthene	9.2	20	360
50-32-8	Benzo (a) pyrene	8.1	20	380
193-39-5	Indeno (1,2,3-cd) pyrene	8.5	20	81
53-70-3	Dibenz (a,h) anthracene	8.5	20	32
191-24-2	Benzo (g,h,i) perylene	6.7	20	80

Sample ID: RGH-SC-05-0-2'  
SAMPLE

Lab Sample ID: NM56P  
LIMS ID: 08-21876  
Matrix: Sediment  
Date Analyzed: 09/12/08 01:57

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17


CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	12 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	51.6%	2-Fluorobiphenyl	55.6%
d14-p-Terphenyl	73.2%	d4-1,2-Dichlorobenzene	46.0%
d5-Phenol	50.4%	2-Fluorophenol	49.3%
2,4,6-Tribromophenol	82.1%	d4-2-Chlorophenol	50.1%

Sample ID: RGH-SC-05-2-4'  
 SAMPLE

Lab Sample ID: NM56Q  
 LIMS ID: 08-21877  
 Matrix: Sediment  
 Data Release Authorized:   
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/12/08 21:36  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 56.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	< 20 U
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	< 20 U
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	< 20 U
83-32-9	Acenaphthene	8.1	20	< 20 U
132-64-9	Dibenzofuran	7.4	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	< 98 U
<b>85-01-8</b>	<b>Phenanthrene</b>	<b>8.3</b>	<b>20</b>	<b>12 J</b>
120-12-7	Anthracene	7.6	20	< 20 U
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
<b>206-44-0</b>	<b>Fluoranthene</b>	<b>7.8</b>	<b>20</b>	<b>17 J</b>
<b>129-00-0</b>	<b>Pyrene</b>	<b>7.6</b>	<b>20</b>	<b>19 J</b>
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo(a)anthracene	5.8	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	< 20 U
218-01-9	Chrysene	6.5	20	< 20 U
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo(b)fluoranthene	9.4	20	< 20 U
207-08-9	Benzo(k)fluoranthene	9.1	20	< 20 U
50-32-8	Benzo(a)pyrene	8.0	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	8.5	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	8.4	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	6.6	20	< 20 U

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PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-05-2-4'  
SAMPLE

Lab Sample ID: NM56Q  
LIMS ID: 08-21877  
Matrix: Sediment  
Date Analyzed: 09/12/08 21:36

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	47.2%	2-Fluorobiphenyl	48.4%
d14-p-Terphenyl	68.8%	d4-1,2-Dichlorobenzene	44.4%
d5-Phenol	53.1%	2-Fluorophenol	49.1%
2,4,6-Tribromophenol	60.3%	d4-2-Chlorophenol	52.3%

Sample ID: RGH-SC-05-4-6'  
 SAMPLE

Lab Sample ID: NM56R  
 LIMS ID: 08-21878  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/15/08 14:39  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.6 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 55.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	21
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	12	20	23
67-72-1	Hexachloroethane	7.0	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	29
87-68-3	Hexachlorobutadiene	7.9	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	< 20 U
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	16 J
83-32-9	Acenaphthene	8.0	20	< 20 U
132-64-9	Dibenzofuran	7.4	20	11 J
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.7	20	20
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.8	20	< 20 U
87-86-5	Pentachlorophenol	46	98	< 98 U
85-01-8	Phenanthrene	8.2	20	470
120-12-7	Anthracene	7.6	20	110
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.7	20	680
129-00-0	Pyrene	7.6	20	610
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	160
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	< 20 U
218-01-9	Chrysene	6.5	20	250
117-84-0	Di-n-Octyl phthalate	8.1	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	120
207-08-9	Benzo (k) fluoranthene	9.0	20	150
50-32-8	Benzo (a) pyrene	8.0	20	170
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	92
53-70-3	Dibenz (a,h) anthracene	8.4	20	18 J
191-24-2	Benzo (g,h,i) perylene	6.6	20	110

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-05-4-6'  
SAMPLE

Lab Sample ID: NM56R  
LIMS ID: 08-21878  
Matrix: Sediment  
Date Analyzed: 09/15/08 14:39

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	57.2%	2-Fluorobiphenyl	59.6%
d14-p-Terphenyl	78.4%	d4-1,2-Dichlorobenzene	53.2%
d5-Phenol	63.5%	2-Fluorophenol	59.2%
2,4,6-Tribromophenol	64.3%	d4-2-Chlorophenol	60.8%

Sample ID: RGH-SC-06-0-2'  
 SAMPLE

Lab Sample ID: NM56S  
 LIMS ID: 08-21879  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/15/08 15:13  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 58.2%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	22
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	38
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	< 20 U
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	< 20 U
83-32-9	Acenaphthene	8.1	20	< 20 U
132-64-9	Dibenzofuran	7.4	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	11 J
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	< 98 U
85-01-8	Phenanthrene	8.2	20	130
120-12-7	Anthracene	7.6	20	30
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	180
129-00-0	Pyrene	7.6	20	180
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	52
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	< 20 U
218-01-9	Chrysene	6.5	20	77
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	40
207-08-9	Benzo (k) fluoranthene	9.1	20	58
50-32-8	Benzo (a) pyrene	8.0	20	61
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	35
53-70-3	Dibenz (a,h) anthracene	8.4	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.6	20	42



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 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-06-0-2'  
 SAMPLE

Lab Sample ID: NM56S  
 LIMS ID: 08-21879  
 Matrix: Sediment  
 Date Analyzed: 09/15/08 15:13

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	54.4%	2-Fluorobiphenyl	53.6%
d14-p-Terphenyl	73.6%	d4-1,2-Dichlorobenzene	50.8%
d5-Phenol	62.4%	2-Fluorophenol	57.6%
2,4,6-Tribromophenol	67.7%	d4-2-Chlorophenol	60.8%

Sample ID: RGH-SC-06-2-4'  
SAMPLE

Lab Sample ID: NM56T  
LIMS ID: 08-21880  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/15/08 15:47  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 52.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	15 J
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	89
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	15 J
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	120
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	94
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	16 J
83-32-9	Acenaphthene	8.0	20	15 J
132-64-9	Dibenzofuran	7.4	20	32
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	17 J
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	< 98 U
85-01-8	Phenanthrene	8.2	20	140
120-12-7	Anthracene	7.6	20	28
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	120
129-00-0	Pyrene	7.6	20	140
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	54
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	14 J
218-01-9	Chrysene	6.5	20	77
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	52
207-08-9	Benzo (k) fluoranthene	9.1	20	50
50-32-8	Benzo (a) pyrene	8.0	20	72
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	38
53-70-3	Dibenz (a,h) anthracene	8.4	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.6	20	48

Sample ID: RGH-SC-06-2-4'  
SAMPLE

Lab Sample ID: NM56T  
LIMS ID: 08-21880  
Matrix: Sediment  
Date Analyzed: 09/15/08 15:47

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	64

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	53.2%	2-Fluorobiphenyl	55.6%
d14-p-Terphenyl	66.8%	d4-1,2-Dichlorobenzene	49.2%
d5-Phenol	60.3%	2-Fluorophenol	56.0%
2,4,6-Tribromophenol	59.5%	d4-2-Chlorophenol	57.6%

Sample ID: RGH-SC-06-4-6'  
SAMPLE

Lab Sample ID: NM56U  
LIMS ID: 08-21881  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/12/08 22:09  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 3.00  
Percent Moisture: 54.0%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	41	59	56 J
541-73-1	1,3-Dichlorobenzene	22	59	< 59 U
106-46-7	1,4-Dichlorobenzene	22	59	< 59 U
100-51-6	Benzyl Alcohol	43	59	< 59 U
95-50-1	1,2-Dichlorobenzene	23	59	< 59 U
95-48-7	2-Methylphenol	42	59	< 59 U
106-44-5	4-Methylphenol	38	59	230
67-72-1	Hexachloroethane	21	59	< 59 U
105-67-9	2,4-Dimethylphenol	44	59	< 59 U
65-85-0	Benzoic Acid	340	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	27	59	< 59 U
91-20-3	Naphthalene	26	59	480
87-68-3	Hexachlorobutadiene	24	59	< 59 U
91-57-6	2-Methylnaphthalene	24	59	200
131-11-3	Dimethylphthalate	23	59	< 59 U
208-96-8	Acenaphthylene	26	59	440
83-32-9	Acenaphthene	24	59	110
132-64-9	Dibenzofuran	22	59	180
84-66-2	Diethylphthalate	49	59	< 59 U
86-73-7	Fluorene	26	59	440
86-30-6	N-Nitrosodiphenylamine	26	59	< 59 U
118-74-1	Hexachlorobenzene	24	59	< 59 U
87-86-5	Pentachlorophenol	140	300	< 300 U
85-01-8	Phenanthrene	25	59	3,300
120-12-7	Anthracene	23	59	1,100
84-74-2	Di-n-Butylphthalate	37	59	< 59 U
206-44-0	Fluoranthene	23	59	4,200
129-00-0	Pyrene	23	59	5,100 E
85-68-7	Butylbenzylphthalate	33	59	< 59 U
56-55-3	Benzo (a) anthracene	18	59	2,100
117-81-7	bis (2-Ethylhexyl) phthalate	33	59	< 59 U
218-01-9	Chrysene	20	59	2,300
117-84-0	Di-n-Octyl phthalate	25	59	< 59 U
205-99-2	Benzo (b) fluoranthene	28	59	2,100
207-08-9	Benzo (k) fluoranthene	27	59	1,200
50-32-8	Benzo (a) pyrene	24	59	2,400
193-39-5	Indeno (1,2,3-cd) pyrene	25	59	1,300
53-70-3	Dibenz (a, h) anthracene	25	59	460
191-24-2	Benzo (g, h, i) perylene	20	59	1,400

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-06-4-6'  
 SAMPLE

Lab Sample ID: NM56U  
 LIMS ID: 08-21881  
 Matrix: Sediment  
 Date Analyzed: 09/12/08 22:09

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	170

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	65.3%	2-Fluorobiphenyl	67.3%
d14-p-Terphenyl	102%	d4-1,2-Dichlorobenzene	59.5%
d5-Phenol	75.5%	2-Fluorophenol	65.8%
2,4,6-Tribromophenol	85.6%	d4-2-Chlorophenol	71.5%

Sample ID: RGH-SC-06-4-6'  
DILUTION

Lab Sample ID: NM56U  
LIMS ID: 08-21881  
Matrix: Sediment  
Data Release Authorized: *AB*  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/13/08 17:12  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 10.0  
Percent Moisture: 54.0%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	140	200	< 200 U
541-73-1	1,3-Dichlorobenzene	73	200	< 200 U
106-46-7	1,4-Dichlorobenzene	73	200	< 200 U
100-51-6	Benzyl Alcohol	140	200	< 200 U
95-50-1	1,2-Dichlorobenzene	78	200	< 200 U
95-48-7	2-Methylphenol	140	200	< 200 U
106-44-5	4-Methylphenol	130	200	180 J
67-72-1	Hexachloroethane	71	200	< 200 U
105-67-9	2,4-Dimethylphenol	150	200	< 200 U
65-85-0	Benzoic Acid	1100	2,000	< 2,000 U
120-82-1	1,2,4-Trichlorobenzene	90	200	< 200 U
91-20-3	Naphthalene	86	200	460
87-68-3	Hexachlorobutadiene	80	200	< 200 U
91-57-6	2-Methylnaphthalene	81	200	190 J
131-11-3	Dimethylphthalate	76	200	< 200 U
208-96-8	Acenaphthylene	85	200	390
83-32-9	Acenaphthene	81	200	110 J
132-64-9	Dibenzofuran	75	200	170 J
84-66-2	Diethylphthalate	160	200	< 200 U
86-73-7	Fluorene	88	200	430
86-30-6	N-Nitrosodiphenylamine	86	200	< 200 U
118-74-1	Hexachlorobenzene	79	200	< 200 U
87-86-5	Pentachlorophenol	470	990	< 990 U
85-01-8	Phenanthrene	83	200	3,500
120-12-7	Anthracene	76	200	1,000
84-74-2	Di-n-Butylphthalate	120	200	< 200 U
206-44-0	Fluoranthene	78	200	4,400
129-00-0	Pyrene	76	200	5,100
85-68-7	Butylbenzylphthalate	110	200	< 200 U
56-55-3	Benzo (a) anthracene	58	200	2,000
117-81-7	bis(2-Ethylhexyl)phthalate	110	200	< 200 U
218-01-9	Chrysene	65	200	2,200
117-84-0	Di-n-Octyl phthalate	82	200	< 200 U
205-99-2	Benzo (b) fluoranthene	94	200	1,800
207-08-9	Benzo (k) fluoranthene	91	200	1,500
50-32-8	Benzo (a) pyrene	80	200	2,300
193-39-5	Indeno (1,2,3-cd) pyrene	85	200	1,200
53-70-3	Dibenz (a,h) anthracene	84	200	200
191-24-2	Benzo (g,h,i) perylene	67	200	1,400

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-06-4-6'  
DILUTION

Lab Sample ID: NM56U  
LIMS ID: 08-21881  
Matrix: Sediment  
Date Analyzed: 09/13/08 17:12

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	71	200	150 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	58.0%	2-Fluorobiphenyl	66.0%
d14-p-Terphenyl	92.4%	d4-1,2-Dichlorobenzene	51.2%
d5-Phenol	60.0%	2-Fluorophenol	57.6%
2,4,6-Tribromophenol	70.7%	d4-2-Chlorophenol	63.5%

**SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT	OUT
MB-090308	64.8%	63.2%	76.4%	64.4%	62.7%	59.5%	73.3%	61.1%	0	
LCS-090308	48.0%	49.2%	54.8%	47.2%	47.5%	45.3%	61.9%	45.6%	0	
LCSD-090308	52.4%	54.0%	62.0%	50.0%	52.5%	49.6%	69.1%	50.4%	0	
RGH-SS-01	47.6%	51.6%	53.2%	43.2%	48.5%	43.2%	63.5%	47.7%	0	
RGH-SS-01 MS	55.6%	62.4%	66.4%	53.2%	58.9%	54.1%	85.3%	55.5%	0	
RGH-SS-01 MSD	52.8%	54.0%	63.6%	48.0%	55.2%	49.6%	82.1%	53.6%	0	
RGH-SS-02	61.6%	62.8%	73.6%	62.4%	66.1%	60.0%	89.1%	64.0%	0	
RGH-SS-03	63.6%	64.8%	77.2%	59.2%	65.9%	59.2%	92.8%	63.7%	0	
RGH-SC-01-0-2'	60.4%	63.2%	77.2%	58.8%	61.6%	59.2%	91.7%	63.7%	0	
RGH-SC-01-2-4'	58.8%	62.8%	80.0%	54.8%	60.8%	56.5%	91.2%	59.2%	0	
RGH-SC-01-4-6'	60.8%	67.6%	94.4%	61.6%	60.8%	56.5%	87.7%	63.5%	0	
RGH-SC-01-4-6' DL	62.5%	70.0%	98.0%*	64.0%	74.6%	64.8%	82.4%	73.5%	1	
RGH-SC-02-0-2'	46.0%	49.2%	54.4%	46.8%	48.0%	44.5%	69.3%	49.6%	0	
RGH-SC-02-2-4'	57.6%	56.4%	73.2%	58.4%	52.3%	53.6%	82.1%	55.5%	0	
RGH-SC-02-4-6'	52.4%	55.2%	58.8%	52.4%	54.7%	51.2%	77.6%	55.5%	0	
RGH-SC-03-0-2'	55.2%	59.2%	75.2%	51.6%	55.2%	53.9%	77.1%	58.1%	0	
RGH-SC-03-2-4'	57.2%	62.0%	98.4%*	54.4%	61.9%	57.3%	81.6%	61.3%	1	
RGH-SC-03-2-4' DL	58.6%	66.1%	96.1%	54.6%	73.0%	61.3%	79.2%	71.8%	0	
RGH-SC-03-4-6'	23.4%*	26.0%*	33.8%	23.0%*	24.8%*	23.0%	34.9%	25.3%*	5	
RGH-SC-03-4-6' DL	24.0%*	27.2%*	34.8%	25.6%	22.1%*	24.8%	26.7%	24.5%*	4	
RGH-SC-04-0-2'	60.0%	66.4%	102%*	56.0%	60.8%	57.6%	85.9%	62.9%	1	
RGH-SC-04-0-2' DL	59.4%	65.4%	93.6%	54.8%	72.1%	62.9%	79.8%	71.8%	0	
RGH-SC-04-2-4'	52.4%	51.2%	67.2%	50.0%	49.9%	50.9%	79.2%	53.3%	0	
RGH-SC-04-4-6'	54.4%	57.6%	71.2%	54.4%	53.1%	54.9%	82.4%	56.5%	0	
RGH-SC-05-0-2'	51.6%	55.6%	73.2%	46.0%	50.4%	49.3%	82.1%	50.1%	0	
RGH-SC-05-2-4'	47.2%	48.4%	68.8%	44.4%	53.1%	49.1%	60.3%	52.3%	0	
RGH-SC-05-4-6'	57.2%	59.6%	78.4%	53.2%	63.5%	59.2%	64.3%	60.8%	0	
RGH-SC-06-0-2'	54.4%	53.6%	73.6%	50.8%	62.4%	57.6%	67.7%	60.8%	0	
RGH-SC-06-2-4'	53.2%	55.6%	66.8%	49.2%	60.3%	56.0%	59.5%	57.6%	0	
MB-090308	65.6%	64.0%	98.4%	68.0%	73.3%	66.1%	73.9%	72.0%	0	
LCS-090308	58.8%	58.8%	87.2%	58.8%	66.9%	61.6%	75.5%	63.2%	0	
LCSD-090308	57.6%	56.0%	90.4%	53.2%	64.0%	59.7%	76.3%	60.8%	0	
RGH-SC-06-4-6'	65.3%	67.3%	102%*	59.5%	75.5%	65.8%	85.6%	71.5%	1	
RGH-SC-06-4-6' DL	58.0%	66.0%	92.4%	51.2%	60.0%	57.6%	70.7%	63.5%	0	
RGH-SC-06-4-6' MS	63.8%	71.9%	89.2%	52.6%	73.2%	63.6%	84.0%	66.0%	0	
RGH-SC-06-4-6' MSD	56.2%	61.6%	86.2%	53.8%	71.5%	60.0%	74.6%	67.4%	0	

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(37-85)	(29-87)
(FBP) = 2-Fluorobiphenyl	(39-82)	(32-88)
(TPH) = d14-p-Terphenyl	(38-105)	(21-97)
(DCB) = d4-1,2-Dichlorobenzene	(33-79)	(25-82)
(PHL) = d5-Phenol	(40-85)	(29-85)
(2FP) = 2-Fluorophenol	(20-93)	(10-114)
(TBP) = 2,4,6-Tribromophenol	(40-96)	(25-103)
(2CP) = d4-2-Chlorophenol	(41-81)	(30-84)

Prep Method: SW3550B  
Log Number Range: 08-21861 to 08-21881



ORGANICS ANALYSIS DATA SHEET  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 1 of 1



Sample ID: RGH-SS-01  
 MS/MSD

Lab Sample ID: NM56A  
 LIMS ID: 08-21861  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted MS/MSD: 09/03/08

Sample Amount MS: 25.7 g-dry-wt  
 MSD: 25.9 g-dry-wt

Date Analyzed MS: 09/11/08 16:56  
 MSD: 09/11/08 17:30

Final Extract Volume MS: 0.5 mL  
 MSD: 0.5 mL

Instrument/Analyst MS: NT4/LJR  
 MSD: NT4/LJR

Dilution Factor MS: 1.00  
 MSD: 1.00


GPC Cleanup: YES

Percent Moisture: 23.5 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	30.3	304	487	56.2%	290	483	53.8%	4.7%
1,3-Dichlorobenzene	< 19.4	230	487	47.2%	216	483	44.7%	6.3%
1,4-Dichlorobenzene	< 19.4	224	487	46.0%	216	483	44.7%	3.6%
Benzyl Alcohol	< 19.4	433	973	44.5%	409	965	42.4%	5.7%
1,2-Dichlorobenzene	< 19.4	220	487	45.2%	211	483	43.7%	4.2%
2-Methylphenol	< 19.4	262	487	53.8%	264	483	54.7%	0.8%
4-Methylphenol	< 19.4	649	973	66.7%	634	965	65.7%	2.3%
Hexachloroethane	< 19.4	216	487	44.4%	203	483	42.0%	6.2%
2,4-Dimethylphenol	< 19.4	268	487	55.0%	267	483	55.3%	0.4%
Benzoic Acid	< 19.4	684	1460	46.8%	772	1450	53.2%	12.1%
1,2,4-Trichlorobenzene	< 19.4	274	487	56.3%	268	483	55.5%	2.2%
Naphthalene	15.3	273	487	52.9%	271	483	52.9%	0.7%
Hexachlorobutadiene	< 19.4	264	487	54.2%	245	483	50.7%	7.5%
2-Methylnaphthalene	14.6	298	487	58.2%	295	483	58.1%	1.0%
Dimethylphthalate	< 19.4	288	487	59.1%	268	483	55.5%	7.2%
Acenaphthylene	9.9	292	487	57.9%	295	483	59.0%	1.0%
Acenaphthene	10.1	302	487	59.9%	282	483	56.3%	6.8%
Dibenzofuran	< 19.4	310	487	63.7%	303	483	62.7%	2.3%
Diethylphthalate	< 19.4	323	487	66.3%	319	483	66.0%	1.2%
Fluorene	< 19.4	333	487	68.4%	323	483	66.9%	3.0%
N-Nitrosodiphenylamine	< 19.4	343	487	70.4%	345	483	71.4%	0.6%
Hexachlorobenzene	< 19.4	307	487	63.0%	299	483	61.9%	2.6%
Pentachlorophenol	83.4	461	487	77.5%	468	483	79.6%	1.5%
Phenanthrene	105	477	487	76.4%	416	483	64.4%	13.7%
Anthracene	23.1	341	487	65.3%	333	483	64.2%	2.4%
Di-n-Butylphthalate	< 19.4	273	487	56.1%	233	483	48.2%	15.8%
Fluoranthene	178	607	487	88.1%	604	483	88.2%	0.5%
Pyrene	156	545	487	79.9%	722	483	117%	27.9%
Butylbenzylphthalate	< 19.4	319	487	65.5%	296	483	61.3%	7.5%
Benzo(a)anthracene	54.7	410	487	73.0%	591	483	111%	36.2%
bis(2-Ethylhexyl)phthalate	143	364	487	45.4%	386	483	50.3%	5.9%
Chrysene	85.6	434	487	71.5%	690	483	125%	45.6%
Di-n-Octyl phthalate	< 19.4	252	487	51.7%	271	483	56.1%	7.3%
Benzo(b)fluoranthene	67.7	392	487	66.6%	635	483	117%	47.3%
Benzo(k)fluoranthene	61.9	517	487	93.4%	596	483	111%	14.2%
Benzo(a)pyrene	62.9	394	487	68.0%	603	483	112%	41.9%
Indeno(1,2,3-cd)pyrene	28.3	260	487	47.6%	270	483	50.0%	3.8%
Dibenz(a,h)anthracene	< 19.4	251	487	51.5%	232	483	48.0%	7.9%
Benzo(g,h,i)perylene	32.6	217	487	37.9%	234	483	41.7%	7.5%
1-Methylnaphthalene	14.6	307	487	60.0%	303	483	59.7%	1.3%

Results reported in µg/kg  
 RPD calculated using sample concentrations per SW846.

Sample ID: RGH-SS-01  
MATRIX SPIKE

Lab Sample ID: NM56A  
LIMS ID: 08-21861  
Matrix: Sediment  
Data Release Authorized:   
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 16:56  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.7 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 23.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	---
541-73-1	1,3-Dichlorobenzene	7.2	20	---
106-46-7	1,4-Dichlorobenzene	7.2	20	---
100-51-6	Benzyl Alcohol	14	20	---
95-50-1	1,2-Dichlorobenzene	7.7	20	---
95-48-7	2-Methylphenol	14	20	---
106-44-5	4-Methylphenol	12	20	---
67-72-1	Hexachloroethane	7.0	20	---
105-67-9	2,4-Dimethylphenol	14	20	---
65-85-0	Benzoic Acid	110	200	---
120-82-1	1,2,4-Trichlorobenzene	8.8	20	---
91-20-3	Naphthalene	8.4	20	---
87-68-3	Hexachlorobutadiene	7.9	20	---
91-57-6	2-Methylnaphthalene	8.0	20	---
131-11-3	Dimethylphthalate	7.6	20	---
208-96-8	Acenaphthylene	8.4	20	---
83-32-9	Acenaphthene	8.0	20	---
132-64-9	Dibenzofuran	7.4	20	---
84-66-2	Diethylphthalate	16	20	---
86-73-7	Fluorene	8.7	20	---
86-30-6	N-Nitrosodiphenylamine	8.4	20	---
118-74-1	Hexachlorobenzene	7.8	20	---
87-86-5	Pentachlorophenol	46	97	---
85-01-8	Phenanthrene	8.2	20	---
120-12-7	Anthracene	7.5	20	---
84-74-2	Di-n-Butylphthalate	12	20	---
206-44-0	Fluoranthene	7.7	20	---
129-00-0	Pyrene	7.6	20	---
85-68-7	Butylbenzylphthalate	11	20	---
56-55-3	Benzo(a)anthracene	5.8	20	---
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	---
218-01-9	Chrysene	6.5	20	---
117-84-0	Di-n-Octyl phthalate	8.1	20	---
205-99-2	Benzo(b)fluoranthene	9.3	20	---
207-08-9	Benzo(k)fluoranthene	9.0	20	---
50-32-8	Benzo(a)pyrene	7.9	20	---
193-39-5	Indeno(1,2,3-cd)pyrene	8.4	20	---
53-70-3	Dibenz(a,h)anthracene	8.3	20	---
191-24-2	Benzo(g,h,i)perylene	6.6	20	---

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SS-01  
MATRIX SPIKE

Lab Sample ID: NM56A  
LIMS ID: 08-21861  
Matrix: Sediment  
Date Analyzed: 09/11/08 16:56

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	55.6%	2-Fluorobiphenyl	62.4%
d14-p-Terphenyl	66.4%	d4-1,2-Dichlorobenzene	53.2%
d5-Phenol	58.9%	2-Fluorophenol	54.1%
2,4,6-Tribromophenol	85.3%	d4-2-Chlorophenol	55.5%

ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS

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Sample ID: RGH-SS-01

MATRIX SPIKE DUPLICATE

Lab Sample ID: NM56A

LIMS ID: 08-21861

Matrix: Sediment

Data Release Authorized:

Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Date Analyzed: 09/11/08 17:30

Instrument/Analyst: NT4/LJR

GPC Cleanup: Yes

Sample Amount: 25.9 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 23.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	19	---
541-73-1	1,3-Dichlorobenzene	7.2	19	---
106-46-7	1,4-Dichlorobenzene	7.1	19	---
100-51-6	Benzyl Alcohol	14	19	---
95-50-1	1,2-Dichlorobenzene	7.6	19	---
95-48-7	2-Methylphenol	14	19	---
106-44-5	4-Methylphenol	12	19	---
67-72-1	Hexachloroethane	6.9	19	---
105-67-9	2,4-Dimethylphenol	14	19	---
65-85-0	Benzoic Acid	110	190	---
120-82-1	1,2,4-Trichlorobenzene	8.8	19	---
91-20-3	Naphthalene	8.4	19	---
87-68-3	Hexachlorobutadiene	7.8	19	---
91-57-6	2-Methylnaphthalene	7.9	19	---
131-11-3	Dimethylphthalate	7.5	19	---
208-96-8	Acenaphthylene	8.4	19	---
83-32-9	Acenaphthene	7.9	19	---
132-64-9	Dibenzofuran	7.3	19	---
84-66-2	Diethylphthalate	16	19	---
86-73-7	Fluorene	8.6	19	---
86-30-6	N-Nitrosodiphenylamine	8.4	19	---
118-74-1	Hexachlorobenzene	7.7	19	---
87-86-5	Pentachlorophenol	46	96	---
85-01-8	Phenanthrene	8.1	19	---
120-12-7	Anthracene	7.5	19	---
84-74-2	Di-n-Butylphthalate	12	19	---
206-44-0	Fluoranthene	7.6	19	---
129-00-0	Pyrene	7.5	19	---
85-68-7	Butylbenzylphthalate	11	19	---
56-55-3	Benzo (a) anthracene	5.7	19	---
117-81-7	bis (2-Ethylhexyl) phthalate	11	19	---
218-01-9	Chrysene	6.4	19	---
117-84-0	Di-n-Octyl phthalate	8.1	19	---
205-99-2	Benzo (b) fluoranthene	9.2	19	---
207-08-9	Benzo (k) fluoranthene	8.9	19	---
50-32-8	Benzo (a) pyrene	7.9	19	---
193-39-5	Indeno (1,2,3-cd) pyrene	8.3	19	---
53-70-3	Dibenz (a,h) anthracene	8.3	19	---
191-24-2	Benzo (g,h,i) perylene	6.5	19	---

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SS-01  
MATRIX SPIKE DUPLICATE

Lab Sample ID: NM56A  
LIMS ID: 08-21861  
Matrix: Sediment  
Date Analyzed: 09/11/08 17:30

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	6.9	19	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	52.8%	2-Fluorobiphenyl	54.0%
d14-p-Terphenyl	63.6%	d4-1,2-Dichlorobenzene	48.0%
d5-Phenol	55.2%	2-Fluorophenol	49.6%
2,4,6-Tribromophenol	82.1%	d4-2-Chlorophenol	53.6%

ORGANICS ANALYSIS DATA SHEET  
 PSSDA Semivolatiles by SW8270D GC/MS  
 Page 1 of 1



Sample ID: RGH-SC-06-4-6'  
 MS/MSD

Lab Sample ID: NM56U  
 LIMS ID: 08-21881  
 Matrix: Sediment  
 Data Release Authorized: *[Signature]*  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted MS/MSD: 09/03/08  
 Date Analyzed MS: 09/12/08 22:43  
 MSD: 09/12/08 23:17  
 Instrument/Analyst MS: NT4/LJR  
 MSD: NT4/LJR  
 GPC Cleanup: NO

Sample Amount MS: 25.4 g-dry-wt  
 MSD: 25.3 g-dry-wt  
 Final Extract Volume MS: 0.5 mL  
 MSD: 0.5 mL  
 Dilution Factor MS: 3.00  
 MSD: 3.00  
 Percent Moisture: 54.0 %

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	55.6	380	493	65.8%	365	493	62.8%	4.0%
1,3-Dichlorobenzene	< 59.1	280	493	56.8%	263	493	53.3%	6.3%
1,4-Dichlorobenzene	< 59.1	272	493	55.2%	256	493	51.9%	6.1%
Benzyl Alcohol	< 59.1	675	985	68.5%	668	987	67.7%	1.0%
1,2-Dichlorobenzene	< 59.1	291	493	59.0%	282	493	57.2%	3.1%
2-Methylphenol	< 59.1	388	493	78.7%	368	493	74.6%	5.3%
4-Methylphenol	229	908	985	68.9%	928	987	70.8%	2.2%
Hexachloroethane	< 59.1	267	493	54.2%	271	493	55.0%	1.5%
2,4-Dimethylphenol	< 59.1	385	493	78.1%	361	493	73.2%	6.4%
Benzoic Acid	< 59.1	379 J	1480	25.6%	353 J	1480	23.9%	7.1%
1,2,4-Trichlorobenzene	< 59.1	310	493	62.9%	288	493	58.4%	7.4%
Naphthalene	480	1030	493	112%	788	493	62.5%	26.6%
Hexachlorobutadiene	< 59.1	320	493	64.9%	291	493	59.0%	9.5%
2-Methylnaphthalene	205	576	493	75.3%	530	493	65.9%	8.3%
Dimethylphthalate	< 59.1	368	493	74.6%	337	493	68.4%	8.8%
Acenaphthylene	444	634	493	38.5%	591	493	29.8%	7.0%
Acenaphthene	107	433	493	66.1%	398	493	59.0%	8.4%
Dibenzofuran	179	500	493	65.1%	453	493	55.6%	9.9%
Diethylphthalate	< 59.1	401	493	81.3%	355	493	72.0%	12.2%
Fluorene	439	618	493	36.3%	575	493	27.6%	7.2%
N-Nitrosodiphenylamine	< 59.1	471	493	95.5%	500	493	101%	6.0%
Hexachlorobenzene	< 59.1	374	493	75.9%	342	493	69.4%	8.9%
Pentachlorophenol	< 296	362	493	73.4%	315	493	63.9%	13.9%
Phenanthrene	3340	1990	493	NA	1950	493	NA	2.0%
Anthracene	1120	744	493	NA	746	493	NA	0.3%
Di-n-Butylphthalate	< 59.1	403	493	81.7%	336	493	68.2%	18.1%
Fluoranthene	4150	2390	493	NA	2370	493	NA	0.8%
Pyrene	5130	2490	493	NA	3080	493	NA	21.2%
Butylbenzylphthalate	< 59.1	414	493	84.0%	348	493	70.6%	17.3%
Benzo(a)anthracene	2140	1140	493	NA	1400	493	NA	20.5%
bis(2-Ethylhexyl)phthalate	< 59.1	394	493	79.9%	342	493	69.4%	14.1%
Chrysene	2310	1330	493	NA	1590	493	NA	17.8%
Di-n-Octyl phthalate	< 59.1	299	493	60.6%	257	493	52.1%	15.1%
Benzo(b)fluoranthene	2080	1080	493	NA	1210	493	NA	11.4%
Benzo(k)fluoranthene	1210	958	493	NA	1240	493	6.1%	25.7%
Benzo(a)pyrene	2360	1260	493	NA	1530	493	NA	19.4%
Indeno(1,2,3-cd)pyrene	1300	889	493	NA	998	493	NA	11.6%
Dibenz(a,h)anthracene	463	538	493	15.2%	606	493	29.0%	11.9%
Benzo(g,h,i)perylene	1420	908	493	NA	967	493	NA	6.3%
1-Methylnaphthalene	169	507	493	68.6%	495	493	66.1%	2.4%

Results reported in µg/kg  
 RPD calculated using sample concentrations per SW846.  
 NA-No recovery due to high concentration of analyte in original sample and/or  
 calculated negative recovery.

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-06-4-6'

MATRIX SPIKE

Lab Sample ID: NM56U

LIMS ID: 08-21881

Matrix: Sediment

Data Release Authorized: *[Signature]*

Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Date Extracted: 09/03/08

Date Analyzed: 09/12/08 22:43

Instrument/Analyst: NT4/LJR

GPC Cleanup: No

Sample Amount: 25.4 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 54.0%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	41	59	---
541-73-1	1,3-Dichlorobenzene	22	59	---
106-46-7	1,4-Dichlorobenzene	22	59	---
100-51-6	Benzyl Alcohol	43	59	---
95-50-1	1,2-Dichlorobenzene	23	59	---
95-48-7	2-Methylphenol	42	59	---
106-44-5	4-Methylphenol	38	59	---
67-72-1	Hexachloroethane	21	59	---
105-67-9	2,4-Dimethylphenol	44	59	---
65-85-0	Benzoic Acid	340	590	---
120-82-1	1,2,4-Trichlorobenzene	27	59	---
91-20-3	Naphthalene	26	59	---
87-68-3	Hexachlorobutadiene	24	59	---
91-57-6	2-Methylnaphthalene	24	59	---
131-11-3	Dimethylphthalate	23	59	---
208-96-8	Acenaphthylene	26	59	---
83-32-9	Acenaphthene	24	59	---
132-64-9	Dibenzofuran	22	59	---
84-66-2	Diethylphthalate	48	59	---
86-73-7	Fluorene	26	59	---
86-30-6	N-Nitrosodiphenylamine	26	59	---
118-74-1	Hexachlorobenzene	24	59	---
87-86-5	Pentachlorophenol	140	300	---
85-01-8	Phenanthrene	25	59	---
120-12-7	Anthracene	23	59	---
84-74-2	Di-n-Butylphthalate	37	59	---
206-44-0	Fluoranthene	23	59	---
129-00-0	Pyrene	23	59	---
85-68-7	Butylbenzylphthalate	33	59	---
56-55-3	Benzo (a) anthracene	18	59	---
117-81-7	bis (2-Ethylhexyl) phthalate	33	59	---
218-01-9	Chrysene	20	59	---
117-84-0	Di-n-Octyl phthalate	25	59	---
205-99-2	Benzo (b) fluoranthene	28	59	---
207-08-9	Benzo (k) fluoranthene	27	59	---
50-32-8	Benzo (a) pyrene	24	59	---
193-39-5	Indeno (1,2,3-cd) pyrene	25	59	---
53-70-3	Dibenz (a, h) anthracene	25	59	---
191-24-2	Benzo (g, h, i) perylene	20	59	---

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-06-4-6'  
MATRIX SPIKE

Lab Sample ID: NM56U  
LIMS ID: 08-21881  
Matrix: Sediment  
Date Analyzed: 09/12/08 22:43

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	63.8%	2-Fluorobiphenyl	71.9%
d14-p-Terphenyl	89.2%	d4-1,2-Dichlorobenzene	52.6%
d5-Phenol	73.2%	2-Fluorophenol	63.6%
2,4,6-Tribromophenol	84.0%	d4-2-Chlorophenol	66.0%



ORGANICS ANALYSIS DATA SHEET  
 PSDDA Semivolatiles by SW8270D GC/MS  
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Sample ID: RGH-SC-06-4-6'  
 MATRIX SPIKE DUPLICATE

Lab Sample ID: NM56U  
 LIMS ID: 08-21881  
 Matrix: Sediment  
 Data Release Authorized: *[Signature]*  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted: 09/03/08  
 Date Analyzed: 09/12/08 23:17  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: No

Sample Amount: 25.3 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 3.00  
 Percent Moisture: 54.0%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	41	59	---
541-73-1	1,3-Dichlorobenzene	22	59	---
106-46-7	1,4-Dichlorobenzene	22	59	---
100-51-6	Benzyl Alcohol	43	59	---
95-50-1	1,2-Dichlorobenzene	23	59	---
95-48-7	2-Methylphenol	42	59	---
106-44-5	4-Methylphenol	38	59	---
67-72-1	Hexachloroethane	21	59	---
105-67-9	2,4-Dimethylphenol	44	59	---
65-85-0	Benzoic Acid	340	590	---
120-82-1	1,2,4-Trichlorobenzene	27	59	---
91-20-3	Naphthalene	26	59	---
87-68-3	Hexachlorobutadiene	24	59	---
91-57-6	2-Methylnaphthalene	24	59	---
131-11-3	Dimethylphthalate	23	59	---
208-96-8	Acenaphthylene	26	59	---
83-32-9	Acenaphthene	24	59	---
132-64-9	Dibenzofuran	22	59	---
84-66-2	Diethylphthalate	49	59	---
86-73-7	Fluorene	27	59	---
86-30-6	N-Nitrosodiphenylamine	26	59	---
118-74-1	Hexachlorobenzene	24	59	---
87-86-5	Pentachlorophenol	140	300	---
85-01-8	Phenanthrene	25	59	---
120-12-7	Anthracene	23	59	---
84-74-2	Di-n-Butylphthalate	37	59	---
206-44-0	Fluoranthene	23	59	---
129-00-0	Pyrene	23	59	---
85-68-7	Butylbenzylphthalate	33	59	---
56-55-3	Benzo(a)anthracene	18	59	---
117-81-7	bis(2-Ethylhexyl)phthalate	33	59	---
218-01-9	Chrysene	20	59	---
117-84-0	Di-n-Octyl phthalate	25	59	---
205-99-2	Benzo(b)fluoranthene	28	59	---
207-08-9	Benzo(k)fluoranthene	27	59	---
50-32-8	Benzo(a)pyrene	24	59	---
193-39-5	Indeno(1,2,3-cd)pyrene	25	59	---
53-70-3	Dibenz(a,h)anthracene	25	59	---
191-24-2	Benzo(g,h,i)perylene	20	59	---

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2



Sample ID: RGH-SC-06-4-6'  
MATRIX SPIKE DUPLICATE

Lab Sample ID: NM56U  
LIMS ID: 08-21881  
Matrix: Sediment  
Date Analyzed: 09/12/08 23:17

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17


CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	56.2%	2-Fluorobiphenyl	61.6%
d14-p-Terphenyl	86.2%	d4-1,2-Dichlorobenzene	53.8%
d5-Phenol	71.5%	2-Fluorophenol	60.0%
2,4,6-Tribromophenol	74.6%	d4-2-Chlorophenol	67.4%

Sample ID: LCS-090308  
 LCS/LCSD

Lab Sample ID: LCS-090308  
 LIMS ID: 08-21861  
 Matrix: Sediment  
 Data Release Authorized:   
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted LCS/LCSD: 09/03/08

Sample Amount LCS: 25.0 g

Date Analyzed LCS: 09/11/08 15:15

LCSD: 25.0 g

LCSD: 09/11/08 15:49

Final Extract Volume LCS: 0.5 mL

LCSD: 0.5 mL

Instrument/Analyst LCS: NT4/LJR

Dilution Factor LCS: 1.00

LCSD: NT4/LJR

LCSD: 1.00

GPC Cleanup: YES

Percent Moisture: NA

Analyte	Spike		LCS		Spike		LCSD		RPD
	LCS	Added-LCS	Recovery	LCSD	Added-LCSD	Recovery	LCSD		
Phenol	253	500	50.6%	278	500	55.6%	9.4%		
1,3-Dichlorobenzene	212	500	42.4%	225	500	45.0%	5.9%		
1,4-Dichlorobenzene	210	500	42.0%	227	500	45.4%	7.8%		
Benzyl Alcohol	403	1000	40.3%	445	1000	44.5%	9.9%		
1,2-Dichlorobenzene	199	500	39.8%	216	500	43.2%	8.2%		
2-Methylphenol	219	500	43.8%	258	500	51.6%	16.4%		
4-Methylphenol	497	1000	49.7%	593	1000	59.3%	17.6%		
Hexachloroethane	189	500	37.8%	209	500	41.8%	10.1%		
2,4-Dimethylphenol	204	500	40.8%	219	500	43.8%	7.1%		
Benzoic Acid	782	1500	52.1%	897	1500	59.8%	13.7%		
1,2,4-Trichlorobenzene	238	500	47.6%	260	500	52.0%	8.8%		
Naphthalene	225	500	45.0%	245	500	49.0%	8.5%		
Hexachlorobutadiene	240	500	48.0%	256	500	51.2%	6.5%		
2-Methylnaphthalene	233	500	46.6%	263	500	52.6%	12.1%		
Dimethylphthalate	259	500	51.8%	293	500	58.6%	12.3%		
Acenaphthylene	234	500	46.8%	246	500	49.2%	5.0%		
Acenaphthene	231	500	46.2%	256	500	51.2%	10.3%		
Dibenzofuran	249	500	49.8%	279	500	55.8%	11.4%		
Diethylphthalate	318	500	63.6%	346	500	69.2%	8.4%		
Fluorene	257	500	51.4%	290	500	58.0%	12.1%		
N-Nitrosodiphenylamine	355	500	71.0%	388	500	77.6%	8.9%		
Hexachlorobenzene	264	500	52.8%	299	500	59.8%	12.4%		
Pentachlorophenol	308	500	61.6%	356	500	71.2%	14.5%		
Phenanthrene	269	500	53.8%	302	500	60.4%	11.6%		
Anthracene	256	500	51.2%	279	500	55.8%	8.6%		
Di-n-Butylphthalate	300	500	60.0%	351	500	70.2%	15.7%		
Fluoranthene	308	500	61.6%	354	500	70.8%	13.9%		
Pyrene	246	500	49.2%	280	500	56.0%	12.9%		
Butylbenzylphthalate	266	500	53.2%	306	500	61.2%	14.0%		
Benzo(a)anthracene	274	500	54.8%	311	500	62.2%	12.6%		
bis(2-Ethylhexyl)phthalate	277	500	55.4%	325	500	65.0%	15.9%		
Chrysene	274	500	54.8%	319	500	63.8%	15.2%		
Di-n-Octyl phthalate	237	500	47.4%	275	500	55.0%	14.8%		
Benzo(b)fluoranthene	298	500	59.6%	353	500	70.6%	16.9%		

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2

Sample ID: LCSD-090308  
LCS/LCSD

Lab Sample ID: LCS-090308

QC Report No: NM56-Hart Crowser, Inc.

LIMS ID: 08-21861

Project: R.G. Haley

Matrix: Sediment

17330-17

Date Analyzed LCS: 09/11/08 15:15

LCSD: 09/11/08 15:49

Analyte	Spike		LCS	LCSD	Spike		RPD
	LCS	Added-LCS	Recovery		Added-LCSD	LCSD Recovery	
Benzo(k)fluoranthene	331	500	66.2%	374	500	74.8%	12.2%
Benzo(a)pyrene	243	500	48.6%	258	500	51.6%	6.0%
Indeno(1,2,3-cd)pyrene	268	500	53.6%	346	500	69.2%	25.4%
Dibenz(a,h)anthracene	306	500	61.2%	344	500	68.8%	11.7%
Benzo(g,h,i)perylene	292	500	58.4%	330	500	66.0%	12.2%
1-Methylnaphthalene	244	500	48.8%	269	500	53.8%	9.7%

**Semivolatile Surrogate Recovery**

	LCS	LCSD
d5-Nitrobenzene	48.0%	52.4%
2-Fluorobiphenyl	49.2%	54.0%
d14-p-Terphenyl	54.8%	62.0%
d4-1,2-Dichlorobenzene	47.2%	50.0%
d5-Phenol	47.5%	52.5%
2-Fluorophenol	45.3%	49.6%
2,4,6-Tribromophenol	61.9%	69.1%
d4-2-Chlorophenol	45.6%	50.4%

Results reported in  $\mu\text{g}/\text{kg}$

RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 1 of 2

Sample ID: LCS-090308  
 LCS/LCSD

Lab Sample ID: LCS-090308  
 LIMS ID: 08-21881  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted LCS/LCSD: 09/03/08

Sample Amount LCS: 25.0 g  
 LCSD: 25.0 g

Date Analyzed LCS: 09/12/08 20:29  
 LCSD: 09/12/08 21:03

Final Extract Volume LCS: 0.5 mL  
 LCSD: 0.5 mL

Instrument/Analyst LCS: NT4/LJR  
 LCSD: NT4/LJR

Dilution Factor LCS: 1.00  
 LCSD: 1.00

GPC Cleanup: NO

Percent Moisture: NA

Analyte	Spike			LCSD			RPD
	LCS	Added-LCS	Recovery	LCS	Added-LCSD	Recovery	
Phenol	351	500	70.2%	347	500	69.4%	1.1%
1,3-Dichlorobenzene	281	500	56.2%	275	500	55.0%	2.2%
1,4-Dichlorobenzene	285	500	57.0%	277	500	55.4%	2.8%
Benzyl Alcohol	520	1000	52.0%	483	1000	48.3%	7.4%
1,2-Dichlorobenzene	295	500	59.0%	289	500	57.8%	2.1%
2-Methylphenol	309	500	61.8%	327	500	65.4%	5.7%
4-Methylphenol	632	1000	63.2%	650	1000	65.0%	2.8%
Hexachloroethane	275	500	55.0%	268	500	53.6%	2.6%
2,4-Dimethylphenol	275	500	55.0%	288	500	57.6%	4.6%
Benzoic Acid	1120	1500	74.7%	1170	1500	78.0%	4.4%
1,2,4-Trichlorobenzene	284	500	56.8%	286	500	57.2%	0.7%
Naphthalene	295	500	59.0%	300	500	60.0%	1.7%
Hexachlorobutadiene	293	500	58.6%	295	500	59.0%	0.7%
2-Methylnaphthalene	319	500	63.8%	328	500	65.6%	2.8%
Dimethylphthalate	349	500	69.8%	362	500	72.4%	3.7%
Acenaphthylene	304	500	60.8%	303	500	60.6%	0.3%
Acenaphthene	301	500	60.2%	305	500	61.0%	1.3%
Dibenzofuran	326	500	65.2%	331	500	66.2%	1.5%
Diethylphthalate	374	500	74.8%	390	500	78.0%	4.2%
Fluorene	330	500	66.0%	348	500	69.6%	5.3%
N-Nitrosodiphenylamine	399	500	79.8%	442	500	88.4%	10.2%
Hexachlorobenzene	322	500	64.4%	339	500	67.8%	5.1%
Pentachlorophenol	335	500	67.0%	352	500	70.4%	4.9%
Phenanthrene	340	500	68.0%	359	500	71.8%	5.4%
Anthracene	309	500	61.8%	323	500	64.6%	4.4%
Di-n-Butylphthalate	374	500	74.8%	390	500	78.0%	4.2%
Fluoranthene	353	500	70.6%	370	500	74.0%	4.7%
Pyrene	405	500	81.0%	439	500	87.8%	8.1%
Butylbenzylphthalate	410	500	82.0%	426	500	85.2%	3.8%
Benzo(a)anthracene	356	500	71.2%	380	500	76.0%	6.5%
bis(2-Ethylhexyl)phthalate	389	500	77.8%	385	500	77.0%	1.0%
Chrysene	376	500	75.2%	393	500	78.6%	4.4%
Di-n-Octyl phthalate	323	500	64.6%	327	500	65.4%	1.2%
Benzo(b)fluoranthene	424	500	84.8%	424	500	84.8%	0.0%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 2 of 2

Sample ID: LCSD-090308

LCS/LCSD

Lab Sample ID: LCS-090308

QC Report No: NM56-Hart Crowser, Inc.

LIMS ID: 08-21881

Project: R.G. Haley

Matrix: Sediment

17330-17

Date Analyzed LCS: 09/12/08 20:29

LCSD: 09/12/08 21:03

Analyte	Spike			LCSD			RPD
	LCS	Added-LCS	Recovery	LCS	Added-LCSD	Recovery	
Benzo(k)fluoranthene	447	500	89.4%	439	500	87.8%	1.8%
Benzo(a)pyrene	314	500	62.8%	318	500	63.6%	1.3%
Indeno(1,2,3-cd)pyrene	420	500	84.0%	416	500	83.2%	1.0%
Dibenz(a,h)anthracene	410	500	82.0%	400	500	80.0%	2.5%
Benzo(g,h,i)perylene	393	500	78.6%	388	500	77.6%	1.3%
1-Methylnaphthalene	326	500	65.2%	342	500	68.4%	4.8%

**Semivolatile Surrogate Recovery**

	LCS	LCSD
d5-Nitrobenzene	58.8%	57.6%
2-Fluorobiphenyl	58.8%	56.0%
d14-p-Terphenyl	87.2%	90.4%
d4-1,2-Dichlorobenzene	58.8%	53.2%
d5-Phenol	66.9%	64.0%
2-Fluorophenol	61.6%	59.7%
2,4,6-Tribromophenol	75.5%	76.3%
d4-2-Chlorophenol	63.2%	60.8%

Results reported in  $\mu\text{g}/\text{kg}$

RPD calculated using sample concentrations per SW846.

4B  
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

NM56MBS1
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Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

ARI Job No: NM56

Project: R.G. HALEY

Lab File ID: NM56MB

Date Extracted: 09/03/08

Instrument ID: NT4

Date Analyzed: 09/11/08

Matrix: SOLID

Time Analyzed: 1442

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	=====	=====	=====	=====
01	NM56LCSS1	NM56LCSS1	NM56SB	09/11/08
02	NM56LCSDS1	NM56LCSDS1	NM56SBD	09/11/08
03	RGH-SS-01	NM56A	NM56A	09/11/08
04	RGH-SS-01 MS	NM56AMS	NM56AMS	09/11/08
05	RGH-SS-01 MSD	NM56AMSD	NM56AMD	09/11/08
06	RGH-SS-02	NM56B	NM56B	09/11/08
07	RGH-SS-03	NM56C	NM56C	09/11/08
08	RGH-SC-01-0-2'	NM56D	NM56D	09/11/08
09	RGH-SC-01-2-4'	NM56E	NM56E	09/11/08
10	RGH-SC-01-4-6'	NM56F	NM56F	09/11/08
11	RGH-SC-02-0-2'	NM56G	NM56G	09/11/08
12	RGH-SC-02-2-4'	NM56H	NM56H	09/11/08
13	RGH-SC-02-4-6'	NM56I	NM56I	09/11/08
14	RGH-SC-03-0-2'	NM56J	NM56J	09/11/08
15	RGH-SC-03-2-4'	NM56K	NM56K	09/11/08
16	RGH-SC-03-4-6'	NM56L	NM56L	09/11/08
17	RGH-SC-04-0-2'	NM56M	NM56M	09/12/08
18	RGH-SC-04-2-4'	NM56N	NM56N	09/12/08
19	RGH-SC-04-4-6'	NM56O	NM56O	09/12/08
20	RGH-SC-05-0-2'	NM56P	NM56P	09/12/08
21	RGH-SC-05-2-4'	NM56Q	NM56Q2	09/12/08
22	RGH-SC-01-4-6'	NM56F	NM56FDL	09/12/08
23	RGH-SC-03-2-4'	NM56K	NM56KDL	09/13/08
24	RGH-SC-03-4-6'	NM56L	NM56LDL	09/13/08
25	RGH-SC-04-0-2'	NM56M	NM56MDL	09/13/08

COMMENTS:

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4B  
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

NM56MBS1

Lab Name: ANALYTICAL RESOURCES, INC  
ARI Job No: NM56  
Lab File ID: NM56MB  
Instrument ID: NT4  
Matrix: SOLID

Client: HART CROWSER, INC.  
Project: R.G. HALEY  
Date Extracted: 09/03/08  
Date Analyzed: 09/11/08  
Time Analyzed: 1442

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	=====	=====	=====	=====
01	RGH-SC-03-4-6'	NM56L	NM56LDL2	09/13/08
02	RGH-SC-05-4-6'	NM56R	NM56R	09/15/08
03	RGH-SC-06-0-2'	NM56S	NM56S	09/15/08
04	RGH-SC-06-2-4'	NM56T	NM56T	09/15/08
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COMMENTS:

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ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS  
Page 1 of 2



Sample ID: MB-090308  
METHOD BLANK

Lab Sample ID: MB-090308  
LIMS ID: 08-21861  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: NA  
Date Received: NA

Date Extracted: 09/03/08  
Date Analyzed: 09/11/08 14:42  
Instrument/Analyst: NT4/LJR  
GPC Cleanup: Yes

Sample Amount: 25.0 g  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: NA

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.4	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.9	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	120	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.1	20	< 20 U
91-20-3	Naphthalene	8.7	20	< 20 U
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	2-Methylnaphthalene	8.2	20	< 20 U
131-11-3	Dimethylphthalate	7.8	20	< 20 U
208-96-8	Acenaphthylene	8.7	20	< 20 U
83-32-9	Acenaphthene	8.2	20	< 20 U
132-64-9	Dibenzofuran	7.6	20	< 20 U
<b>84-66-2</b>	<b>Diethylphthalate</b>	<b>16</b>	<b>20</b>	<b>35</b>
86-73-7	Fluorene	9.0	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.7	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	Pentachlorophenol	48	100	< 100 U
85-01-8	Phenanthrene	8.4	20	< 20 U
120-12-7	Anthracene	7.7	20	< 20 U
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.9	20	< 20 U
129-00-0	Pyrene	7.8	20	< 20 U
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.9	20	< 20 U
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	< 20 U
218-01-9	Chrysene	6.6	20	< 20 U
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.5	20	< 20 U
207-08-9	Benzo (k) fluoranthene	9.3	20	< 20 U
50-32-8	Benzo (a) pyrene	8.2	20	< 20 U
193-39-5	Indeno (1,2,3-cd) pyrene	8.6	20	< 20 U
53-70-3	Dibenz (a, h) anthracene	8.6	20	< 20 U
191-24-2	Benzo (g, h, i) perylene	6.8	20	< 20 U

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2



Sample ID: MB-090308  
METHOD BLANK

Lab Sample ID: MB-090308  
LIMS ID: 08-21861  
Matrix: Sediment  
Date Analyzed: 09/11/08 14:42

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	64.8%	2-Fluorobiphenyl	63.2%
d14-p-Terphenyl	76.4%	d4-1,2-Dichlorobenzene	64.4%
d5-Phenol	62.7%	2-Fluorophenol	59.5%
2,4,6-Tribromophenol	73.3%	d4-2-Chlorophenol	61.1%

4B  
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

NM56MBS2
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Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

ARI Job No: NM56

Project: R.G. HALEY

Lab File ID: NM56MB2

Date Extracted: 09/03/08

Instrument ID: NT4

Date Analyzed: 09/12/08

Matrix: SOLID

Time Analyzed: 1955

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	=====	=====	=====	=====
01	NM56LCSS2	NM56LCSS2	NM56SB2	09/12/08
02	NM56LCSDS2	NM56LCSDS2	NM56SBD2	09/12/08
03	RGH-SC-06-4-6'	NM56U	NM56U	09/12/08
04	RGH-SC-06-4-6' M	NM56UMS	NM56UMS	09/12/08
05	RGH-SC-06-4-6' M	NM56UMSD	NM56UMD	09/12/08
06	RGH-SC-06-4-6'	NM56U	NM56UDL	09/13/08
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COMMENTS:

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**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 1 of 2

Sample ID: MB-090308  
 METHOD BLANK

Lab Sample ID: MB-090308  
 LIMS ID: 08-21881  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/16/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: NA  
 Date Received: NA

Date Extracted: 09/03/08  
 Date Analyzed: 09/12/08 19:55  
 Instrument/Analyst: NT4/LJR  
 GPC Cleanup: No

Sample Amount: 25.0 g  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: NA

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.4	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.9	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	120	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.1	20	< 20 U
91-20-3	Naphthalene	8.7	20	< 20 U
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	2-Methylnaphthalene	8.2	20	< 20 U
131-11-3	Dimethylphthalate	7.8	20	< 20 U
208-96-8	Acenaphthylene	8.7	20	< 20 U
83-32-9	Acenaphthene	8.2	20	< 20 U
132-64-9	Dibenzofuran	7.6	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	9.0	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.7	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	Pentachlorophenol	48	100	< 100 U
85-01-8	Phenanthrene	8.4	20	< 20 U
120-12-7	Anthracene	7.7	20	< 20 U
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.9	20	< 20 U
129-00-0	Pyrene	7.8	20	< 20 U
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo(a)anthracene	5.9	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	< 20 U
218-01-9	Chrysene	6.6	20	< 20 U
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo(b)fluoranthene	9.5	20	< 20 U
207-08-9	Benzo(k)fluoranthene	9.3	20	< 20 U
50-32-8	Benzo(a)pyrene	8.2	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	8.6	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	8.6	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	6.8	20	< 20 U

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2



Sample ID: MB-090308  
METHOD BLANK

Lab Sample ID: MB-090308  
LIMS ID: 08-21881  
Matrix: Sediment  
Date Analyzed: 09/12/08 19:55

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	65.6%	2-Fluorobiphenyl	64.0%
d14-p-Terphenyl	98.4%	d4-1,2-Dichlorobenzene	68.0%
d5-Phenol	73.3%	2-Fluorophenol	66.1%
2,4,6-Tribromophenol	73.9%	d4-2-Chlorophenol	72.0%

**ORGANICS ANALYSIS DATA SHEET**  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 1 of 2

Sample ID: RGH-SC-03-4-6'  
REEXTRACT

Lab Sample ID: NM56L  
LIMS ID: 08-21872  
Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 09/29/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/17/08  
Date Analyzed: 09/27/08 03:25  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: Yes

Sample Amount: 4.22 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 57.8%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	81	120	< 120 U
541-73-1	1,3-Dichlorobenzene	44	120	< 120 U
106-46-7	1,4-Dichlorobenzene	44	120	< 120 U
100-51-6	Benzyl Alcohol	86	120	< 120 U
95-50-1	1,2-Dichlorobenzene	47	120	< 120 U
95-48-7	2-Methylphenol	84	120	< 120 U
106-44-5	4-Methylphenol	76	120	< 120 U
67-72-1	Hexachloroethane	43	120	< 120 U
105-67-9	2,4-Dimethylphenol	88	120	< 120 U
65-85-0	Benzoic Acid	680	1,200	< 1,200 U
120-82-1	1,2,4-Trichlorobenzene	54	120	< 120 U
91-20-3	Naphthalene	51	120	< 120 U
87-68-3	Hexachlorobutadiene	48	120	< 120 U
91-57-6	2-Methylnaphthalene	49	120	< 120 U
131-11-3	Dimethylphthalate	46	120	< 120 U
208-96-8	Acenaphthylene	51	120	< 120 U
83-32-9	Acenaphthene	49	120	< 120 U
132-64-9	Dibenzofuran	45	120	< 120 U
84-66-2	Diethylphthalate	97	120	< 120 U
86-73-7	Fluorene	53	120	< 120 U
86-30-6	N-Nitrosodiphenylamine	51	120	< 120 U
118-74-1	Hexachlorobenzene	48	120	< 120 U
87-86-5	Pentachlorophenol	280	590	< 590 U
85-01-8	Phenanthrene	50	120	230
120-12-7	Anthracene	46	120	79 J
84-74-2	Di-n-Butylphthalate	73	120	< 120 U
206-44-0	Fluoranthene	47	120	550
129-00-0	Pyrene	46	120	630
85-68-7	Butylbenzylphthalate	66	120	69 J
56-55-3	Benzo (a) anthracene	35	120	260
117-81-7	bis (2-Ethylhexyl) phthalate	65	120	470
218-01-9	Chrysene	39	120	370
117-84-0	Di-n-Octyl phthalate	49	120	< 120 U
205-99-2	Benzo (b) fluoranthene	56	120	320
207-08-9	Benzo (k) fluoranthene	55	120	210
50-32-8	Benzo (a) pyrene	48	120	230
193-39-5	Indeno (1,2,3-cd) pyrene	51	120	72 J
53-70-3	Dibenz (a, h) anthracene	51	120	< 120 U
191-24-2	Benzo (g, h, i) perylene	40	120	86 J

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-03-4-6'  
 REEXTRACT

Lab Sample ID: NM56L  
 LIMS ID: 08-21872  
 Matrix: Sediment  
 Date Analyzed: 09/27/08 03:25

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	43	120	< 120 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	54.4%	2-Fluorobiphenyl	62.4%
d14-p-Terphenyl	82.0%	d4-1,2-Dichlorobenzene	54.4%
d5-Phenol	60.3%	2-Fluorophenol	53.3%
2,4,6-Tribromophenol	75.2%	d4-2-Chlorophenol	60.5%

**SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT	OUT
MB-091708	54.8%	59.2%	70.0%	55.6%	59.7%	52.5%	71.2%	58.9%	0	
LCS-091708	54.8%	68.0%	88.8%	53.6%	62.1%	54.7%	88.3%	58.9%	0	
RGH-SC-03-4-6'	23.4%*	26.0%*	33.8%	23.0%*	24.8%*	23.0%	34.9%	25.3%*	5	
RGH-SC-03-4-6' DL	24.0%*	27.2%*	34.8%	25.6%	22.1%*	24.8%	26.7%	24.5%*	4	
RGH-SC-03-4-6' RE	54.4%	62.4%	82.0%	54.4%	60.3%	53.3%	75.2%	60.5%	0	

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(37-85)	(29-87)
(FBP) = 2-Fluorobiphenyl	(39-82)	(32-88)
(TPH) = d14-p-Terphenyl	(38-105)	(21-97)
(DCB) = d4-1,2-Dichlorobenzene	(33-79)	(25-82)
(PHL) = d5-Phenol	(40-85)	(29-85)
(2FP) = 2-Fluorophenol	(20-93)	(10-114)
(TBP) = 2,4,6-Tribromophenol	(40-96)	(25-103)
(2CP) = d4-2-Chlorophenol	(41-81)	(30-84)

Prep Method: SW3550B  
Log Number Range: 08-21872 to 08-21872



Sample ID: LCS-091708  
LAB CONTROL

Lab Sample ID: LCS-091708  
LIMS ID: 08-21872  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/29/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted: 09/17/08  
Date Analyzed: 09/26/08 18:12  
Instrument/Analyst: NT6/LJR  
GPC Cleanup: YES

Sample Amount: 25.0 g  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Phenol	281	500	56.2%
1,3-Dichlorobenzene	280	500	56.0%
1,4-Dichlorobenzene	281	500	56.2%
Benzyl Alcohol	287	1000	28.7%
1,2-Dichlorobenzene	278	500	55.6%
2-Methylphenol	276	500	55.2%
4-Methylphenol	582	1000	58.2%
Hexachloroethane	239	500	47.8%
2,4-Dimethylphenol	281	500	56.2%
Benzoic Acid	985	1500	65.7%
1,2,4-Trichlorobenzene	309	500	61.8%
Naphthalene	298	500	59.6%
Hexachlorobutadiene	318	500	63.6%
2-Methylnaphthalene	312	500	62.4%
Dimethylphthalate	372	500	74.4%
Acenaphthylene	364	500	72.8%
Acenaphthene	329	500	65.8%
Dibenzofuran	382	500	76.4%
Diethylphthalate	375	500	75.0%
Fluorene	373	500	74.6%
N-Nitrosodiphenylamine	457	500	91.4%
Hexachlorobenzene	364	500	72.8%
Pentachlorophenol	358	500	71.6%
Phenanthrene	352	500	70.4%
Anthracene	361	500	72.2%
Di-n-Butylphthalate	395	500	79.0%
Fluoranthene	417	500	83.4%
Pyrene	426	500	85.2%
Butylbenzylphthalate	472	500	94.4%
Benzo(a)anthracene	445	500	89.0%
bis(2-Ethylhexyl)phthalate	364	500	72.8%
Chrysene	412	500	82.4%
Di-n-Octyl phthalate	244	500	48.8%
Benzo(b)fluoranthene	384	500	76.8%
Benzo(k)fluoranthene	406	500	81.2%
Benzo(a)pyrene	328	500	65.6%
Indeno(1,2,3-cd)pyrene	361	500	72.2%

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 2 of 2

Sample ID: LCS-091708  
 LAB CONTROL

Lab Sample ID: LCS-091708  
 LIMS ID: 08-21872  
 Matrix: Sediment  
 Date Analyzed: 09/26/08 18:12

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17

Analyte	Lab Control	Spike Added	Recovery
Dibenz (a,h) anthracene	347	500	69.4%
Benzo (g,h,i) perylene	346	500	69.2%
1-Methylnaphthalene	336	500	67.2%

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	54.8%
2-Fluorobiphenyl	68.0%
d14-p-Terphenyl	88.8%
d4-1,2-Dichlorobenzene	53.6%
d5-Phenol	62.1%
2-Fluorophenol	54.7%
2,4,6-Tribromophenol	88.3%
d4-2-Chlorophenol	58.9%

Results reported in  $\mu\text{g}/\text{kg}$

4B  
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

NM56MBS2

Lab Name: ANALYTICAL RESOURCES, INC  
 ARI Job No: NM56  
 Lab File ID: NM56MB2  
 Instrument ID: NT6  
 Matrix: SOLID

Client: HART CROWSER, INC.  
 Project: R.G. HALEY  
 Date Extracted: 09/17/08  
 Date Analyzed: 09/26/08  
 Time Analyzed: 1737

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	=====	=====	=====	=====
01	NM56LCSS2	NM56LCSS2	NM56SB2	09/26/08
02	RGH-SC-03-4-6'	NM56LRE	NM56LRE	09/27/08
03				
04				
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COMMENTS:

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## ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2



Sample ID: MB-091708

METHOD BLANK

Lab Sample ID: MB-091708

LIMS ID: 08-21872

Matrix: Sediment

Data Release Authorized:

Reported: 09/29/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: NA

Date Received: NA

Date Extracted: 09/17/08

Date Analyzed: 09/26/08 17:37

Instrument/Analyst: NT6/LJR

GPC Cleanup: Yes

Sample Amount: 25.0 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.4	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.9	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	120	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.1	20	< 20 U
91-20-3	Naphthalene	8.7	20	< 20 U
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	2-Methylnaphthalene	8.2	20	< 20 U
131-11-3	Dimethylphthalate	7.8	20	< 20 U
208-96-8	Acenaphthylene	8.7	20	< 20 U
83-32-9	Acenaphthene	8.2	20	< 20 U
132-64-9	Dibenzofuran	7.6	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	9.0	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.7	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	Pentachlorophenol	48	100	< 100 U
85-01-8	Phenanthrene	8.4	20	< 20 U
120-12-7	Anthracene	7.7	20	< 20 U
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.9	20	< 20 U
129-00-0	Pyrene	7.8	20	< 20 U
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo(a)anthracene	5.9	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	< 20 U
218-01-9	Chrysene	6.6	20	< 20 U
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo(b)fluoranthene	9.5	20	< 20 U
207-08-9	Benzo(k)fluoranthene	9.3	20	< 20 U
50-32-8	Benzo(a)pyrene	8.2	20	< 20 U
193-39-5	Indeno(1,2,3-cd)pyrene	8.6	20	< 20 U
53-70-3	Dibenz(a,h)anthracene	8.6	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	6.8	20	< 20 U

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2



Sample ID: MB-091708  
METHOD BLANK

Lab Sample ID: MB-091708  
LIMS ID: 08-21872  
Matrix: Sediment  
Date Analyzed: 09/26/08 17:37

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	54.8%	2-Fluorobiphenyl	59.2%
d14-p-Terphenyl	70.0%	d4-1,2-Dichlorobenzene	55.6%
d5-Phenol	59.7%	2-Fluorophenol	52.5%
2,4,6-Tribromophenol	71.2%	d4-2-Chlorophenol	58.9%

**NWTPHDx**

**ORGANICS ANALYSIS DATA SHEET**

**TOTAL DIESEL RANGE HYDROCARBONS**

NWTPHD by GC/FID-Silica and Acid Cleaned

Page 1 of 2

Matrix: Sediment

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Data Release Authorized:

Reported: 09/10/08

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	MDL	RL	Result
NM56A 08-21861	RGH-SS-01 HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 4.3	6.5 13	19 69 78.0%
MB-090308 08-21862	Method Blank HC ID: ---	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.5 3.3	5.0 10	< 5.0 U < 10 U 79.3%
NM56B 08-21862	RGH-SS-02 HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 3.7	5.6 11	12 42 80.9%
NM56C 08-21863	RGH-SS-03 HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 4.2	6.5 13	17 63 79.6%
NM56D 08-21864	RGH-SC-01-0-2' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.7 4.7	7.1 14	37 110 76.4%
NM56E 08-21865	RGH-SC-01-2-4' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 4.1	6.3 13	43 120 73.3%
NM56F 08-21866	RGH-SC-01-4-6' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 4.1	6.3 13	220 450 72.0%
NM56G 08-21867	RGH-SC-02-0-2' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.7 4.3	6.6 13	32 100 75.8%
NM56H 08-21868	RGH-SC-02-2-4' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 3.8	5.8 12	18 100 75.8%
NM56I 08-21869	RGH-SC-02-4-6' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.6 4.2	6.5 13	25 92 86.4%
NM56J 08-21870	RGH-SC-03-0-2' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.0 6.8	10 21	46 140 76.4%
NM56K 08-21871	RGH-SC-03-2-4' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.2 7.8	12 24	180 510 69.1%
NM56L 08-21872	RGH-SC-03-4-6' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.1 7.4	11 23	110 240 77.8%

**ORGANICS ANALYSIS DATA SHEET**

**TOTAL DIESEL RANGE HYDROCARBONS**

NWTPHD by GC/FID-Silica and Acid Cleaned

Page 2 of 2

Matrix: Sediment

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Data Release Authorized: *[Signature]*

Reported: 09/10/08

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range	MDL	RL	Result
NM56M 08-21873	RGH-SC-04-0-2' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.8 5.2	7.9 16	28 75 76.7%
NM56N 08-21874	RGH-SC-04-2-4' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.0 6.3	9.6 19	13 28 74.0%
NM56O 08-21875	RGH-SC-04-4-6' HC ID: ---	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.9 5.8	8.8 18	< 8.8 U < 18 U 77.8%
NM56P 08-21876	RGH-SC-05-0-2' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.1 7.4	11 23	120 200 76.9%
NM56Q 08-21877	RGH-SC-05-2-4' HC ID: DRO	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.1 6.9	11 21	12 < 21 U 75.8%
NM56R 08-21878	RGH-SC-05-4-6' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.1 7.0	11 22	41 72 75.8%
NM56S 08-21879	RGH-SC-06-0-2' HC ID: DRO/MOTOR OIL	09/03/08	09/05/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.2 7.7	12 24	61 99 74.7%
NM56T 08-21880	RGH-SC-06-2-4' HC ID: DRO/MOTOR OIL	09/03/08	09/06/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.0 6.4	9.8 20	50 64 72.0%
MB-090308 08-21881	Method Blank HC ID: ---	09/03/08	09/06/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	0.5 3.3	5.0 10	< 5.0 U < 10 U 71.6%
NM56U 08-21881	RGH-SC-06-4-6' HC ID: DRO/MOTOR OIL	09/03/08	09/06/08 FID3A	1.00 1.0	Diesel Motor Oil o-Terphenyl	1.0 6.7	10 21	110 190 68.9%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.

DL-Dilution of extract prior to analysis.

RL-Reporting limit.

Diesel quantitation on total peaks in the range from C12 to C24.

Motor Oil quantitation on total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicate results of organics or additional hydrocarbons in ranges are not identifiable.



**CLEANED TPHD SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
RGH-SS-01	78.0%	0
MB-090308	79.3%	0
LCS-090308	76.0%	0
LCSD-090308	76.9%	0
RGH-SS-02	80.9%	0
RGH-SS-02 MS	75.3%	0
RGH-SS-02 MSD	79.3%	0
RGH-SS-03	79.6%	0
RGH-SC-01-0-2'	76.4%	0
RGH-SC-01-2-4'	73.3%	0
RGH-SC-01-4-6'	72.0%	0
RGH-SC-02-0-2'	75.8%	0
RGH-SC-02-2-4'	75.8%	0
RGH-SC-02-4-6'	86.4%	0
RGH-SC-03-0-2'	76.4%	0
RGH-SC-03-2-4'	69.1%	0
RGH-SC-03-4-6'	77.8%	0
RGH-SC-04-0-2'	76.7%	0
RGH-SC-04-2-4'	74.0%	0
RGH-SC-04-4-6'	77.8%	0
RGH-SC-05-0-2'	76.9%	0
RGH-SC-05-2-4'	75.8%	0
RGH-SC-05-4-6'	75.8%	0
RGH-SC-06-0-2'	74.7%	0
RGH-SC-06-2-4'	72.0%	0
MB-090308	71.6%	0
LCS-090308	71.8%	0
LCSD-090308	74.0%	0
RGH-SC-06-4-6'	68.9%	0
RGH-SC-06-4-6' MS	68.4%	0
RGH-SC-06-4-6' MSD	73.1%	0

LCS/MB LIMITS      QC LIMITS

(OTER) = o-Terphenyl

(62-118)

(49-125)

Prep Method: SW3546  
Log Number Range: 08-21861 to 08-21881

**ORGANICS ANALYSIS DATA SHEET**  
 NWTPHD by GC/FID-Silica and Acid Cleaned  
 Page 1 of 1

Sample ID: RGH-SS-02  
 MS/MSD

Lab Sample ID: NM56B  
 LIMS ID: 08-21862  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/10/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted MS/MSD: 09/03/08

Sample Amount MS: 8.36 g-dry-wt  
 MSD: 8.78 g-dry-wt

Date Analyzed MS: 09/05/08 17:43  
 MSD: 09/05/08 17:58

Final Extract Volume MS: 1.0 mL  
 MSD: 1.0 mL

Instrument/Analyst MS: FID/MS  
 MSD: FID/MS

Dilution Factor MS: 1.0  
 MSD: 1.0

Percent Moisture: 17.6%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	12.5	119	179	59.5%	115	171	59.9%	3.4%

**TPHD Surrogate Recovery**

	MS	MSD
o-Terphenyl	75.3%	79.3%

Results reported in mg/kg  
 RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**  
 NWTPHD by GC/FID-Silica and Acid Cleaned  
 Page 1 of 1

Sample ID: RGH-SC-06-4-6'  
 MS/MSD

Lab Sample ID: NM56U  
 LIMS ID: 08-21881  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/10/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/27/08  
 Date Received: 08/28/08

Date Extracted MS/MSD: 09/03/08

Sample Amount MS: 4.97 g-dry-wt  
 MSD: 4.63 g-dry-wt

Date Analyzed MS: 09/06/08 02:15  
 MSD: 09/06/08 02:31

Final Extract Volume MS: 1.0 mL  
 MSD: 1.0 mL

Instrument/Analyst MS: FID/MS  
 MSD: FID/MS

Dilution Factor MS: 1.0  
 MSD: 1.0

Percent Moisture: 54.0%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	112	535	302	140%	312	324	61.7%	52.7%

**TPHD Surrogate Recovery**

	MS	MSD
o-Terphenyl	68.4%	73.1%

Results reported in mg/kg  
 RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**  
 NWTPHD by GC/FID-Silica and Acid Cleaned  
 Page 1 of 1

Sample ID: LCS-090308  
 LCS/LCSD

Lab Sample ID: LCS-090308  
 LIMS ID: 08-21862  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 09/10/08

QC Report No: NM56-Hart Crowser, Inc.  
 Project: R.G. Haley  
 17330-17  
 Date Sampled: 08/26/08  
 Date Received: 08/28/08

Date Extracted LCS/LCSD: 09/03/08

Sample Amount LCS: 10.0 g

Date Analyzed LCS: 09/05/08 16:25  
 LCSD: 09/05/08 16:40

Final Extract Volume LCS: 1.0 mL

Instrument/Analyst LCS: FID/MS  
 LCSD: FID/MS

Dilution Factor LCS: 1.0  
 LCSD: 1.0

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	105	150	70.0%	106	150	70.7%	0.9%

**TPHD Surrogate Recovery**

	LCS	LCSD
o-Terphenyl	76.0%	76.9%

Results reported in mg/kg  
 RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**

NWTPHD by GC/FID-Silica and Acid Cleaned  
Page 1 of 1

Sample ID: LCS-090308  
LCS/LCSD

Lab Sample ID: LCS-090308  
LIMS ID: 08-21881  
Matrix: Sediment  
Data Release Authorized:  
Reported: 09/10/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Date Extracted LCS/LCSD: 09/03/08

Sample Amount LCS: 10.0 g  
LCSD: 10.0 g

Date Analyzed LCS: 09/06/08 01:13  
LCSD: 09/06/08 01:29

Final Extract Volume LCS: 1.0 mL  
LCSD: 1.0 mL

Instrument/Analyst LCS: FID/MS  
LCSD: FID/MS

Dilution Factor LCS: 1.0  
LCSD: 1.0

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	90.3	150	60.2%	93.2	150	62.1%	3.2%

**TPHD Surrogate Recovery**

	LCS	LCSD
o-Terphenyl	71.8%	74.0%

Results reported in mg/kg  
RPD calculated using sample concentrations per SW846.

4  
TPH METHOD BLANK SUMMARY

BLANK NO.

NM56MBS1

Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

SDG No.: NM56

Project No.: R.G.HALEY

Date Extracted: 09/03/08

Matrix: SOLID

Date Analyzed : 09/05/08

Instrument ID : FID3A

Time Analyzed : 1656

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
	=====	=====	=====
01	NM56LCSS1	NM56LCSS1	09/05/08
02	NM56LCSDS1	NM56LCSDS1	09/05/08
03	RGH-SS-01	NM56A	09/05/08
04	RGH-SS-02	NM56B	09/05/08
05	RGH-SS-02 MS	NM56BMS	09/05/08
06	RGH-SS-02 MS	NM56BMSD	09/05/08
07	RGH-SS-03	NM56C	09/05/08
08	RGH-SC-01-0-	NM56D	09/05/08
09	RGH-SC-01-2-	NM56E	09/05/08
10	RGH-SC-01-4-	NM56F	09/05/08
11	RGH-SC-02-0-	NM56G	09/05/08
12	RGH-SC-02-2-	NM56H	09/05/08
13	RGH-SC-02-4-	NM56I	09/05/08
14	RGH-SC-03-0-	NM56J	09/05/08
15	RGH-SC-03-2-	NM56K	09/05/08
16	RGH-SC-03-4-	NM56L	09/05/08
17	RGH-SC-04-0-	NM56M	09/05/08
18	RGH-SC-04-2-	NM56N	09/05/08
19	RGH-SC-04-4-	NM56O	09/05/08
20	RGH-SC-05-0-	NM56P	09/05/08
21	RGH-SC-05-2-	NM56Q	09/05/08
22	RGH-SC-05-4-	NM56R	09/05/08
23	RGH-SC-06-0-	NM56S	09/05/08
24	RGH-SC-06-2-	NM56T	09/06/08

4  
TPH METHOD BLANK SUMMARY

BLANK NO.

NM56MBS1

Lab Name: ANALYTICAL RESOURCES, INC	Client: HART CROWSER, INC.
SDG No.: NM56	Project No.: R.G. HALEY
Date Extracted: 09/03/08	Matrix: SOLID
Date Analyzed : 09/06/08	Instrument ID : FID3A
Time Analyzed : 0144	

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
	=====	=====	=====
01	NM56LCSS1	NM56LCSS1	09/06/08
02	NM56LCSDS1	NM56LCSDS1	09/06/08
03	RGH-SC-06-4-	NM56U	09/06/08
04	RGH-SC-06-4-	NM56UMS	09/06/08
05	RGH-SC-06-4-	NM56UMSD	09/06/08

## **METALS**



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SS-01  
SAMPLE

Lab Sample ID: NM56A

LIMS ID: 08-21861

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 81.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0043	0.04	0.10	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

Sample ID: RGH-SS-01  
DUPLICATE

Lab Sample ID: NM56A  
LIMS ID: 08-21861  
Matrix: Sediment  
Data Release Authorized  
Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

**MATRIX DUPLICATE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7471A	0.10	0.12	18.2%	+/- 0.04	L

Reported in mg/kg-dry

\*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

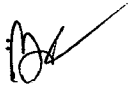
Sample ID: RGH-SS-01

**MATRIX SPIKE**

Lab Sample ID: NM56A

LIMS ID: 08-21861

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

**MATRIX SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7471A	0.10	0.51	0.430	95.3%	

Reported in mg/kg-dry

N-Control Limit Not Met


H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

**INORGANICS ANALYSIS DATA SHEET**  
**TOTAL METALS**  
Page 1 of 1

Sample ID: **RGH-SS-02**  
SAMPLE

Lab Sample ID: NM56B  
LIMS ID: 08-21862  
Matrix: Sediment  
Data Release Authorized:   
Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Percent Total Solids: 83.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0041	0.04	0.05	

Reported in mg/kg-dry (ppm).  
U-Analyte undetected at given RL  
RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SS-03

SAMPLE

Lab Sample ID: NM56C

LIMS ID: 08-21863

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 72.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0048	0.05	0.13	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-01-0-2'  
SAMPLE

Lab Sample ID: NM56D

LIMS ID: 08-21864

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 78.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0052	0.05	0.13	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-01-2-4'

SAMPLE

Lab Sample ID: NM56E

LIMS ID: 08-21865

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 79.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0050	0.05	0.27	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-01-4-6'

**SAMPLE**

Lab Sample ID: NM56F

LIMS ID: 08-21866

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 77.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0049	0.05	0.16	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-02-0-2'

**SAMPLE**

Lab Sample ID: NM56G

LIMS ID: 08-21867

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 75.3%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0048	0.05	0.08	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

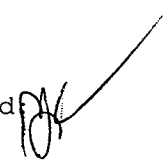
Sample ID: RGH-SC-02-2-4'

SAMPLE

Lab Sample ID: NM56H

LIMS ID: 08-21868

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 82.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0051	0.05	0.07	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-02-4-6'  
SAMPLE

Lab Sample ID: NM56I

LIMS ID: 08-21869

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/26/08

Date Received: 08/28/08

Percent Total Solids: 76.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0054	0.05	0.08	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-03-0-2'

**SAMPLE**

Lab Sample ID: NM56J

LIMS ID: 08-21870

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 46.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0089	0.09	0.48	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-03-2-4'  
SAMPLE

Lab Sample ID: NM56K

LIMS ID: 08-21871

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 39.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.010	0.1	0.7	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

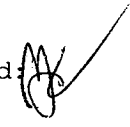
Page 1 of 1

Sample ID: RGH-SC-03-4-6'  
SAMPLE

Lab Sample ID: NM56L

LIMS ID: 08-21872

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 45.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0080	0.08	1.59	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-04-0-2'

**SAMPLE**

Lab Sample ID: NM56M

LIMS ID: 08-21873

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 63.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0057	0.06	0.23	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-04-2-4'  
SAMPLE

Lab Sample ID: NM56N

LIMS ID: 08-21874

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 52.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0091	0.09	0.11	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

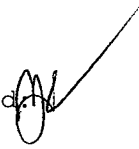
Page 1 of 1

Sample ID: RGH-SC-04-4-6'  
SAMPLE

Lab Sample ID: NM560

LIMS ID: 08-21875

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 53.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0070	0.07	0.09	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-05-0-2'  
SAMPLE

Lab Sample ID: NM56P

LIMS ID: 08-21876

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 44.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0097	0.1	0.3	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

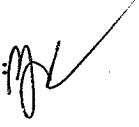
Page 1 of 1

Sample ID: RGH-SC-05-2-4'  
SAMPLE

Lab Sample ID: NM56Q

LIMS ID: 08-21877

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 44.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0094	0.09	0.09	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-05-4-6'

**SAMPLE**

Lab Sample ID: NM56R

LIMS ID: 08-21878

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 44.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0084	0.08	0.29	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

Sample ID: RGH-SC-06-0-2'  
SAMPLE

Lab Sample ID: NM56S

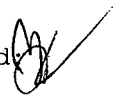
QC Report No: NM56-Hart Crowser, Inc.

LIMS ID: 08-21879

Project: R.G. Haley

Matrix: Sediment

17330-17

Data Release Authorized 

Date Sampled: 08/27/08

Reported: 09/23/08

Date Received: 08/28/08

Percent Total Solids: 43.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.010	0.1	0.2	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-06-2-4'  
SAMPLE

Lab Sample ID: NM56T

LIMS ID: 08-21880

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

Percent Total Solids: 47.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0088	0.09	0.74	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit



INORGANICS ANALYSIS DATA SHEET

TOTAL METALS  
Page 1 of 1

Sample ID: RGH-SC-06-4-6'  
SAMPLE

Lab Sample ID: NM56U  
LIMS ID: 08-21881  
Matrix: Sediment  
Data Release Authorized  
Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.  
Project: R.G. Haley  
17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Percent Total Solids: 43.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0084	0.08	0.83	

Reported in mg/kg-dry (ppm).  
U-Analyte undetected at given RL  
RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

Sample ID: RGH-SC-06-4-6'

DUPLICATE

Lab Sample ID: NM56U

LIMS ID: 08-21881

Matrix: Sediment

Data Release Authorized

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

**MATRIX DUPLICATE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7471A	0.83	1.04	22.5%	+/- 20%	*

Reported in mg/kg-dry

\*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-06-4-6'  
MATRIX SPIKE

Lab Sample ID: NM56U

LIMS ID: 08-21881

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: 08/27/08

Date Received: 08/28/08

**MATRIX SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7471A	0.83	1.72	0.831	107%	

Reported in mg/kg-dry

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

**Sample ID: METHOD BLANK**

Page 1 of 1

Lab Sample ID: NM56MB


QC Report No: NM56-Hart Crowser, Inc.

LIMS ID: 08-21862

Project: R.G. Haley

Matrix: Sediment

17330-17

Data Release Authorized: 

Date Sampled: NA

Reported: 09/23/08

Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0050	0.05	0.05	U

Reported in mg/kg (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

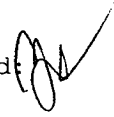
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: NM56LCS

LIMS ID: 08-21862

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: NA

Date Received: NA

**BLANK SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7471A	1.06	1.00	106%	

Reported in mg/kg-dry

N-Control limit not met

NA-Not Applicable, Analyte Not Spiked

Control Limits: 80-120%

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

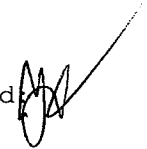
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: NM56MB

LIMS ID: 08-21881

Matrix: Sediment

Data Release Authorized 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: NA

Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/16/08	7471A	09/19/08	7439-97-6	Mercury	0.0050	0.05	0.05	U

Reported in mg/kg (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: NM56LCS

LIMS ID: 08-21881

Matrix: Sediment

Data Release Authorized: 

Reported: 09/23/08

QC Report No: NM56-Hart Crowser, Inc.

Project: R.G. Haley

17330-17

Date Sampled: NA

Date Received: NA

**BLANK SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7471A	1.06	1.00	106%	

Reported in mg/kg-dry

N-Control limit not met

NA-Not Applicable, Analyte Not Spiked

Control Limits: 80-120%

# **GENERAL CHEMISTRY**

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SS-01  
ARI ID: 08-21861 NM56A

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	75.60
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	79.30
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.13	3.39
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	119	1,420
Total Organic Carbon	10/09/08 100908#1	Plumb,1981	Percent	0.020	4.13

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 10/13/08

A handwritten signature in black ink, appearing to be 'JK' or similar, written over the 'Data Release Authorized' text.

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SS-02  
ARI ID: 08-21862 NM56B

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	81.50
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	80.30
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.12	5.01
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	60.2	1,190
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	2.38

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.



SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SS-03  
ARI ID: 08-21863 NM56C


Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	67.40
Preserved Total Solids	09/01/08 090108#1	EPA 160.3	Percent	0.01	64.50
N-Ammonia	09/01/08 090108#1	EPA 350.1M	mg-N/kg	0.14	6.34
Sulfide	09/01/08 090108#1	EPA 376.2	mg/kg	28.9	503
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	2.20

RL Analytical reporting limit  
U Undetected at reported detection limit

Ammonia determined on 2N KCl extracts.

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SC-01-0-2'  
ARI ID: 08-21864 NM56D

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	73.90
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	2.87

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SC-01-2-4'  
ARI ID: 08-21865 NM56E

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	75.40
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	4.24

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *ML*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SC-01-4-6'  
ARI ID: 08-21866 NM56F

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	74.20
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	8.12

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 10/13/08

A handwritten signature in black ink, appearing to be 'M' or 'W', written over the 'Data Release Authorized' text.

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SC-02-0-2'  
ARI ID: 08-21867 NM56G

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	73.20
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	5.01

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Client ID: RGH-SC-02-2-4'  
ARI ID: 08-21868 NM56H

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	84.70
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	1.47

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized *AW*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08


Client ID: RGH-SC-02-4-6'  
ARI ID: 08-21869 NM56I

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	80.00
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	6.86

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-03-0-2'  
ARI ID: 08-21870 NM56J

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	47.80
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	4.32

RL Analytical reporting limit  
U Undetected at reported detection limit



SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-03-2-4'  
ARI ID: 08-21871 NM56K

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	39.80
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	7.94

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-03-4-6'  
ARI ID: 08-21872 NM56L

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	39.30
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	10.1

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *ML*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-04-0-2'  
ARI ID: 08-21873 NM56M

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	59.90
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	10.6

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-04-2-4'  
ARI ID: 08-21874 NM56N

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	50.50
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	4.22

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-04-4-6'  
ARI ID: 08-21875 NM560

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	56.10
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	1.64

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 10/13/08

A handwritten signature or initials, possibly 'M', written in black ink.

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-05-0-2'  
ARI ID: 08-21876 NM56P

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	44.70
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	4.80

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *AK*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08


Client ID: RGH-SC-05-2-4'  
ARI ID: 08-21877 NM56Q

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	45.00
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	2.38

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-05-4-6'  
ARI ID: 08-21878 NM56R

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	44.10
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	6.39

RL Analytical reporting limit  
U Undetected at reported detection limit



SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-06-0-2'  
ARI ID: 08-21879 NM56S

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	44.30
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	4.08

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

Client ID: RGH-SC-06-2-4'  
ARI ID: 08-21880 NM56T

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#1	EPA 160.3	Percent	0.01	48.40
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	3.89

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/27/08  
Date Received: 08/28/08

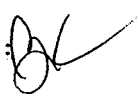
Client ID: RGH-SC-06-4-6'  
ARI ID: 08-21881 NM56U

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/03/08 090308#2	EPA 160.3	Percent	0.01	44.30
Total Organic Carbon	10/09/08 100908#1	Plumb, 1981	Percent	0.020	8.08

RL Analytical reporting limit  
U Undetected at reported detection limit

REPLICATE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: NM56A Client ID: RGH-SS-01					
Total Solids	09/03/08	Percent	75.60	78.00 80.90	3.4%
Preserved Total Solids	09/01/08	Percent	79.30	74.40 78.40	3.4%
N-Ammonia	09/01/08	mg-N/kg	3.39	3.28	3.3%
Total Organic Carbon	10/09/08	Percent	4.13	3.98 4.06	1.9%
ARI ID: NM56C Client ID: RGH-SS-03					
Sulfide	09/01/08	mg/kg	503	477	5.3%

MS/MSD RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: 08/26/08  
Date Received: 08/28/08

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: NM56A Client ID: RGH-SS-01						
N-Ammonia	09/01/08	mg-N/kg	3.39	117	121	94.0%
Total Organic Carbon	10/09/08	Percent	4.13	10.5	5.79	110.0%
ARI ID: NM56C Client ID: RGH-SS-03						
Sulfide	09/01/08	mg/kg	503	757	412	61.7%

LAB CONTROL RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



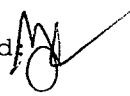
Matrix: Sediment  
Data Release Authorized: *ML*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: NA  
Date Received: NA

Analyte	Date	Units	LCS	Spike Added	Recovery
Sulfide	09/01/08	mg/kg	6.91	7.20	96.0%
Total Organic Carbon	10/09/08	Percent	0.102	0.100	102.0%

METHOD BLANK RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: NA  
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	09/03/08 09/03/08	Percent	< 0.01 U < 0.01 U
Preserved Total Solids	09/01/08	Percent	< 0.01 U
N-Ammonia	09/01/08	mg-N/kg	< 0.10 U
Sulfide	09/01/08	mg/kg	< 1.00 U
Total Organic Carbon	10/09/08	Percent	< 0.020 U

STANDARD REFERENCE RESULTS-CONVENTIONALS  
NM56-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/13/08

Project: R.G. Haley  
Event: 17330-17  
Date Sampled: NA  
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
N-Ammonia SPEX 28-24AS	09/01/08	mg-N/kg	9.79	10.0	97.9%
Total Organic Carbon NIST #8704	10/09/08	Percent	3.31	3.35	98.8%



**GEOTECH**

Hart Crowser, Inc.  
R.G. Haley, 17330-17

Apparent Grain Size Distribution Summary  
Percent Finer Than Indicated Size

Sample No.	Gravel			Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Silt				Clay	
	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
Phi Size	3/8"	#4	#10 (2000)	#18 (1000)	#35 (500)	#60 (250)	#120 (125)	#230 (62)	31.00	15.60	7.80	3.90	2.00	1.00
NJ29 E-1	100.0	99.2	95.3	92.2	86.0	73.9	64.8	54.5	46.4	35.6	24.8	17.8	13.5	9.5
NJ29 E-2	100.0	100.0	95.2	91.6	85.0	73.0	63.8	53.5	46.4	35.7	25.2	18.0	13.4	9.2
NJ29 E-3	100.0	99.6	95.5	92.1	85.5	73.2	63.5	52.8	45.2	35.3	24.6	17.4	13.4	9.4
RGH-SS-01	100.0	63.3	44.8	33.0	23.5	9.8	2.2	0.2	NA	NA	NA	NA	NA	NA
RGH-SS-02	100.0	56.7	44.0	34.8	23.3	6.8	1.8	1.1	NA	NA	NA	NA	NA	NA
RGH-SS-03	100.0	87.3	80.5	73.1	63.2	43.7	23.5	11.1	9.8	8.5	6.5	5.2	4.0	2.7

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

Hart Crowser, Inc.  
R.G. Haley, 17330-17

Apparent Grain Size Distribution Summary  
Percent Retained in Each Size Fraction

Sample No.	Gravel	Very Coarse Sand	Coarse Sand	Medium Sand	Fine Sand	Very Fine Sand	Coarse Silt	Medium Silt	Fine Silt	Very Fine Silt	Clay			Total Fines
Phi Size	> -1	-1 to 0	0 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9	9 to 10	< 10	<4
Sieve Size (microns)	> #10 (2000)	10 to 18 (2000-1000)	18-35 (1000-500)	35-60 (500-250)	60-120 (250-125)	120-230 (125-62)	62.5-31.0	31.0-15.6	15.6-7.8	7.8-3.9	3.9-2.0	2.0-1.0	<1.0	<230 (<62)
NJ29 E-1	4.7	3.1	6.2	12.1	9.1	10.3	8.0	10.8	10.8	7.0	4.4	3.9	9.5	54.5
NJ29 E-2	4.8	3.6	6.6	12.0	9.2	10.2	7.2	10.7	10.4	7.3	4.6	4.2	9.2	53.5
NJ29 E-3	4.5	3.4	6.6	12.4	9.6	10.7	7.7	9.9	10.7	7.2	4.0	4.0	9.4	52.8
RGH-SS-01	55.2	11.8	9.5	13.7	7.6	2.0	NA	NA	NA	NA	NA	NA	NA	0.2
RGH-SS-02	56.0	9.2	11.5	16.5	5.0	0.8	NA	NA	NA	NA	NA	NA	NA	1.1
RGH-SS-03	19.5	7.3	9.9	19.5	20.2	12.4	1.3	1.3	2.0	1.2	1.3	1.3	2.7	11.1

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

QA SUMMARY

PROJECT:	Hart Crowser, Inc.	Project No.:	R.G. Haley, 17330-17
ARI Triplicate Sample ID:	NJ29 E	Batch No.:	NM56 -1
Client Triplicate Sample ID:	NJ29 E-1	Page:	1 of 1

Relative Standard Deviation, By Phi Size

Sample ID	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
NJ29 E-1	100.0	99.2	95.3	92.2	86.0	73.9	64.8	54.5	46.4	35.6	24.8	17.8	13.5	9.5
NJ29 E-2	100.0	100.0	95.2	91.6	85.0	73.0	63.8	53.5	46.4	35.7	25.2	18.0	13.4	9.2
NJ29 E-3	100.0	99.6	95.5	92.1	85.5	73.2	63.5	52.8	45.2	35.3	24.6	17.4	13.4	9.4
AVE	NA	99.60	95.32	91.98	85.51	73.33	64.04	53.62	46.00	35.53	24.88	17.73	13.41	9.35
STDEV	NA	0.40	0.14	0.30	0.49	0.47	0.67	0.82	0.70	0.20	0.32	0.31	0.04	0.18
%RSD	NA	0.40	0.14	0.33	0.58	0.64	1.05	1.53	1.52	0.56	1.29	1.73	0.32	1.94

The Triplicate Applies To The Following Samples

Client ID	Date Sampled	Date Extracted	Date Complete	QA Ratio (95-105)	Data Qualifiers	Pipette Portion (5.0-25.0g)
NJ29 E-1	8/1/2008	9/18/2008	9/25/2008	97.8		11.7
NJ29 E-2	8/1/2008	9/18/2008	9/25/2008	98.3		11.3
NJ29 E-3	8/1/2008	9/18/2008	9/25/2008	98.4		11.3
RGH-SS-01	8/26/2008	9/18/2008	9/25/2008	96.7	SS	0.1
RGH-SS-02	8/26/2008	9/18/2008	9/25/2008	99.5	SS	1.4
RGH-SS-03	8/26/2008	9/18/2008	9/25/2008	98.6		12.1

\* ARI Internal QA limits = 95-105%

Notes to the Testing:

1. Organic matter was not removed prior to testing, thus the reported values are the "apparent" grain size distribution. See narrative for discussion of the testing.

**TOTAL SOLIDS**

Extractions Total Solids-exttts  
Data By: Jim Hawk  
Created: 9/ 1/08

Worklist: 6560  
Analyst: MH  
Comments:

	ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1.	NM56A 08-21861 RGH-SS-01	1.18	12.52	9.86	76.5	NR
2.	NM56B 08-21862 RGH-SS-02	1.18	14.36	12.04	82.4	NR
3.	NM56C 08-21863 RGH-SS-03	1.18	10.24	7.74	72.4	NR
4.	NM56D 08-21864 RGH-SC-01-0-2'	1.16	12.36	8.90	69.1	NR
5.	NM56E 08-21865 RGH-SC-01-2-4'	1.16	14.18	10.78	73.9	NR
6.	NM56F 08-21866 RGH-SC-01-4-6'	1.18	10.68	8.52	77.3	NR
7.	NM56G 08-21867 RGH-SC-02-0-2'	1.18	13.54	10.10	72.2	NR
8.	NM56H 08-21868 RGH-SC-02-2-4'	1.20	11.36	9.88	85.4	NR
9.	NM56I 08-21869 RGH-SC-02-4-6'	1.16	11.82	9.38	77.1	NR
10.	NM56J 08-21870 RGH-SC-03-0-2'	1.16	11.88	6.02	45.3	NR
11.	NM56K 08-21871 RGH-SC-03-2-4'	1.16	11.48	5.16	38.8	NR
12.	NM56L 08-21872 RGH-SC-03-4-6'	1.16	13.28	6.28	42.2	NR
13.	NM56M 08-21873 RGH-SC-04-0-2'	1.16	10.80	6.82	58.7	NR
14.	NM56N 08-21874 RGH-SC-04-2-4'	1.18	12.76	6.98	50.1	NR
15.	NM56O 08-21875 RGH-SC-04-4-6'	1.16	10.88	6.34	53.3	NR

Extractions Total Solids-extts  
Data By: Jim Hawk  
Created: 9/ 1/08

Worklist: 6560  
Analyst: MH  
Comments:

ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
16. NM56P 08-21876 RGH-SC-05-0-2'	1.18	10.60	5.06	41.2	NR
17. NM56Q 08-21877 RGH-SC-05-2-4'	1.18	12.08	5.92	43.5	NR
18. NM56R 08-21878 RGH-SC-05-4-6'	1.18	10.40	5.28	44.5	NR
19. NM56S 08-21879 RGH-SC-06-0-2'	1.16	10.96	5.26	41.8	NR
20. NM56T 08-21880 RGH-SC-06-2-4'	1.18	10.64	5.68	47.6	NR
21. NM56U 08-21881 RGH-SC-06-4-6'	1.16	10.60	5.50	46.0	NR

Solids Data Entry Report  
Date: 09/17/08

Checked by: KM Date: 9/17/08  
Data Analyst: DM

Solids Determination performed on 09/16/08 by MH

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
NM56	A	RGH-SS-01	1.011	10.031	8.339	81.24
NM56	B	RGH-SS-02	1.004	10.241	8.678	83.08
NM56	C	RGH-SS-03	1.003	10.870	8.114	72.07
NM56	D	RGH-SC-01-0-2'	1.013	10.574	8.540	78.73
NM56	E	RGH-SC-01-2-4'	0.999	10.181	8.264	79.12
NM56	F	RGH-SC-01-4-6'	1.002	10.649	8.455	77.26
NM56	G	RGH-SC-02-0-2'	1.044	10.691	8.307	75.29
NM56	H	RGH-SC-02-2-4'	1.025	10.343	8.748	82.88
NM56	I	RGH-SC-02-4-6'	1.005	10.482	8.280	76.76
NM56	J	RGH-SC-03-0-2'	1.038	10.089	5.283	46.90
NM56	K	RGH-SC-03-2-4'	1.012	10.204	4.674	39.84
NM56	L	RGH-SC-03-4-6'	1.013	10.630	5.359	45.19
NM56	M	RGH-SC-04-0-2'	1.003	10.329	6.891	63.14
NM56	N	RGH-SC-04-2-4'	1.033	10.262	5.839	52.07
NM56	O	RGH-SC-04-4-6'	1.025	10.428	6.064	53.59
NM56	P	RGH-SC-05-0-2'	1.025	10.687	5.274	43.98
NM56	Q	RGH-SC-05-2-4'	1.025	10.019	5.067	44.94
NM56	R	RGH-SC-05-4-6'	1.026	10.572	5.229	44.03
NM56	S	RGH-SC-06-0-2'	1.038	10.220	5.009	43.25
NM56	T	RGH-SC-06-2-4'	1.030	10.957	5.712	47.16
NM56	U	RGH-SC-06-4-6'	1.025	10.564	5.140	43.14



Total Solids Targets-Extractions  
Data By: Steve Potter  
Created: 9/ 2/08

Worklist: 6876  
Analyst: SDP  
Comments:

ARI ID	Target Dry Wt (g)	Total Solids	Min Wet Wt (g)
1. NM56A	25.00	76.5	32.68
2. NM56B	25.00	82.4	30.34
3. NM56C	25.00	72.4	34.53
4. NM56D	25.00	69.1	36.18
5. NM56E	25.00	73.9	33.83
6. NM56F	25.00	77.3	32.34
7. NM56G	25.00	72.2	34.63
8. NM56H	25.00	85.4	29.27
9. NM56I	25.00	77.1	32.43
10. NM56J	25.00	45.3	55.19
11. NM56K	25.00	38.8	64.43
12. NM56L	25.00	42.2	59.24
13. NM56M	25.00	58.7	42.59
14. NM56N	25.00	50.1	49.90
15. NM56O	25.00	53.3	46.90
16. NM56P	25.00	41.2	60.68
17. NM56Q	25.00	43.5	57.47
18. NM56R	25.00	44.5	56.18
19. NM56S	25.00	41.8	59.81
20. NM56T	25.00	47.6	52.52
21. NM56U	25.00	46.0	54.35

**Laboratory Data Package**

**prepared  
for**

**HART CROWSER, INC.**

**Project: R. G. HALEY, 17330-17**

**ARI JOB NO.: NM56**

**prepared  
by**

**Analytical Resources, Inc.**



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

November 13, 2008

Mr. Roger McGinnis  
Hart Crowser, Inc.  
1700 Westlake Avenue North Suite 200  
Seattle, WA 98109-3056

**RE: Project: R. G. Haley – 17330-17**  
**ARI Job No: NR16**

Dear Mr. McGinnis:

Please find enclosed the original Chain-of-Custody record, sample receipt documentation, and the final data package for the samples from the project referenced above.

The samples were analyzed for SVOCs, NWTPH-Dx, Total Metals and TOC, as requested.

Sample receipt and details of these analyses are discussed in the Case Narrative.

An electronic copy of this data package and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,  
ANALYTICAL RESOURCES, INC.

A handwritten signature in black ink, appearing to read "Kelly Bottem".

Kelly Bottem  
Client Services Manager  
206-695-6211  
[kellyb@arilabs.com](mailto:kellyb@arilabs.com)  
[www.arilabs.com](http://www.arilabs.com)

Enclosures

cc: files NR16

**Chain of Custody  
Documentation**

**prepared  
for**

**HART CROWSER, INC.**

**Project: Bellingham Bay-RG Haley**

**ARI JOB NO: NR16**

**prepared  
by**

**Analytical Resources, Inc.**

# NR 16 Sample Custody Record

Samples Shipped to: ARI

1 of 1



Hart Crowser, Inc.  
1910 Fairview Avenue East  
Seattle, Washington 98102-3699  
Phone: 206-324-9530 FAX: 206-328-5581

JOB <u>1733017</u> LAB NUMBER _____ PROJECT NAME <u>BELLINGHAM BAY COLLALET</u> HART CROWSER CONTACT <u>ROGER MCGINNIS</u> SAMPLED BY: <u>CFR/AAP/ANL/MH</u>						REQUESTED ANALYSIS MERCURY TOC TPH-DX SVOCs										NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
---	--	--	--	--	--	---	--	--	--	--	--	--	--	--	--	-------------------	--

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	MERCURY	TOC	TPH-DX	SVOCs	NO. OF CONTAINERS
R6H-SL-07-0-2'			9/24/08	1405	SEDIMENT	X	X	X		1
R6H-SL-07-2-4'				1410						1
R6H-SL-07-4-68'				1415						1
R6H-SL-08-0-2'				1640						1
R6H-SL-08-2-4'				1645						1
R6H-SL-08-4-55'				1650						1
R6H-SL-09-0-2'				1600						1
R6H-SL-09-2-4'				1605						1
R6H-SL-09-4-55'				1610						1

RELINQUISHED BY: <u>[Signature]</u> SIGNATURE PRINT NAME: <u>Colleen Rust</u> COMPANY: <u>HC</u>		DATE: <u>9/25/08</u> TIME: <u>1730</u>	RECEIVED BY: <u>[Signature]</u> SIGNATURE PRINT NAME: <u>Jonathan Walter</u> COMPANY: <u>ARI</u>		DATE: <u>9/25/08</u> TIME: <u>1730</u>	SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:		9 TOTAL NUMBER OF CONTAINERS	
RELINQUISHED BY: _____ SIGNATURE PRINT NAME: _____ COMPANY: _____		DATE: _____ TIME: _____	RECEIVED BY: _____ SIGNATURE PRINT NAME: _____ COMPANY: _____		DATE: _____ TIME: _____	COOLER NO.: _____ STORAGE LOCATION: _____		TURNAROUND TIME: <input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK <input type="checkbox"/> 48 HOURS <input checked="" type="checkbox"/> STANDARD <input type="checkbox"/> 72 HOURS    OTHER _____	



# Cooler Receipt Form

ARI Client: Hart Crowser  
COC No: \_\_\_\_\_  
Assigned ARI Job No: NR16

Project Name: Bellingham Bay - RG Haley  
Delivered by: Hand  
Tracking No: \_\_\_\_\_

### Preliminary Examination Phase:

- Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO
- Were custody papers included with the cooler? ..... YES  NO
- Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO
- Record cooler temperature (recommended 2.0-6.0 °C for chemistry) ..... 3.4 °C

Cooler Accepted by: JW Date: 9/25/08 Time: 1130

**Complete custody forms and attach all shipping documents**

### Log-In Phase:

- Was a temperature blank included in the cooler? ..... YES  NO
- What kind of packing material was used? ..... ICE
- Was sufficient ice used (if appropriate)? ..... YES  NO
- Were all bottles sealed in individual plastic bags? ..... YES  NO
- Did all bottle arrive in good condition (unbroken)? ..... YES  NO
- Were all bottle labels complete and legible? ..... YES  NO
- Did all bottle labels and tags agree with custody papers? ..... YES  NO
- Were all bottles used correct for the requested analyses? ..... YES  NO
- Do any of the analyses (bottles) require preservation? (attach preservation checklist) ..... YES  NO
- Were all VOC vials free of air bubbles? ..... NA YES  NO
- Was sufficient amount of sample sent in each bottle? ..... YES  NO

Samples Logged by: JW Date: 9/26/08 Time: 930

**\*\* Notify Project Manager of discrepancies or concerns \*\***

Explain discrepancies or negative responses:

By: \_\_\_\_\_ Date: \_\_\_\_\_

**Case Narrative**

**prepared  
for**

**HART CROWSER, INC.**

**Project: Bellingham Bay-RG Haley**

**ARI JOB NO: NR16**

**prepared  
by**

**Analytical Resources, Inc.**

**Case Narrative****Hart Crowser****R. G. Haley – 17330-17****ARI Job: NR16****November 13, 2008****Sample Receipt**

Analytical Resources Inc. (ARI) accepted nine sediment samples in good condition on September 25, 2008 under the ARI job referenced above. The cooler temperature measured by IR thermometer following ARI SOP was 3.4°C and the samples were well iced. For more details regarding sample receipt, please refer to the Cooler Receipt Form. All samples were frozen to protect the holding times.

**Semivolatile Analysis (PSDDA SW8270D):**

All samples were originally extracted and analyzed within the method recommended holding times for samples that were frozen.

**Initial calibration (s):** All compounds of interest were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**Internal Standard(s):** The internal standard recoveries were outside the control limits for samples **RGH-SC-08-2-4'**, **RGH-SC-08-5.5'**, **RGH-SC-09-2-4'** and **RGH-SC-09-5.5**. The samples were re-analyzed at a dilution and the internal standard percent recoveries were within control limits. No further corrective action was required.

**Method Blank (s):** Diethylphthalate was present in the method blank **MB-090308** at a concentration that was greater than the reporting limit. All associated samples were undetected for this compound. No further corrective action was required.

**Surrogate(s):** Are in control.

**MS/MSD (s):** Are in control.

**LCS/LCSD (s):** Are in control.

**NWTPH-Dx:**

All samples were extracted and analyzed within the method recommended holding times for frozen samples.

**Initial calibration (s):** All analytes were within method acceptance criteria.

**Continuing calibration (s):** All analytes of interest were within method acceptance criteria.

**Method Blank (s):** The method blanks were free of contamination.





**Case Narrative**

**Hart Crowser**

**R. G. Haley – 17330-17**

**ARI Job: NR16**

**November 13, 2008**

*Surrogate(s)*: All surrogate percent recoveries were within control limits.

*MS/MSD (s)*: The matrix spike percent recovery of Diesel was outside the advisory control limits high for sample **RGH-SC-07-0-2'** with wide RPDs due to lack of sample homogeneity. The matrix spike duplicate percent recovery and all LCS and LCSD percent recoveries were within control limits. No further corrective action was required.

*LCS/LCSD (s)*: The LCS and LCSD percent recoveries were within control limits.

**Total Metals (Mercury):**

All samples were prepared and analyzed within the method recommended holding times.

*Initial calibration (s)*: All analytes were within method acceptance criteria.

*Continuing calibration (s)*: All analytes of interest were within method acceptance criteria.

*Method Blank (s)*: All method blanks were free of contamination.

*MS(s)*: All matrix spike percent recoveries were within control limits.

*Duplicate(s)*: Is in control.

*LCS(s)*: All LCS percent recoveries were within control limits.

**Conventional Parameters:**

All samples were prepared and analyzed within the method recommended holding times.

*Method Blank (s)*: All method blanks were free of contamination.

*MS(s)*: Is in control.

*Replicate(s)*: All replicate RPD/RSDs were within control limits.

*LCS(s)*: All LCS percent recoveries were within control limits.

*SRM(s)*: All SRM percent recoveries were within control limits.

**Geotechnical Parameters:**

A laboratory-specific Case Narrative follows.

Case Narrative NR16  
R. G. Haley – 17330-17

## Data Reporting Qualifiers

Effective 12/28/04

### Inorganic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Duplicate RPD is not within established control limits
- B Reported value is less than the CRDL but  $\geq$  the Reporting Limit
- N Matrix Spike recovery not within established control limits
- NA Not Applicable, analyte not spiked
- H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- L Analyte concentration is  $\leq 5$  times the Reporting Limit and the replicate control limit defaults to  $\pm 1$  RL instead of the normal 20% RPD

### Organic Data

- U Indicates that the target analyte was not detected at the reported concentration
- \* Flagged value is not within established control limits
- B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
- J Estimated concentration when the value is less than ARI's established reporting limits
- D The spiked compound was not detected due to sample extract dilution
- NR Spiked compound recovery is not reported due to chromatographic interference
- E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
- S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
- NA The flagged analyte was not analyzed for
- NS The flagged analyte was not spiked into the sample

- M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
- M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.
- N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
- Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
- C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
- P The analyte was detected on both chromatographic columns but the quantified values differ by  $\geq 40\%$  RPD with no obvious chromatographic interference

### Geotechnical Data

- A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
- F Samples were frozen prior to particle size determination
- SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
- SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
- W Weight of sample in some pipette aliquots was below the level required for accurate weighting

# LCS SOLUTIONS

9/4/2008

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1534-5	PCB	20	MEOH	08/26/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1515-1	LOW PEST	0.2/0.4/2	ACETONE	01/24/09
5	1537-1	EPH	1500	MECL2	08/16/09
6*	1456-3	PCP	12.5	ACETONE	04/18/09
7	1537-3	ABN	100	ACETONE	08/01/09
8	1487-2	TBT	10	MECL2	12/15/08
9	1493-3	PORE TBT	.25/.5	MECL2	12/15/08
10	1537-2	ABN ACID	100/200	MEOH	04/10/09
11	1526-1	TPHD	15000	ACETONE	06/25/09
12	1533-1	ABN BASE	200	ACETONE	07/01/09
13*	1427-3	LOW PCB	2	ACETONE	10/11/08
14	1480-2	LOW ABN ACID	10/20	MEOH	10/09/08
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1490-4	PNA	100	MEOH	01/10/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1539-1	HERB	12.5/12500	MEOH	08/31/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1504-4	LOW ABN	10	ACETONE	10/01/08
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1522-2	OP-PEST	30	MEOH	11/30/08
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09





**Data Summary Package**

**prepared  
for**

**HART CROWSER, INC.**

**Project: Bellingham Bay-RG Haley**

**ARI JOB NO: NR16**

**prepared  
by**

**Analytical Resources, Inc.**

**SVOA**



**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-07-0-2'

SAMPLE

Lab Sample ID: NR16A

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 14:45

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.6 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 46.6%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	18 J
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	34
67-72-1	Hexachloroethane	7.0	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	670
87-68-3	Hexachlorobutadiene	7.9	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	38
131-11-3	Dimethylphthalate	7.6	20	180
208-96-8	Acenaphthylene	8.5	20	36
83-32-9	Acenaphthene	8.0	20	47
132-64-9	Dibenzofuran	7.4	20	38
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	63
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.8	20	< 20 U
87-86-5	Pentachlorophenol	47	98	< 98 U
85-01-8	Phenanthrene	8.2	20	580
120-12-7	Anthracene	7.6	20	110
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.7	20	760
129-00-0	Pyrene	7.6	20	600
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	210
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	100
218-01-9	Chrysene	6.5	20	390
117-84-0	Di-n-Octyl phthalate	8.1	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	220
207-08-9	Benzo (k) fluoranthene	9.0	20	190
50-32-8	Benzo (a) pyrene	8.0	20	310
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	95
53-70-3	Dibenz (a,h) anthracene	8.4	20	39
191-24-2	Benzo (g,h,i) perylene	6.6	20	120

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-07-0-2'  
 SAMPLE

Lab Sample ID: NR16A  
 LIMS ID: 08-25458  
 Matrix: Sediment  
 Date Analyzed: 10/22/08 14:45

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	38

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	40.4%	2-Fluorobiphenyl	62.0%
d14-p-Terphenyl	51.6%	d4-1,2-Dichlorobenzene	36.3%
d5-Phenol	53.9%	2-Fluorophenol	57.6%
2,4,6-Tribromophenol	89.6%	d4-2-Chlorophenol	54.9%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2


Sample ID: **RGH-SC-07-2-4'**

**SAMPLE**

Lab Sample ID: NR16B

LIMS ID: 08-25459

Matrix: Sediment

Data Release Authorized: 

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 16:27

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 71.2%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	40
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.3	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.8	20	< 20 U
95-48-7	2-Methylphenol	14	20	32
106-44-5	4-Methylphenol	13	20	44
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	42
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.0	20	< 20 U
91-20-3	Naphthalene	8.6	20	5,500 E
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	210
131-11-3	Dimethylphthalate	7.7	20	< 20 U
208-96-8	Acenaphthylene	8.6	20	110
83-32-9	Acenaphthene	8.1	20	90
132-64-9	Dibenzofuran	7.5	20	160
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.9	20	170
86-30-6	N-Nitrosodiphenylamine	8.6	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	99	< 99 U
85-01-8	Phenanthrene	8.3	20	840
120-12-7	Anthracene	7.7	20	97
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	490
129-00-0	Pyrene	7.7	20	250
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.9	20	24
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	< 20 U
218-01-9	Chrysene	6.6	20	27
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.4	20	35
207-08-9	Benzo (k) fluoranthene	9.2	20	35
50-32-8	Benzo (a) pyrene	8.1	20	42
193-39-5	Indeno (1,2,3-cd) pyrene	8.5	20	19 J
53-70-3	Dibenz (a, h) anthracene	8.5	20	< 20 U
191-24-2	Benzo (g, h, i) perylene	6.7	20	36

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2

Sample ID: RGH-SC-07-2-4'  
SAMPLE

Lab Sample ID: NR16B  
LIMS ID: 08-25459  
Matrix: Sediment  
Date Analyzed: 10/22/08 16:27

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	230

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	35.5%	2-Fluorobiphenyl	49.6%
d14-p-Terphenyl	25.2%	d4-1,2-Dichlorobenzene	39.0%
d5-Phenol	49.1%	2-Fluorophenol	64.0%
2,4,6-Tribromophenol	59.2%	d4-2-Chlorophenol	48.5%

## ORGANICS ANALYSIS DATA SHEET

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-07-2-4'

DILUTION

Lab Sample ID: NR16B

LIMS ID: 08-25459

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/24/08 00:59

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 10.0

Percent Moisture: 71.2%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	140	200	< 200 U
541-73-1	1,3-Dichlorobenzene	74	200	< 200 U
106-46-7	1,4-Dichlorobenzene	73	200	< 200 U
100-51-6	Benzyl Alcohol	140	200	< 200 U
95-50-1	1,2-Dichlorobenzene	78	200	< 200 U
95-48-7	2-Methylphenol	140	200	< 200 U
106-44-5	4-Methylphenol	130	200	< 200 U
67-72-1	Hexachloroethane	71	200	< 200 U
105-67-9	2,4-Dimethylphenol	150	200	< 200 U
65-85-0	Benzoic Acid	1100	2,000	< 2,000 U
120-82-1	1,2,4-Trichlorobenzene	90	200	< 200 U
91-20-3	<b>Naphthalene</b>	<b>86</b>	<b>200</b>	<b>5,900</b> U
97-68-3	Hexachlorobutadiene	80	200	< 200 U
91-57-6	<b>2-Methylnaphthalene</b>	<b>81</b>	<b>200</b>	<b>210</b> U
131-11-3	Dimethylphthalate	77	200	< 200 U
208-96-8	Acenaphthylene	86	200	< 200 U
83-32-9	Acenaphthene	81	200	< 200 U
132-64-9	<b>Dibenzofuran</b>	<b>75</b>	<b>200</b>	<b>140</b> J
84-66-2	Diethylphthalate	160	200	< 200 U
86-73-7	<b>Fluorene</b>	<b>89</b>	<b>200</b>	<b>150</b> J
86-30-6	N-Nitrosodiphenylamine	86	200	< 200 U
118-74-1	Hexachlorobenzene	79	200	< 200 U
87-86-5	Pentachlorophenol	470	990	< 990 U
85-01-8	<b>Phenanthrene</b>	<b>83</b>	<b>200</b>	<b>760</b> U
120-12-7	Anthracene	77	200	< 200 U
84-74-2	Di-n-Butylphthalate	120	200	< 200 U
206-44-0	<b>Fluoranthene</b>	<b>78</b>	<b>200</b>	<b>370</b> U
129-00-0	<b>Pyrene</b>	<b>77</b>	<b>200</b>	<b>380</b> U
85-68-7	Butylbenzylphthalate	110	200	< 200 U
56-55-3	Benzo(a)anthracene	59	200	< 200 U
117-81-7	bis(2-Ethylhexyl)phthalate	110	200	< 200 U
218-01-9	Chrysene	66	200	< 200 U
117-84-0	Di-n-Octyl phthalate	83	200	< 200 U
205-99-2	Benzo(b)fluoranthene	94	200	< 200 U
207-08-9	Benzo(k)fluoranthene	92	200	< 200 U
50-32-8	Benzo(a)pyrene	81	200	< 200 U
193-39-5	Indeno(1,2,3-cd)pyrene	85	200	< 200 U
53-70-3	Dibenz(a,h)anthracene	85	200	< 200 U
191-24-2	<b>Benzo(g,h,i)perylene</b>	<b>67</b>	<b>200</b>	<b>170</b> J

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-07-2-4'  
 DILUTION

Lab Sample ID: NR16B  
 LIMS ID: 08-25459  
 Matrix: Sediment  
 Date Analyzed: 10/24/08 00:59

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	71	200	220

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	33.2%	2-Fluorobiphenyl	44.0%
d14-p-Terphenyl	40.0%	d4-1,2-Dichlorobenzene	34.8%
d5-Phenol	44.8%	2-Fluorophenol	53.9%
2,4,6-Tribromophenol	35.7%	d4-2-Chlorophenol	42.7%

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 1 of 2

Sample ID: RGH-SC-07-4-6.8'  
SAMPLE

Lab Sample ID: NR16C  
LIMS ID: 08-25460  
Matrix: Sediment  
Data Release Authorized:  
Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Date Extracted: 10/08/08  
Date Analyzed: 10/22/08 17:02  
Instrument/Analyst: NT4/PK  
GPC Cleanup: Yes

Sample Amount: 25.7 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 60.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	31
541-73-1	1,3-Dichlorobenzene	7.2	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	12	20	13 J
67-72-1	Hexachloroethane	7.0	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.8	20	< 20 U
91-20-3	Naphthalene	8.5	20	840
97-68-3	Hexachlorobutadiene	7.9	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	35
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.4	20	33
83-32-9	Acenaphthene	8.0	20	17 J
132-64-9	Dibenzofuran	7.4	20	32
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.7	20	32
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.8	20	< 20 U
87-86-5	Pentachlorophenol	46	97	< 97 U
85-01-8	Phenanthrene	8.2	20	180
120-12-7	Anthracene	7.5	20	26
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.7	20	130
129-00-0	Pyrene	7.6	20	89
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo(a)anthracene	5.8	20	< 20 U
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	< 20 U
218-01-9	Chrysene	6.5	20	< 20 U
117-84-0	Di-n-Octyl phthalate	8.1	20	< 20 U
205-99-2	Benzo(b)fluoranthene	9.3	20	22
207-08-9	Benzo(k)fluoranthene	9.0	20	20
50-32-8	Benzo(a)pyrene	8.0	20	27
193-39-5	Indeno(1,2,3-cd)pyrene	8.4	20	11 J
53-70-3	Dibenz(a,h)anthracene	8.3	20	< 20 U
191-24-2	Benzo(g,h,i)perylene	6.6	20	15 J

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-07-4-6.8'  
 SAMPLE

Lab Sample ID: NR16C  
 LIMS ID: 08-25460  
 Matrix: Sediment  
 Date Analyzed: 10/22/08 17:02

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	34

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	40.8%	2-Fluorobiphenyl	62.8%
d14-p-Terphenyl	57.6%	d4-1,2-Dichlorobenzene	40.8%
d5-Phenol	52.5%	2-Fluorophenol	65.3%
2,4,6-Tribromophenol	90.7%	d4-2-Chlorophenol	52.3%



**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-08-0-2'

SAMPLE

Lab Sample ID: NR16D

LIMS ID: 08-25461

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 17:36

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.5 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 61.9%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	18 J
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	13 J
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	< 20 U
131-11-3	Dimethylphthalate	7.6	20	30
208-96-8	Acenaphthylene	8.5	20	17 J
83-32-9	Acenaphthene	8.1	20	11 J
132-64-9	Dibenzofuran	7.4	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	13 J
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	150
85-01-8	Phenanthrene	8.2	20	120
120-12-7	Anthracene	7.6	20	34
84-74-2	Di-n-Butylphthalate	12	20	18 J
206-44-0	Fluoranthene	7.8	20	210
129-00-0	Pyrene	7.6	20	150
85-68-7	Butylbenzylphthalate	11	20	110
56-55-3	Benzo (a) anthracene	5.8	20	110
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	84
218-01-9	Chrysene	6.5	20	130
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	110
207-08-9	Benzo (k) fluoranthene	9.1	20	100
50-32-8	Benzo (a) pyrene	8.0	20	120
193-39-5	Indeno (1,2,3-cd) pyrene	8.4	20	34
53-70-3	Dibenz (a,h) anthracene	8.4	20	14 J
191-24-2	Benzo (g,h,i) perylene	6.6	20	38

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-08-0-2'  
 SAMPLE

Lab Sample ID: NR16D  
 LIMS ID: 08-25461  
 Matrix: Sediment  
 Date Analyzed: 10/22/08 17:36

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	36.3%	2-Fluorobiphenyl	53.6%
d14-p-Terphenyl	44.8%	d4-1,2-Dichlorobenzene	30.4%
d5-Phenol	45.9%	2-Fluorophenol	57.1%
2,4,6-Tribromophenol	77.3%	d4-2-Chlorophenol	45.3%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-08-2-4'

SAMPLE

Lab Sample ID: NR16E

LIMS ID: 08-25462

Matrix: Sediment

Data Release Authorized: 

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 18:10

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.0 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 69.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	15 J
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.4	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.9	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	21
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.1	20	< 20 U
91-20-3	Naphthalene	8.7	20	27
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	2-Methylnaphthalene	8.2	20	32
131-11-3	Dimethylphthalate	7.8	20	< 20 U
208-96-8	Acenaphthylene	8.7	20	26
83-32-9	Acenaphthene	8.2	20	17 J
132-64-9	Dibenzofuran	7.6	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	9.0	20	19 J
86-30-6	N-Nitrosodiphenylamine	8.7	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	Pentachlorophenol	48	100	450
85-01-8	Phenanthrene	8.4	20	180
120-12-7	Anthracene	7.7	20	41
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.9	20	330
129-00-0	Pyrene	7.8	20	250
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.9	20	190
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	230
218-01-9	Chrysene	6.6	20	240
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.5	20	220
207-08-9	Benzo (k) fluoranthene	9.3	20	190
50-32-8	Benzo (a) pyrene	8.2	20	260
193-39-5	Indeno (1,2,3-cd) pyrene	8.6	20	70
53-70-3	Dibenz (a,h) anthracene	8.6	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.8	20	68

ORGANICS ANALYSIS DATA SHEET  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-08-2-4'  
 SAMPLE

Lab Sample ID: NR16E  
 LIMS ID: 08-25462  
 Matrix: Sediment  
 Date Analyzed: 10/22/08 18:10

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	27

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	33.3%	2-Fluorobiphenyl	54.0%
d14-p-Terphenyl	53.2%	d4-1,2-Dichlorobenzene	31.1%
d5-Phenol	37.9%	2-Fluorophenol	46.1%
2,4,6-Tribromophenol	75.5%	d4-2-Chlorophenol	40.3%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-08-2-4'

DILUTION

Lab Sample ID: NR16E

LIMS ID: 08-25462

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/24/08 01:32

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.0 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 69.5%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	41	60	< 60 U
541-73-1	1,3-Dichlorobenzene	22	60	< 60 U
106-46-7	1,4-Dichlorobenzene	22	60	< 60 U
100-51-6	Benzyl Alcohol	43	60	< 60 U
95-50-1	1,2-Dichlorobenzene	24	60	< 60 U
95-48-7	2-Methylphenol	43	60	< 60 U
106-44-5	4-Methylphenol	38	60	< 60 U
67-72-1	Hexachloroethane	22	60	< 60 U
105-67-9	2,4-Dimethylphenol	44	60	< 60 U
65-85-0	Benzoic Acid	340	600	< 600 U
120-82-1	1,2,4-Trichlorobenzene	27	60	< 60 U
91-20-3	Naphthalene	26	60	< 60 U
87-68-3	Hexachlorobutadiene	24	60	< 60 U
91-57-6	2-Methylnaphthalene	25	60	35 J
131-11-3	Dimethylphthalate	23	60	< 60 U
208-96-8	Acenaphthylene	26	60	< 60 U
83-32-9	Acenaphthene	25	60	< 60 U
132-64-9	Dibenzofuran	23	60	< 60 U
84-66-2	Diethylphthalate	49	60	< 60 U
86-73-7	Fluorene	27	60	< 60 U
86-30-6	N-Nitrosodiphenylamine	26	60	< 60 U
118-74-1	Hexachlorobenzene	24	60	< 60 U
87-86-5	Pentachlorophenol	140	300	390
85-01-8	Phenanthrene	25	60	180
120-12-7	Anthracene	23	60	42 J
84-74-2	Di-n-Butylphthalate	37	60	< 60 U
206-44-0	Fluoranthene	24	60	290
129-00-0	Pyrene	23	60	270
85-68-7	Butylbenzylphthalate	34	60	< 60 U
56-55-3	Benzo (a) anthracene	18	60	190
117-81-7	bis (2-Ethylhexyl) phthalate	33	60	250
218-01-9	Chrysene	20	60	220
117-84-0	Di-n-Octyl phthalate	25	60	< 60 U
205-99-2	Benzo (b) fluoranthene	29	60	220
207-08-9	Benzo (k) fluoranthene	28	60	170
50-32-8	Benzo (a) pyrene	24	60	240
193-39-5	Indeno (1,2,3-cd) pyrene	26	60	120
53-70-3	Dibenz (a,h) anthracene	26	60	40 J
191-24-2	Benzo (g,h,i) perylene	20	60	150

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 2 of 2

Sample ID: **RGH-SC-08-2-4'**  
**DILUTION**

Lab Sample ID: **NR16E**  
 LIMS ID: **08-25462**  
 Matrix: **Sediment**  
 Date Analyzed: **10/24/08 01:32**

QC Report No: **NR16-Hart Crowser, Inc.**  
 Project: **BELLINGHAM BAY-RG HALEY**  
**NA**

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	22	60	32 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	34.9%	2-Fluorobiphenyl	48.6%
d14-p-Terphenyl	54.1%	d4-1,2-Dichlorobenzene	32.5%
d5-Phenol	41.2%	2-Fluorophenol	44.3%
2,4,6-Tribromophenol	66.0%	d4-2-Chlorophenol	41.7%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-08-4-5.5'

SAMPLE

Lab Sample ID: NR16F

LIMS ID: 08-25463

Matrix: Sediment

Data Release Authorized: *[Signature]*

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 20:27

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 70.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	41	60	< 60 U
541-73-1	1,3-Dichlorobenzene	22	60	< 60 U
106-46-7	1,4-Dichlorobenzene	22	60	< 60 U
100-51-6	Benzyl Alcohol	43	60	< 60 U
95-50-1	1,2-Dichlorobenzene	23	60	< 60 U
95-48-7	2-Methylphenol	42	60	< 60 U
<b>106-44-5</b>	<b>4-Methylphenol</b>	<b>38</b>	<b>60</b>	<b>48 J</b>
67-72-1	Hexachloroethane	21	60	< 60 U
105-67-9	2,4-Dimethylphenol	44	60	< 60 U
65-85-0	Benzoic Acid	340	600	< 600 U
120-82-1	1,2,4-Trichlorobenzene	27	60	< 60 U
<b>91-20-3</b>	<b>Naphthalene</b>	<b>26</b>	<b>60</b>	<b>84</b>
87-68-3	Hexachlorobutadiene	24	60	< 60 U
<b>91-57-6</b>	<b>2-Methylnaphthalene</b>	<b>24</b>	<b>60</b>	<b>180</b>
<b>131-11-3</b>	<b>Dimethylphthalate</b>	<b>23</b>	<b>60</b>	<b>110</b>
<b>208-96-8</b>	<b>Acenaphthylene</b>	<b>26</b>	<b>60</b>	<b>37 J</b>
<b>83-32-9</b>	<b>Acenaphthene</b>	<b>24</b>	<b>60</b>	<b>140</b>
<b>132-64-9</b>	<b>Dibenzofuran</b>	<b>22</b>	<b>60</b>	<b>110</b>
84-66-2	Diethylphthalate	49	60	< 60 U
<b>86-73-7</b>	<b>Fluorene</b>	<b>27</b>	<b>60</b>	<b>110</b>
86-30-6	N-Nitrosodiphenylamine	26	60	< 60 U
118-74-1	Hexachlorobenzene	24	60	< 60 U
<b>87-86-5</b>	<b>Pentachlorophenol</b>	<b>140</b>	<b>300</b>	<b>4,100</b>
<b>85-01-8</b>	<b>Phenanthrene</b>	<b>25</b>	<b>60</b>	<b>780</b>
<b>120-12-7</b>	<b>Anthracene</b>	<b>23</b>	<b>60</b>	<b>450</b>
<b>84-74-2</b>	<b>Di-n-Butylphthalate</b>	<b>37</b>	<b>60</b>	<b>190</b>
<b>206-44-0</b>	<b>Fluoranthene</b>	<b>24</b>	<b>60</b>	<b>2,000</b>
<b>129-00-0</b>	<b>Pyrene</b>	<b>23</b>	<b>60</b>	<b>1,100</b>
85-68-7	Butylbenzylphthalate	33	60	< 60 U
56-55-3	Benzo (a) anthracene	18	60	490
117-81-7	bis (2-Ethylhexyl) phthalate	33	60	980
218-01-9	Chrysene	20	60	650
117-84-0	Di-n-Octyl phthalate	25	60	< 60 U
205-99-2	Benzo (b) fluoranthene	28	60	400
207-08-9	Benzo (k) fluoranthene	28	60	400
50-32-8	Benzo (a) pyrene	24	60	370
193-39-5	Indeno (1,2,3-cd) pyrene	26	60	66
53-70-3	Dibenz (a,h) anthracene	25	60	< 60 U
191-24-2	Benzo (g,h,i) perylene	20	60	100

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2

Sample ID: RGH-SC-08-4-5.5'  
SAMPLE

Lab Sample ID: NR16F  
LIMS ID: 08-25463  
Matrix: Sediment  
Date Analyzed: 10/22/08 20:27

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	60	120

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	40.9%	2-Fluorobiphenyl	59.9%
d14-p-Terphenyl	64.1%	d4-1,2-Dichlorobenzene	39.4%
d5-Phenol	48.7%	2-Fluorophenol	59.1%
2,4,6-Tribromophenol	92.0%	d4-2-Chlorophenol	46.3%



**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-08-4-5.5'

DILUTION

Lab Sample ID: NR16F

LIMS ID: 08-25463

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/24/08 03:12

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 10.0

Percent Moisture: 70.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	140	200	< 200 U
541-73-1	1,3-Dichlorobenzene	74	200	< 200 U
106-46-7	1,4-Dichlorobenzene	73	200	< 200 U
100-51-6	Benzyl Alcohol	140	200	< 200 U
95-50-1	1,2-Dichlorobenzene	78	200	< 200 U
95-48-7	2-Methylphenol	140	200	< 200 U
106-44-5	4-Methylphenol	130	200	< 200 U
67-72-1	Hexachloroethane	71	200	< 200 U
105-67-9	2,4-Dimethylphenol	150	200	< 200 U
65-85-0	Benzoic Acid	1100	2,000	< 2,000 U
120-82-1	1,2,4-Trichlorobenzene	90	200	< 200 U
91-20-3	Naphthalene	86	200	< 200 U
87-68-3	Hexachlorobutadiene	80	200	< 200 U
91-57-6	2-Methylnaphthalene	81	200	170 J
131-11-3	Dimethylphthalate	77	200	120 J
208-96-8	Acenaphthylene	86	200	< 200 U
83-32-9	Acenaphthene	81	200	140 J
132-64-9	Dibenzofuran	75	200	130 J
84-66-2	Diethylphthalate	160	200	< 200 U
86-73-7	Fluorene	89	200	120 J
86-30-6	N-Nitrosodiphenylamine	86	200	< 200 U
118-74-1	Hexachlorobenzene	79	200	< 200 U
87-86-5	Pentachlorophenol	470	990	3,400
85-01-8	Phenanthrene	83	200	910
120-12-7	Anthracene	77	200	220
84-74-2	Di-n-Butylphthalate	120	200	360
206-44-0	Fluoranthene	78	200	1,800
129-00-0	Pyrene	77	200	1,100
85-68-7	Butylbenzylphthalate	110	200	< 200 U
56-55-3	Benzo (a) anthracene	59	200	540
117-81-7	bis (2-Ethylhexyl) phthalate	110	200	940
218-01-9	Chrysene	66	200	620
117-84-0	Di-n-Octyl phthalate	83	200	< 200 U
205-99-2	Benzo (b) fluoranthene	94	200	330
207-08-9	Benzo (k) fluoranthene	92	200	270
50-32-8	Benzo (a) pyrene	81	200	340
193-39-5	Indeno (1,2,3-cd) pyrene	85	200	< 200 U
53-70-3	Dibenz (a,h) anthracene	85	200	< 200 U
191-24-2	Benzo (g,h,i) perylene	67	200	120 J

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2

Sample ID: RGH-SC-08-4-5.5'  
DILUTION

Lab Sample ID: NR16F  
LIMS ID: 08-25463  
Matrix: Sediment  
Date Analyzed: 10/24/08 03:12

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	71	200	130 J


Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	41.6%	2-Fluorobiphenyl	59.6%
d14-p-Terphenyl	64.0%	d4-1,2-Dichlorobenzene	34.4%
d5-Phenol	45.3%	2-Fluorophenol	56.3%
2,4,6-Tribromophenol	81.9%	d4-2-Chlorophenol	46.4%

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 1 of 2

Sample ID: RGH-SC-09-0-2'  
SAMPLE

Lab Sample ID: NR16G  
LIMS ID: 08-25464  
Matrix: Sediment  
Data Release Authorized:   
Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Date Extracted: 10/08/08  
Date Analyzed: 10/22/08 18:45  
Instrument/Analyst: NT4/PK  
GPC Cleanup: Yes

Sample Amount: 25.1 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 1.00  
Percent Moisture: 56.0%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.3	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.8	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.0	20	< 20 U
91-20-3	<b>Naphthalene</b>	<b>8.6</b>	<b>20</b>	<b>15 J</b>
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	<b>2-Methylnaphthalene</b>	<b>8.2</b>	<b>20</b>	<b>12 J</b>
131-11-3	Dimethylphthalate	7.7	20	< 20 U
208-96-8	<b>Acenaphthylene</b>	<b>8.6</b>	<b>20</b>	<b>14 J</b>
83-32-9	Acenaphthene	8.2	20	< 20 U
132-64-9	Dibenzofuran	7.5	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	<b>Fluorene</b>	<b>8.9</b>	<b>20</b>	<b>12 J</b>
86-30-6	N-Nitrosodiphenylamine	8.6	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	<b>Pentachlorophenol</b>	<b>47</b>	<b>100</b>	<b>91 J</b>
85-01-8	<b>Phenanthrene</b>	<b>8.4</b>	<b>20</b>	<b>96</b>
120-12-7	<b>Anthracene</b>	<b>7.7</b>	<b>20</b>	<b>33</b>
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	<b>Fluoranthene</b>	<b>7.9</b>	<b>20</b>	<b>170</b>
129-00-0	<b>Pyrene</b>	<b>7.7</b>	<b>20</b>	<b>130</b>
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	<b>Benzo (a) anthracene</b>	<b>5.9</b>	<b>20</b>	<b>97</b>
117-81-7	<b>bis (2-Ethylhexyl) phthalate</b>	<b>11</b>	<b>20</b>	<b>120</b>
218-01-9	<b>Chrysene</b>	<b>6.6</b>	<b>20</b>	<b>160</b>
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	<b>Benzo (b) fluoranthene</b>	<b>9.5</b>	<b>20</b>	<b>80</b>
207-08-9	<b>Benzo (k) fluoranthene</b>	<b>9.2</b>	<b>20</b>	<b>77</b>
50-32-8	<b>Benzo (a) pyrene</b>	<b>8.1</b>	<b>20</b>	<b>78</b>
193-39-5	<b>Indeno (1,2,3-cd) pyrene</b>	<b>8.6</b>	<b>20</b>	<b>23</b>
53-70-3	Dibenz (a, h) anthracene	8.5	20	< 20 U
191-24-2	<b>Benzo (g, h, i) perylene</b>	<b>6.7</b>	<b>20</b>	<b>25</b>

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 2 of 2

Sample ID: RGH-SC-09-0-2'

SAMPLE

Lab Sample ID: NR16G

QC Report No: NR16-Hart Crowser, Inc.

LIMS ID: 08-25464

Project: BELLINGHAM BAY-RG HALEY

Matrix: Sediment

NA

Date Analyzed: 10/22/08 18:45

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	10 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	34.2%	2-Fluorobiphenyl	52.0%
d14-p-Terphenyl	52.8%	d4-1,2-Dichlorobenzene	30.8%
d5-Phenol	42.1%	2-Fluorophenol	49.6%
2,4,6-Tribromophenol	77.3%	d4-2-Chlorophenol	43.2%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-09-2-4'

SAMPLE

Lab Sample ID: NR16H

LIMS ID: 08-25465

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 19:19

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 56.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	260
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	76
67-72-1	Hexachloroethane	7.1	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	32
87-68-3	Hexachlorobutadiene	8.0	20	< 20 U
91-57-6	2-Methylnaphthalene	8.1	20	26
131-11-3	Dimethylphthalate	7.6	20	< 20 U
208-96-8	Acenaphthylene	8.5	20	19 J
83-32-9	Acenaphthene	8.1	20	14 J
132-64-9	Dibenzofuran	7.4	20	15 J
84-66-2	Diethylphthalate	16	20	18 J
86-73-7	Fluorene	8.8	20	24
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.9	20	< 20 U
87-86-5	Pentachlorophenol	47	98	260
85-01-8	Phenanthrene	8.3	20	120
120-12-7	Anthracene	7.6	20	83
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.8	20	400
129-00-0	Pyrene	7.6	20	250
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	190
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	160
218-01-9	Chrysene	6.5	20	170
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.4	20	120
207-08-9	Benzo (k) fluoranthene	9.1	20	130
50-32-8	Benzo (a) pyrene	8.0	20	130
193-39-5	Indeno (1,2,3-cd) pyrene	8.5	20	34
53-70-3	Dibenz (a,h) anthracene	8.4	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.6	20	34

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 2 of 2

Sample ID: **RGH-SC-09-2-4'**  
**SAMPLE**

Lab Sample ID: **NR16H**  
 LIMS ID: **08-25465**  
 Matrix: **Sediment**  
 Date Analyzed: **10/22/08 19:19**

QC Report No: **NR16-Hart Crowser, Inc.**  
 Project: **BELLINGHAM BAY-RG HALEY  
 NA**

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	25

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	37.1%	2-Fluorobiphenyl	55.2%
d14-p-Terphenyl	52.0%	d4-1,2-Dichlorobenzene	32.4%
d5-Phenol	46.7%	2-Fluorophenol	54.4%
2,4,6-Tribromophenol	85.3%	d4-2-Chlorophenol	46.4%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-09-2-4'

DILUTION

Lab Sample ID: NR16H

LIMS ID: 08-25465

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/24/08 02:06

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.4 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 3.00

Percent Moisture: 56.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	40	59	260
541-73-1	1,3-Dichlorobenzene	22	59	< 59 U
106-46-7	1,4-Dichlorobenzene	22	59	< 59 U
100-51-6	Benzyl Alcohol	43	59	< 59 U
95-50-1	1,2-Dichlorobenzene	23	59	< 59 U
95-48-7	2-Methylphenol	42	59	< 59 U
106-44-5	4-Methylphenol	38	59	79
67-72-1	Hexachloroethane	21	59	< 59 U
105-67-9	2,4-Dimethylphenol	44	59	< 59 U
65-85-0	Benzoic Acid	340	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	27	59	< 59 U
91-20-3	Naphthalene	26	59	31 J
87-68-3	Hexachlorobutadiene	24	59	< 59 U
91-57-6	2-Methylnaphthalene	24	59	< 59 U
131-11-3	Dimethylphthalate	23	59	< 59 U
208-96-8	Acenaphthylene	26	59	< 59 U
83-32-9	Acenaphthene	24	59	< 59 U
132-64-9	Dibenzofuran	22	59	< 59 U
84-66-2	Diethylphthalate	48	59	< 59 U
86-73-7	Fluorene	26	59	< 59 U
86-30-6	N-Nitrosodiphenylamine	26	59	< 59 U
118-74-1	Hexachlorobenzene	24	59	< 59 U
87-86-5	Pentachlorophenol	140	300	200 J
85-01-8	Phenanthrene	25	59	130
120-12-7	Anthracene	23	59	72
84-74-2	Di-n-Butylphthalate	37	59	< 59 U
206-44-0	Fluoranthene	23	59	400
129-00-0	Pyrene	23	59	270
85-68-7	Butylbenzylphthalate	33	59	67
56-55-3	Benzo (a) anthracene	17	59	160
117-81-7	bis (2-Ethylhexyl) phthalate	32	59	180
218-01-9	Chrysene	20	59	230
117-84-0	Di-n-Octyl phthalate	25	59	< 59 U
205-99-2	Benzo (b) fluoranthene	28	59	120
207-08-9	Benzo (k) fluoranthene	27	59	110
50-32-8	Benzo (a) pyrene	24	59	110
193-39-5	Indeno (1,2,3-cd) pyrene	25	59	40 J
53-70-3	Dibenz (a,h) anthracene	25	59	< 59 U
191-24-2	Benzo (g,h,i) perylene	20	59	54 J

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-09-2-4'  
 DILUTION

Lab Sample ID: NR16H  
 LIMS ID: 08-25465  
 Matrix: Sediment  
 Date Analyzed: 10/24/08 02:06

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	< 59 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	37.4%	2-Fluorobiphenyl	55.1%
d14-p-Terphenyl	53.3%	d4-1,2-Dichlorobenzene	31.9%
d5-Phenol	47.0%	2-Fluorophenol	50.6%
2,4,6-Tribromophenol	77.2%	d4-2-Chlorophenol	46.4%



**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 1 of 2

Sample ID: **RGH-SC-09-4-5.5'**  
**SAMPLE**

Lab Sample ID: NR16I  
 LIMS ID: 08-25466  
 Matrix: Sediment  
 Data Release Authorized:  
 Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA  
 Date Sampled: 09/24/08  
 Date Received: 09/25/08

Date Extracted: 10/08/08  
 Date Analyzed: 10/22/08 19:53  
 Instrument/Analyst: NT4/PK  
 GPC Cleanup: Yes

Sample Amount: 25.6 g-dry-wt  
 Final Extract Volume: 0.5 mL  
 Dilution Factor: 1.00  
 Percent Moisture: 56.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	13	20	22
541-73-1	1,3-Dichlorobenzene	7.3	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.2	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.7	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	27
67-72-1	Hexachloroethane	7.0	20	< 20 U
105-67-9	2,4-Dimethylphenol	14	20	< 20 U
65-85-0	Benzoic Acid	110	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	8.9	20	< 20 U
91-20-3	Naphthalene	8.5	20	68
87-68-3	Hexachlorobutadiene	7.9	20	< 20 U
91-57-6	2-Methylnaphthalene	8.0	20	70
131-11-3	Dimethylphthalate	7.6	20	12 J
208-96-8	Acenaphthylene	8.5	20	88
83-32-9	Acenaphthene	8.0	20	59
132-64-9	Dibenzofuran	7.4	20	42
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	8.8	20	71
86-30-6	N-Nitrosodiphenylamine	8.5	20	< 20 U
118-74-1	Hexachlorobenzene	7.8	20	< 20 U
87-86-5	Pentachlorophenol	47	98	420
85-01-8	Phenanthrene	8.2	20	680
120-12-7	Anthracene	7.6	20	200
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.7	20	1,200
129-00-0	Pyrene	7.6	20	710
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.8	20	310
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	170
218-01-9	Chrysene	6.5	20	630
117-84-0	Di-n-Octyl phthalate	8.2	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.3	20	470
207-08-9	Benzo (k) fluoranthene	9.1	20	440
50-32-8	Benzo (a) pyrene	8.0	20	540
193-39-5	Indeno (1, 2, 3-cd) pyrene	8.4	20	140
53-70-3	Dibenz (a, h) anthracene	8.4	20	47
191-24-2	Benzo (g, h, i) perylene	6.6	20	150

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 2 of 2

Sample ID: **RGH-SC-09-4-5.5'**  
**SAMPLE**

Lab Sample ID: **NR16I**  
 LIMS ID: **08-25466**  
 Matrix: **Sediment**  
 Date Analyzed: **10/22/08 19:53**

QC Report No: **NR16-Hart Crowser, Inc.**  
 Project: **BELLINGHAM BAY-RG HALEY**  
**NA**

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.0	20	58

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	38.8%	2-Fluorobiphenyl	55.6%
d14-p-Terphenyl	52.8%	d4-1,2-Dichlorobenzene	33.3%
d5-Phenol	46.1%	2-Fluorophenol	57.9%
2,4,6-Tribromophenol	84.8%	d4-2-Chlorophenol	48.3%

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 1 of 2

Sample ID: RGH-SC-09-4-5.5'  
DILUTION

Lab Sample ID: NR16I  
LIMS ID: 08-25466  
Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Date Extracted: 10/08/08  
Date Analyzed: 10/24/08 02:39  
Instrument/Analyst: NT4/PK  
GPC Cleanup: Yes

Sample Amount: 25.6 g-dry-wt  
Final Extract Volume: 0.5 mL  
Dilution Factor: 3.00  
Percent Moisture: 56.4%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	40	59	< 59 U
541-73-1	1,3-Dichlorobenzene	22	59	< 59 U
106-46-7	1,4-Dichlorobenzene	22	59	< 59 U
100-51-6	Benzyl Alcohol	43	59	< 59 U
95-50-1	1,2-Dichlorobenzene	23	59	< 59 U
95-48-7	2-Methylphenol	42	59	< 59 U
106-44-5	4-Methylphenol	38	59	< 59 U
67-72-1	Hexachloroethane	21	59	< 59 U
105-67-9	2,4-Dimethylphenol	43	59	< 59 U
65-85-0	Benzoic Acid	340	590	< 590 U
120-82-1	1,2,4-Trichlorobenzene	27	59	< 59 U
91-20-3	<b>Naphthalene</b>	<b>25</b>	<b>59</b>	<b>70</b>
87-68-3	Hexachlorobutadiene	24	59	< 59 U
91-57-6	<b>2-Methylnaphthalene</b>	<b>24</b>	<b>59</b>	<b>73</b>
131-11-3	Dimethylphthalate	23	59	< 59 U
208-96-8	<b>Acenaphthylene</b>	<b>25</b>	<b>59</b>	<b>76</b>
83-32-9	<b>Acenaphthene</b>	<b>24</b>	<b>59</b>	<b>59</b>
132-64-9	<b>Dibenzofuran</b>	<b>22</b>	<b>59</b>	<b>46 J</b>
84-66-2	Diethylphthalate	48	59	< 59 U
86-73-7	<b>Fluorene</b>	<b>26</b>	<b>59</b>	<b>76</b>
86-30-6	N-Nitrosodiphenylamine	25	59	< 59 U
118-74-1	Hexachlorobenzene	24	59	< 59 U
87-86-5	<b>Pentachlorophenol</b>	<b>140</b>	<b>290</b>	<b>370</b>
85-01-8	<b>Phenanthrene</b>	<b>25</b>	<b>59</b>	<b>750</b>
120-12-7	<b>Anthracene</b>	<b>23</b>	<b>59</b>	<b>160</b>
84-74-2	Di-n-Butylphthalate	36	59	< 59 U
206-44-0	<b>Fluoranthene</b>	<b>23</b>	<b>59</b>	<b>1,200</b>
129-00-0	<b>Pyrene</b>	<b>23</b>	<b>59</b>	<b>780</b>
85-68-7	Butylbenzylphthalate	33	59	< 59 U
56-55-3	<b>Benzo (a) anthracene</b>	<b>17</b>	<b>59</b>	<b>440</b>
117-81-7	<b>bis (2-Ethylhexyl) phthalate</b>	<b>32</b>	<b>59</b>	<b>200</b>
218-01-9	<b>Chrysene</b>	<b>19</b>	<b>59</b>	<b>520</b>
117-84-0	Di-n-Octyl phthalate	24	59	< 59 U
205-99-2	<b>Benzo (b) fluoranthene</b>	<b>28</b>	<b>59</b>	<b>440</b>
207-08-9	<b>Benzo (k) fluoranthene</b>	<b>27</b>	<b>59</b>	<b>410</b>
50-32-8	<b>Benzo (a) pyrene</b>	<b>24</b>	<b>59</b>	<b>480</b>
193-39-5	<b>Indeno (1,2,3-cd) pyrene</b>	<b>25</b>	<b>59</b>	<b>190</b>
53-70-3	<b>Dibenz (a,h) anthracene</b>	<b>25</b>	<b>59</b>	<b>70</b>
191-24-2	<b>Benzo (g,h,i) perylene</b>	<b>20</b>	<b>59</b>	<b>200</b>

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: RGH-SC-09-4-5.5'  
 DILUTION

Lab Sample ID: NR16I  
 LIMS ID: 08-25466  
 Matrix: Sediment  
 Date Analyzed: 10/24/08 02:39

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	21	59	58 J

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	37.9%	2-Fluorobiphenyl	56.8%
d14-p-Terphenyl	55.7%	d4-1,2-Dichlorobenzene	33.8%
d5-Phenol	48.0%	2-Fluorophenol	55.3%
2,4,6-Tribromophenol	76.6%	d4-2-Chlorophenol	44.9%

**SW8270 SEMIVOLATILES SOIL/SEDIMENT SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT	OUT
MB-100808	44.0%	60.8%	88.8%	46.0%	51.5%	60.8%	79.7%	52.0%		0
LCS-100808	37.1%	55.6%	77.2%	32.2%*	48.0%	50.9%	83.7%	44.3%		1
LCSD-100808	47.2%	66.0%	82.0%	44.0%	54.4%	60.0%	86.7%	52.5%		0
RGH-SC-07-0-2'	40.4%	62.0%	51.6%	36.3%	53.9%	57.6%	89.6%	54.9%		0
RGH-SC-07-0-2' MS	40.0%	65.6%	52.0%	38.1%	46.9%	54.1%	87.5%	49.1%		0
RGH-SC-07-0-2' MSD	42.0%	68.4%	52.4%	39.2%	50.9%	61.9%	97.6%	52.3%		0
RGH-SC-07-2-4'	35.5%	49.6%	25.2%	39.0%	49.1%	64.0%	59.2%	48.5%		0
RGH-SC-07-2-4' DL	33.2%	44.0%	40.0%	34.8%	44.8%	53.9%	35.7%	42.7%		0
RGH-SC-07-4-6.8'	40.8%	62.8%	57.6%	40.8%	52.5%	65.3%	90.7%	52.3%		0
RGH-SC-08-0-2'	36.3%	53.6%	44.8%	30.4%	45.9%	57.1%	77.3%	45.3%		0
RGH-SC-08-2-4'	33.3%	54.0%	53.2%	31.1%	37.9%	46.1%	75.5%	40.3%		0
RGH-SC-08-2-4' DL	34.9%	48.6%	54.1%	32.5%	41.2%	44.3%	66.0%	41.7%		0
RGH-SC-08-4-5.5'	40.9%	59.9%	64.1%	39.4%	48.7%	59.1%	92.0%	46.3%		0
RGH-SC-08-4-5.5' DL	41.6%	59.6%	64.0%	34.4%	45.3%	56.3%	81.9%	46.4%		0
RGH-SC-09-0-2'	34.2%	52.0%	52.8%	30.8%	42.1%	49.6%	77.3%	43.2%		0
RGH-SC-09-2-4'	37.1%	55.2%	52.0%	32.4%	46.7%	54.4%	85.3%	46.4%		0
RGH-SC-09-2-4' DL	37.4%	55.1%	53.3%	31.9%	47.0%	50.6%	77.2%	46.4%		0
RGH-SC-09-4-5.5'	38.8%	55.6%	52.8%	33.3%	46.1%	57.9%	84.8%	48.3%		0
RGH-SC-09-4-5.5' DL	37.9%	56.8%	55.7%	33.8%	48.0%	55.3%	76.6%	44.9%		0

	LCS/MB LIMITS	QC LIMITS
(NBZ) = d5-Nitrobenzene	(37-85)	(29-87)
(FBP) = 2-Fluorobiphenyl	(39-82)	(32-88)
(TPH) = d14-p-Terphenyl	(38-105)	(21-97)
(DCB) = d4-1,2-Dichlorobenzene	(33-79)	(25-82)
(PHL) = d5-Phenol	(40-85)	(29-85)
(2FP) = 2-Fluorophenol	(20-93)	(10-114)
(TBP) = 2,4,6-Tribromophenol	(40-96)	(25-103)
(2CP) = d4-2-Chlorophenol	(41-81)	(30-84)

Prep Method: SW3550B  
Log Number Range: 08-25458 to 08-25466

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 1 of 1

Sample ID: **RGH-SC-07-0-2'**  
**MS/MSD**

Lab Sample ID: **NR16A**  
 LIMS ID: **08-25458**  
 Matrix: **Sediment**  
 Data Release Authorized:  
 Reported: **10/24/08**

QC Report No: **NR16-Hart Crowser, Inc.**  
 Project: **BELLINGHAM BAY-RG HALEY**

Date Sampled: **09/24/08**  
 Date Received: **09/25/08**

Date Extracted MS/MSD: **10/08/08**  
 Date Analyzed MS: **10/22/08 15:19**  
 MSD: **10/22/08 15:53**  
 Instrument/Analyst MS: **NT4/PK**  
 MSD: **NT4/PK**  
 GPC Cleanup: **YES**

Sample Amount MS: **25.3 g-dry-wt**  
 MSD: **25.2 g-dry-wt**  
 Final Extract Volume MS: **0.5 mL**  
 MSD: **0.5 mL**  
 Dilution Factor MS: **1.00**  
 MSD: **1.00**  
 Percent Moisture: **46.6 %**

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Phenol	18.4	256	494	48.1%	264	497	49.4%	3.1%
1,3-Dichlorobenzene	< 19.5	216	494	43.7%	218	497	43.9%	0.9%
1,4-Dichlorobenzene	< 19.5	216	494	43.7%	223	497	44.9%	3.2%
Benzyl Alcohol	< 19.5	356	989	36.0%	366	994	36.8%	2.8%
1,2-Dichlorobenzene	< 19.5	209	494	42.3%	209	497	42.1%	0.0%
2-Methylphenol	< 19.5	254	494	51.4%	267	497	53.7%	5.0%
4-Methylphenol	33.8	541	989	51.3%	583	994	55.3%	7.5%
Hexachloroethane	< 19.5	165	494	33.4%	172	497	34.6%	4.2%
2,4-Dimethylphenol	< 19.5	205	494	41.5%	223	497	44.9%	8.4%
Benzoic Acid	< 195	382	1480	25.8%	375	1490	25.2%	1.8%
1,2,4-Trichlorobenzene	< 19.5	255	494	51.6%	261	497	52.5%	2.3%
Naphthalene	668	1090	494	85.4%	1330	497	133%	19.8%
Hexachlorobutadiene	< 19.5	225	494	45.5%	228	497	45.9%	1.3%
2-Methylnaphthalene	38.3	331	494	59.3%	361	497	64.9%	8.7%
Dimethylphthalate	177	447	494	54.7%	385	497	41.9%	14.9%
Acenaphthylene	36.3	416	494	76.9%	437	497	80.6%	4.9%
Acenaphthene	46.9	394	494	70.3%	393	497	69.6%	0.3%
Dibenzofuran	37.7	396	494	72.5%	413	497	75.5%	4.2%
Diethylphthalate	< 19.5	346	494	70.0%	351	497	70.6%	1.4%
Fluorene	63.3	412	494	70.6%	408	497	69.4%	1.0%
N-Nitrosodiphenylamine	< 19.5	388	494	78.5%	410	497	82.5%	5.5%
Hexachlorobenzene	< 19.5	355	494	71.9%	353	497	71.0%	0.6%
Pentachlorophenol	< 97.7	398	494	80.6%	406	497	81.7%	2.0%
Phenanthrene	579	884	494	61.7%	907	497	66.0%	2.6%
Anthracene	114	426	494	63.2%	431	497	63.8%	1.2%
Di-n-Butylphthalate	< 19.5	418	494	84.6%	393	497	79.1%	6.2%
Fluoranthene	.756	991	494	47.6%	1050	497	59.2%	5.8%
Pyrene	596	674	494	15.8%	702	497	21.3%	4.1%
Butylbenzylphthalate	< 19.5	287	494	58.1%	288	497	57.9%	0.3%
Benzo(a)anthracene	213	485	494	55.1%	402	497	38.0%	18.7%
bis(2-Ethylhexyl)phthalate	101	451	494	70.9%	711	497	123%	44.8%
Chrysene	390	531	494	28.5%	566	497	35.4%	6.4%
Di-n-Octyl phthalate	< 19.5	337	494	68.2%	327	497	65.8%	3.0%
Benzo(b)fluoranthene	215	580	494	73.9%	573	497	72.0%	1.2%
Benzo(k)fluoranthene	194	493	494	60.5%	483	497	58.1%	2.0%
Benzo(a)pyrene	313	466	494	31.0%	528	497	43.3%	12.5%
Indeno(1,2,3-cd)pyrene	94.8	293	494	40.1%	271	497	35.5%	7.8%
Dibenz(a,h)anthracene	39.3	250	494	42.7%	224	497	37.2%	11.0%
Benzo(g,h,i)perylene	116	287	494	34.6%	262	497	29.4%	9.1%
1-Methylnaphthalene	37.9	323	494	57.7%	337	497	60.2%	4.2%

Results reported in  $\mu\text{g}/\text{kg}$   
 RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: RGH-SC-07-0-2'

MATRIX SPIKE

Lab Sample ID: NR16A

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 15:19

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.3 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 46.6%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	---
541-73-1	1,3-Dichlorobenzene	7.4	20	---
106-46-7	1,4-Dichlorobenzene	7.3	20	---
100-51-6	Benzyl Alcohol	14	20	---
95-50-1	1,2-Dichlorobenzene	7.8	20	---
95-48-7	2-Methylphenol	14	20	---
106-44-5	4-Methylphenol	13	20	---
67-72-1	Hexachloroethane	7.1	20	---
105-67-9	2,4-Dimethylphenol	15	20	---
65-85-0	Benzoic Acid	110	200	---
120-82-1	1,2,4-Trichlorobenzene	9.0	20	---
91-20-3	Naphthalene	8.6	20	---
87-68-3	Hexachlorobutadiene	8.0	20	---
91-57-6	2-Methylnaphthalene	8.1	20	---
131-11-3	Dimethylphthalate	7.7	20	---
208-96-8	Acenaphthylene	8.6	20	---
83-32-9	Acenaphthene	8.1	20	---
132-64-9	Dibenzofuran	7.5	20	---
84-66-2	Diethylphthalate	16	20	---
86-73-7	Fluorene	8.9	20	---
86-30-6	N-Nitrosodiphenylamine	8.6	20	---
118-74-1	Hexachlorobenzene	7.9	20	---
87-86-5	Pentachlorophenol	47	99	---
85-01-8	Phenanthrene	8.3	20	---
120-12-7	Anthracene	7.7	20	---
84-74-2	Di-n-Butylphthalate	12	20	---
206-44-0	Fluoranthene	7.8	20	---
129-00-0	Pyrene	7.7	20	---
85-68-7	Butylbenzylphthalate	11	20	---
56-55-3	Benzo (a) anthracene	5.9	20	---
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	---
218-01-9	Chrysene	6.6	20	---
117-84-0	Di-n-Octyl phthalate	8.2	20	---
205-99-2	Benzo (b) fluoranthene	9.4	20	---
207-08-9	Benzo (k) fluoranthene	9.2	20	---
50-32-8	Benzo (a) pyrene	8.1	20	---
193-39-5	Indeno (1,2,3-cd) pyrene	8.5	20	---
53-70-3	Dibenz (a,h) anthracene	8.5	20	---
191-24-2	Benzo (g,h,i) perylene	6.7	20	---

**ORGANICS ANALYSIS DATA SHEET**  
**PSDDA Semivolatiles by SW8270D GC/MS**  
 Page 2 of 2

Sample ID: **RGH-SC-07-0-2'**  
**MATRIX SPIKE**

Lab Sample ID: **NR16A**  
 LIMS ID: **08-25458**  
 Matrix: **Sediment**  
 Date Analyzed: **10/22/08 15:19**

QC Report No: **NR16-Hart Crowser, Inc.**  
 Project: **BELLINGHAM BAY-RG HALEY  
 NA**

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.1	20	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	40.0%	2-Fluorobiphenyl	65.6%
d14-p-Terphenyl	52.0%	d4-1,2-Dichlorobenzene	38.1%
d5-Phenol	46.9%	2-Fluorophenol	54.1%
2,4,6-Tribromophenol	87.5%	d4-2-Chlorophenol	49.1%



**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2


Sample ID: RGH-SC-07-0-2'

MATRIX SPIKE DUPLICATE

Lab Sample ID: NR16A

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: 

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 15:53

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.2 g-dry-wt

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: 46.6%

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	---
541-73-1	1,3-Dichlorobenzene	7.4	20	---
106-46-7	1,4-Dichlorobenzene	7.3	20	---
100-51-6	Benzyl Alcohol	14	20	---
95-50-1	1,2-Dichlorobenzene	7.8	20	---
95-48-7	2-Methylphenol	14	20	---
106-44-5	4-Methylphenol	13	20	---
67-72-1	Hexachloroethane	7.2	20	---
105-67-9	2,4-Dimethylphenol	15	20	---
65-85-0	Benzoic Acid	110	200	---
120-82-1	1,2,4-Trichlorobenzene	9.0	20	---
91-20-3	Naphthalene	8.6	20	---
87-68-3	Hexachlorobutadiene	8.1	20	---
91-57-6	2-Methylnaphthalene	8.1	20	---
131-11-3	Dimethylphthalate	7.7	20	---
208-96-8	Acenaphthylene	8.6	20	---
83-32-9	Acenaphthene	8.2	20	---
132-64-9	Dibenzofuran	7.5	20	---
84-66-2	Diethylphthalate	16	20	---
86-73-7	Fluorene	8.9	20	---
86-30-6	N-Nitrosodiphenylamine	8.6	20	---
118-74-1	Hexachlorobenzene	8.0	20	---
87-86-5	Pentachlorophenol	47	99	---
85-01-8	Phenanthrene	8.3	20	---
120-12-7	Anthracene	7.7	20	---
84-74-2	Di-n-Butylphthalate	12	20	---
206-44-0	Fluoranthene	7.9	20	---
129-00-0	Pyrene	7.7	20	---
85-68-7	Butylbenzylphthalate	11	20	---
56-55-3	Benzo(a)anthracene	5.9	20	---
117-81-7	bis(2-Ethylhexyl)phthalate	11	20	---
218-01-9	Chrysene	6.6	20	---
117-84-0	Di-n-Octyl phthalate	8.3	20	---
205-99-2	Benzo(b)fluoranthene	9.5	20	---
207-08-9	Benzo(k)fluoranthene	9.2	20	---
50-32-8	Benzo(a)pyrene	8.1	20	---
193-39-5	Indeno(1,2,3-cd)pyrene	8.5	20	---
53-70-3	Dibenz(a,h)anthracene	8.5	20	---
191-24-2	Benzo(g,h,i)perylene	6.7	20	---

Sample ID: RGH-SC-07-0-2'  
MATRIX SPIKE DUPLICATE

Lab Sample ID: NR16A  
LIMS ID: 08-25458  
Matrix: Sediment  
Date Analyzed: 10/22/08 15:53

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY  
NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	---

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	42.0%	2-Fluorobiphenyl	68.4%
d14-p-Terphenyl	52.4%	d4-1,2-Dichlorobenzene	39.2%
d5-Phenol	50.9%	2-Fluorophenol	61.9%
2,4,6-Tribromophenol	97.6%	d4-2-Chlorophenol	52.3%

**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: LCS-100808

LCS/LCSD

Lab Sample ID: LCS-100808

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: 

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Date Extracted LCS/LCSD: 10/08/08

Sample Amount LCS: 25.0 g

LCSD: 25.0 g

Date Analyzed LCS: 10/22/08 13:38

Final Extract Volume LCS: 0.5 mL

LCSD: 10/22/08 14:11

LCSD: 0.5 mL

Instrument/Analyst LCS: NT4/PK

Dilution Factor LCS: 1.00

LCSD: NT4/PK

LCSD: 1.00

GPC Cleanup: YES

Percent Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Phenol	293	500	58.6%	318	500	63.6%	8.2%
1,3-Dichlorobenzene	185	500	37.0%	242	500	48.4%	26.7%
1,4-Dichlorobenzene	188	500	37.6%	243	500	48.6%	25.5%
Benzyl Alcohol	327	1000	32.7%	316	1000	31.6%	3.4%
1,2-Dichlorobenzene	188	500	37.6%	235	500	47.0%	22.2%
2-Methylphenol	221	500	44.2%	241	500	48.2%	8.7%
4-Methylphenol	494	1000	49.4%	521	1000	52.1%	5.3%
Hexachloroethane	147	500	29.4%	191	500	38.2%	26.0%
2,4-Dimethylphenol	126	500	25.2%	149	500	29.8%	16.7%
Benzoic Acid	1030	1500	68.7%	1050	1500	70.0%	1.9%
1,2,4-Trichlorobenzene	238	500	47.6%	283	500	56.6%	17.3%
Naphthalene	232	500	46.4%	267	500	53.4%	14.0%
Hexachlorobutadiene	204	500	40.8%	242	500	48.4%	17.0%
2-Methylnaphthalene	279	500	55.8%	302	500	60.4%	7.9%
Dimethylphthalate	371	500	74.2%	391	500	78.2%	5.2%
Acenaphthylene	344	500	68.8%	380	500	76.0%	9.9%
Acenaphthene	337	500	67.4%	372	500	74.4%	9.9%
Dibenzofuran	342	500	68.4%	363	500	72.6%	6.0%
Diethylphthalate	359	500	71.8%	371	500	74.2%	3.3%
Fluorene	309	500	61.8%	330	500	66.0%	6.6%
N-Nitrosodiphenylamine	452	500	90.4%	471	500	94.2%	4.1%
Hexachlorobenzene	388	500	77.6%	386	500	77.2%	0.5%
Pentachlorophenol	371	500	74.2%	348	500	69.6%	6.4%
Phenanthrene	359	500	71.8%	365	500	73.0%	1.7%
Anthracene	334	500	66.8%	349	500	69.8%	4.4%
Di-n-Butylphthalate	388	500	77.6%	394	500	78.8%	1.5%
Fluoranthene	369	500	73.8%	367	500	73.4%	0.5%
Pyrene	358	500	71.6%	375	500	75.0%	4.6%
Butylbenzylphthalate	365	500	73.0%	376	500	75.2%	3.0%
Benzo(a)anthracene	372	500	74.4%	382	500	76.4%	2.7%
bis(2-Ethylhexyl)phthalate	405	500	81.0%	422	500	84.4%	4.1%
Chrysene	388	500	77.6%	398	500	79.6%	2.5%
Di-n-Octyl phthalate	362	500	72.4%	372	500	74.4%	2.7%
Benzo(b)fluoranthene	421	500	84.2%	423	500	84.6%	0.5%

ORGANICS ANALYSIS DATA SHEET  
PSDDA Semivolatiles by SW8270D GC/MS  
Page 2 of 2

Sample ID: LCSD-100808  
LCS/LCSD

Lab Sample ID: LCS-100808

QC Report No: NR16-Hart Crowser, Inc.

LIMS ID: 08-25458

Project: BELLINGHAM BAY-RG HALEY

Matrix: Sediment

Date Analyzed LCS: 10/22/08 13:38

LCSD: 10/22/08 14:11

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzo(k)fluoranthene	341	500	68.2%	340	500	68.0%	0.3%
Benzo(a)pyrene	272	500	54.4%	291	500	58.2%	6.7%
Indeno(1,2,3-cd)pyrene	331	500	66.2%	347	500	69.4%	4.7%
Dibenz(a,h)anthracene	403	500	80.6%	416	500	83.2%	3.2%
Benzo(g,h,i)perylene	410	500	82.0%	423	500	84.6%	3.1%
1-Methylnaphthalene	273	500	54.6%	294	500	58.8%	7.4%

**Semivolatile Surrogate Recovery**

	LCS	LCSD
d5-Nitrobenzene	37.1%	47.2%
2-Fluorobiphenyl	55.6%	66.0%
d14-p-Terphenyl	77.2%	82.0%
d4-1,2-Dichlorobenzene	32.2%	44.0%
d5-Phenol	48.0%	54.4%
2-Fluorophenol	50.9%	60.0%
2,4,6-Tribromophenol	83.7%	86.7%
d4-2-Chlorophenol	44.3%	52.5%

Results reported in  $\mu\text{g}/\text{kg}$

RPD calculated using sample concentrations per SW846.

4B  
SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

NR16MBS1

Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

ARI Job No: NR16

Project: BELLINGHAM BAY-RG HA

Lab File ID: 102203

Date Extracted: 10/08/08

Instrument ID: NT4

Date Analyzed: 10/22/08

Matrix: SOLID

Time Analyzed: 1304

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	NR16LCSS1	NR16LCSS1	102204	10/22/08
02	NR16LCSDS1	NR16LCSDS1	102205	10/22/08
03	RGH-SC-07-0-2'	NR16A	102206	10/22/08
04	RGH-SC-07-0-2' M	NR16AMS	102207	10/22/08
05	RGH-SC-07-0-2' M	NR16AMSD	102208	10/22/08
06	RGH-SC-07-2-4'	NR16B	102209	10/22/08
07	RGH-SC-07-4-6.8'	NR16C	102210	10/22/08
08	RGH-SC-08-0-2'	NR16D	102211	10/22/08
09	RGH-SC-08-2-4'	NR16E	102212	10/22/08
10	RGH-SC-09-0-2'	NR16G	102213	10/22/08
11	RGH-SC-09-2-4'	NR16H	102214	10/22/08
12	RGH-SC-09-4-5.5'	NR16I	102215	10/22/08
13	RGH-SC-08-4-5.5'	NR16F	102216	10/22/08
14	RGH-SC-07-2-4'	NR16B	102322	10/24/08
15	RGH-SC-08-2-4'	NR16E	102323	10/24/08
16	RGH-SC-09-2-4'	NR16H	102324	10/24/08
17	RGH-SC-09-4-5.5'	NR16I	102325	10/24/08
18	RGH-SC-08-4-5.5'	NR16F	102326	10/24/08
19				
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COMMENTS:

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**ORGANICS ANALYSIS DATA SHEET**

PSDDA Semivolatiles by SW8270D GC/MS

Page 1 of 2

Sample ID: MB-100808

METHOD BLANK

Lab Sample ID: MB-100808

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized:

Reported: 10/24/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

NA

Date Sampled: NA

Date Received: NA

Date Extracted: 10/08/08

Date Analyzed: 10/22/08 13:04

Instrument/Analyst: NT4/PK

GPC Cleanup: Yes

Sample Amount: 25.0 g

Final Extract Volume: 0.5 mL

Dilution Factor: 1.00

Percent Moisture: NA

CAS Number	Analyte	MDL	RL	Result
108-95-2	Phenol	14	20	< 20 U
541-73-1	1,3-Dichlorobenzene	7.4	20	< 20 U
106-46-7	1,4-Dichlorobenzene	7.4	20	< 20 U
100-51-6	Benzyl Alcohol	14	20	< 20 U
95-50-1	1,2-Dichlorobenzene	7.9	20	< 20 U
95-48-7	2-Methylphenol	14	20	< 20 U
106-44-5	4-Methylphenol	13	20	< 20 U
67-72-1	Hexachloroethane	7.2	20	< 20 U
105-67-9	2,4-Dimethylphenol	15	20	< 20 U
65-85-0	Benzoic Acid	120	200	< 200 U
120-82-1	1,2,4-Trichlorobenzene	9.1	20	< 20 U
91-20-3	Naphthalene	8.7	20	< 20 U
87-68-3	Hexachlorobutadiene	8.1	20	< 20 U
91-57-6	2-Methylnaphthalene	8.2	20	< 20 U
131-11-3	Dimethylphthalate	7.8	20	< 20 U
208-96-8	Acenaphthylene	8.7	20	< 20 U
83-32-9	Acenaphthene	8.2	20	< 20 U
132-64-9	Dibenzofuran	7.6	20	< 20 U
84-66-2	Diethylphthalate	16	20	< 20 U
86-73-7	Fluorene	9.0	20	< 20 U
86-30-6	N-Nitrosodiphenylamine	8.7	20	< 20 U
118-74-1	Hexachlorobenzene	8.0	20	< 20 U
87-86-5	Pentachlorophenol	48	100	< 100 U
85-01-8	Phenanthrene	8.4	20	< 20 U
120-12-7	Anthracene	7.7	20	< 20 U
84-74-2	Di-n-Butylphthalate	12	20	< 20 U
206-44-0	Fluoranthene	7.9	20	< 20 U
129-00-0	Pyrene	7.8	20	< 20 U
85-68-7	Butylbenzylphthalate	11	20	< 20 U
56-55-3	Benzo (a) anthracene	5.9	20	< 20 U
117-81-7	bis (2-Ethylhexyl) phthalate	11	20	< 20 U
218-01-9	Chrysene	6.6	20	< 20 U
117-84-0	Di-n-Octyl phthalate	8.3	20	< 20 U
205-99-2	Benzo (b) fluoranthene	9.5	20	< 20 U
207-08-9	Benzo (k) fluoranthene	9.3	20	< 20 U
50-32-8	Benzo (a) pyrene	8.2	20	< 20 U
193-39-5	Indeno (1,2,3-cd) pyrene	8.6	20	< 20 U
53-70-3	Dibenz (a,h) anthracene	8.6	20	< 20 U
191-24-2	Benzo (g,h,i) perylene	6.8	20	< 20 U

**ORGANICS ANALYSIS DATA SHEET**  
 PSDDA Semivolatiles by SW8270D GC/MS  
 Page 2 of 2

Sample ID: MB-100808  
 METHOD BLANK

Lab Sample ID: MB-100808  
 LIMS ID: 08-25458  
 Matrix: Sediment  
 Date Analyzed: 10/22/08 13:04

QC Report No: NR16-Hart Crowser, Inc.  
 Project: BELLINGHAM BAY-RG HALEY  
 NA

CAS Number	Analyte	MDL	RL	Result
90-12-0	1-Methylnaphthalene	7.2	20	< 20 U

Reported in  $\mu\text{g}/\text{kg}$  (ppb)

**Semivolatile Surrogate Recovery**

d5-Nitrobenzene	44.0%	2-Fluorobiphenyl	60.8%
d14-p-Terphenyl	88.8%	d4-1,2-Dichlorobenzene	46.0%
d5-Phenol	51.5%	2-Fluorophenol	60.8%
2,4,6-Tribromophenol	79.7%	d4-2-Chlorophenol	52.0%

**NWTPH-Dx**



**ORGANICS ANALYSIS DATA SHEET  
TOTAL DIESEL RANGE HYDROCARBONS**

NWTPHD by GC/FID

Page 1 of 1

Matrix: Sediment

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Received: 09/25/08

Data Release Authorized:

Reported: 10/13/08

ARI ID	Sample ID	Analysis Date	DL	Range	Result	RL	MDL
MB-100708 08-25458	Method Blank	10/08/08 FID3A	1.0	Diesel Motor Oil HC ID o-Terphenyl	< 5.0 U < 10 U --- 81.3%	5.0 10	5.0 10
NR16A 08-25458	RGH-SC-07-0-2'	10/08/08 FID3A	1.0	Diesel Motor Oil HC ID o-Terphenyl	63 170 DRO/MOTOR OIL 79.6%	9.3 18	9.3 18
NR16B 08-25459	RGH-SC-07-2-4'	10/08/08 FID3A	1.0	Diesel Motor Oil HC ID o-Terphenyl	210 190 DRO/RRO 89.8%	16 33	16 33
NR16C 08-25460	RGH-SC-07-4-6.8'	10/08/08 FID3A	1.0	Diesel Motor Oil HC ID o-Terphenyl	330 650 DRO/MOTOR OIL 88.0%	12 25	12 25
NR16D 08-25461	RGH-SC-08-0-2'	10/08/08 FID3A	2.0	Diesel Motor Oil HC ID o-Terphenyl	210 670 DRO/MOTOR OIL 79.1%	25 50	25 50
NR16E 08-25462	RGH-SC-08-2-4'	10/08/08 FID3A	2.0	Diesel Motor Oil HC ID o-Terphenyl	320 800 DRO/MOTOR OIL 78.7%	31 62	31 62
NR16F 08-25463	RGH-SC-08-4-5.5'	10/08/08 FID3A	1.0	Diesel Motor Oil HC ID o-Terphenyl	670 690 DRO/MOTOR OIL 91.1%	16 32	16 32
NR16G 08-25464	RGH-SC-09-0-2'	10/08/08 FID3A	5.0	Diesel Motor Oil HC ID o-Terphenyl	300 500 DRO/MOTOR OIL 77.8%	56 110	56 110
NR16H 08-25465	RGH-SC-09-2-4'	10/08/08 FID3A	5.0	Diesel Motor Oil HC ID o-Terphenyl	130 300 DRO/MOTOR OIL 77.7%	55 110	55 110
NR16I 08-25466	RGH-SC-09-4-5.5'	10/08/08 FID3A	2.0	Diesel Motor Oil HC ID o-Terphenyl	360 950 DRO/MOTOR OIL 81.3%	22 44	22 44

Reported in mg/kg (ppm)

Diesel quantitation on total peaks in the range from C12 to C24.

Motor Oil quantitation on total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

**TPHD SURROGATE RECOVERY SUMMARY**

Matrix: Sediment

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

<u>Client ID</u>	<u>OTER</u>	<u>TOT OUT</u>
100708MBS	81.3%	0
100708LCS	86.7%	0
100708LCSD	83.6%	0
RGH-SC-07-0-2'	79.6%	0
RGH-SC-07-0-2' MS	82.7%	0
RGH-SC-07-0-2' MSD	89.8%	0
RGH-SC-07-2-4'	89.8%	0
RGH-SC-07-4-6.8'	88.0%	0
RGH-SC-08-0-2'	79.1%	0
RGH-SC-08-2-4'	78.7%	0
RGH-SC-08-4-5.5'	91.1%	0
RGH-SC-09-0-2'	77.8%	0
RGH-SC-09-2-4'	77.7%	0
RGH-SC-09-4-5.5'	81.3%	0

**LCS/MB LIMITS      QC LIMITS**

(OTER) = o-Terphenyl

(52-121)


(48-119)

Prep Method: SW3546  
Log Number Range: 08-25458 to 08-25466

**ORGANICS ANALYSIS DATA SHEET**

NWTPHD by GC/FID  
Page 1 of 1

Sample ID: RGH-SC-07-0-2'  
MS/MSD

Lab Sample ID: NR16A  
LIMS ID: 08-25458  
Matrix: Sediment  
Data Release Authorized:   
Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08  
Date Received: 09/25/08

Date Extracted MS/MSD: 10/07/08

Sample Amount MS: 5.48 g-dry-wt  
MSD: 5.67 g-dry-wt

Date Analyzed MS: 10/08/08 16:02  
MSD: 10/08/08 16:33

Final Extract Volume MS: 1.0 mL  
MSD: 1.0 mL

Instrument/Analyst MS: FID3A/MS  
MSD: FID3A/MS

Dilution Factor MS: 1.00  
MSD: 1.00  
Percent Moisture: 46.6%

Range	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Diesel	62.8	421	274	131%	282	265	82.7%	39.5%

**TPHD Surrogate Recovery**

	MS	MSD
o-Terphenyl	82.7%	89.8%

Results reported in mg/kg  
RPD calculated using sample concentrations per SW846.

**ORGANICS ANALYSIS DATA SHEET**

NWTPHD by GC/FID

Page 1 of 1

Sample ID: LCS-100708  
LCS/LCSD

Lab Sample ID: LCS-100708

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: *[Signature]*

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Date Sampled: NA

Date Received: NA

Date Extracted LCS/LCSD: 10/07/08

Sample Amount LCS: 10.0 g

LCSD: 10.0 g

Date Analyzed LCS: 10/08/08 15:00

Final Extract Volume LCS: 1.0 mL

LCSD: 10/08/08 15:15

LCSD: 1.0 mL

Instrument/Analyst LCS: FID3A/MS

Dilution Factor LCS: 1.00

LCSD: FID3A/MS

LCSD: 1.00

Range	Spike		LCS		Spike		LCSD	RPD
	LCS	Added-LCS	Recovery	LCSD	Added-LCSD	Recovery		
Diesel	120	150	80.0%	117	150	78.0%	2.5%	

**TPHD Surrogate Recovery**

	LCS	LCSD
o-Terphenyl	86.7%	83.6%

Results reported in mg/kg

RPD calculated using sample concentrations per SW846.

4  
TPH METHOD BLANK SUMMARY

BLANK NO.

NR16MBS1

Lab Name: ANALYTICAL RESOURCES, INC

Client: HART CROWSER, INC.

SDG No.: NR16

Project No.: BELLINGHAM BAY

Date Extracted: 10/07/08

Matrix: SOLID

Date Analyzed : 10/08/08

Instrument ID : FID3A

Time Analyzed : 1444

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS, and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
	=====	=====	=====
01	NR16LCSS1	NR16LCSS1	10/08/08
02	NR16LCSDS1	NR16LCSDS1	10/08/08
03	RGH-SC-07-0-	NR16A	10/08/08
04	RGH-SC-07-0-	NR16AMS	10/08/08
05	RGH-SC-07-0-	NR16AMSD	10/08/08
06	RGH-SC-07-2-	NR16B	10/08/08
07	RGH-SC-07-4-	NR16C	10/08/08
08	RGH-SC-08-0-	NR16D	10/08/08
09	RGH-SC-08-2-	NR16E	10/08/08
10	RGH-SC-08-4-	NR16F	10/08/08
11	RGH-SC-09-0-	NR16G	10/08/08
12	RGH-SC-09-2-	NR16H	10/08/08
13	RGH-SC-09-4-	NR16I	10/08/08

## **METALS**

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

Sample ID: RGH-SC-07-0-2'  
SAMPLE

Lab Sample ID: NR16A

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: *[Signature]*

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 50.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	10/08/08	7471A	10/10/08	7439-97-6	Mercury	0.0094	0.09	0.20	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

Sample ID: RGH-SC-07-0-2'  
DUPLICATE

Lab Sample ID: NR16A

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized *DA*

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

**MATRIX DUPLICATE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7471A	0.20	0.21	4.9%	+/- 0.09	L

Reported in mg/kg-dry

\*-Control Limit Not Met

L-RPD Invalid, Limit = Detection Limit



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1

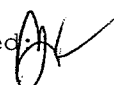
Sample ID: RGH-SC-07-0-2'

**MATRIX SPIKE**

Lab Sample ID: NR16A

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

**MATRIX SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7471A	0.20	1.13	0.920	101%	

Reported in mg/kg-dry

N-Control Limit Not Met

H-% Recovery Not Applicable, Sample Concentration Too High

NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%



INORGANICS ANALYSIS DATA SHEET

TOTAL METALS


Page 1 of 1

Sample ID: RGH-SC-07-2-4'  
SAMPLE

Lab Sample ID: NR16B

LIMS ID: 08-25459

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 28.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.015	0.2	0.2	U

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Page 1 of 1


Sample ID: RGH-SC-07-4-6.8'

SAMPLE

Lab Sample ID: NR16C

LIMS ID: 08-25460

Matrix: Sediment

Data Release Authorized 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 41.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.0088	0.09	0.09	U

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

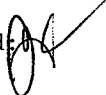
Page 1 of 1

Sample ID: RGH-SC-08-0-2'  
SAMPLE

Lab Sample ID: NR16D

LIMS ID: 08-25461

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 36.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.011	0.1	1.0	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-08-2-4'  
SAMPLE

Lab Sample ID: NR16E

LIMS ID: 08-25462

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 33.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.013	0.1	0.9	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-08-4-5.5'  
SAMPLE

Lab Sample ID: NR16F

LIMS ID: 08-25463

Matrix: Sediment

Data Release Authorized 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 30.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.015	0.2	11.3	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: RGH-SC-09-0-2'  
SAMPLE

Lab Sample ID: NR16G

LIMS ID: 08-25464

Matrix: Sediment

Data Release Authorized 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 42.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.0092	0.09	0.56	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit



INORGANICS ANALYSIS DATA SHEET

TOTAL METALS

Page 1 of 1


Sample ID: RGH-SC-09-2-4'  
SAMPLE

Lab Sample ID: NR16H

QC Report No: NR16-Hart Crowser, Inc.  
Project: BELLINGHAM BAY-RG HALEY

LIMS ID: 08-25465

Matrix: Sediment

Data Release Authorized: 

Date Sampled: 09/24/08

Reported: 10/13/08

Date Received: 09/25/08

Percent Total Solids: 40.7%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.010	0.1	1.5	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit



**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

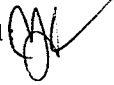
Page 1 of 1

Sample ID: **RGH-SC-09-4-5.5'**  
**SAMPLE**

Lab Sample ID: NR16I

LIMS ID: 08-25466

Matrix: Sediment

Data Release Authorized 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: 09/24/08

Date Received: 09/25/08

Percent Total Solids: 42.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.010	0.1	1.9	

Reported in mg/kg-dry (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: NR16MB

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: NA

Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	10/08/08	7471A	10/10/08	7439-97-6	Mercury	0.0050	0.05	0.05	U

Reported in mg/kg (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: NR16LCS

LIMS ID: 08-25458

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: NA

Date Received: NA

**BLANK SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7471A	1.05	1.00	105%	

Reported in mg/kg-dry

N-Control limit not met

NA-Not Applicable, Analyte Not Spiked

Control Limits: 80-120%

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**

Sample ID: METHOD BLANK

Page 1 of 1

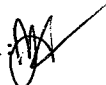
Lab Sample ID: NR16MB

QC Report No: NR16-Hart Crowser, Inc.

LIMS ID: 08-25459

Project: BELLINGHAM BAY-RG HALEY

Matrix: Sediment

Data Release Authorized: 

Date Sampled: NA

Reported: 10/13/08

Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	MDL	RL	Result	Q
CLP	09/30/08	7471A	10/06/08	7439-97-6	Mercury	0.0050	0.05	0.05	U

Reported in mg/kg (ppm).

U-Analyte undetected at given RL

RL-Reporting Limit

**INORGANICS ANALYSIS DATA SHEET**

**TOTAL METALS**


Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: NR16LCS

LIMS ID: 08-25459

Matrix: Sediment

Data Release Authorized: 

Reported: 10/13/08

QC Report No: NR16-Hart Crowser, Inc.

Project: BELLINGHAM BAY-RG HALEY

Date Sampled: NA

Date Received: NA

**BLANK SPIKE QUALITY CONTROL REPORT**

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7471A	1.12	1.00	112%	

Reported in mg/kg-dry

N-Control limit not met

NA-Not Applicable, Analyte Not Spiked

Control Limits: 80-120%

# GENERAL CHEMISTRY

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized  
Reported: 11/10/08

A handwritten signature in black ink, appearing to be 'M' or 'M.', written over the 'Data Release Authorized' text.

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Client ID: RGH-SC-07-0-2'  
ARI ID: 08-25458 NR16A

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	53.80
Total Organic Carbon	10/29/08 102908#1	Plumb, 1981	Percent	0.020	11.3

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Client ID: RGH-SC-07-2-4'  
ARI ID: 08-25459 NR16B

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	29.70
Total Organic Carbon	11/06/08 110608#1	Plumb, 1981	Percent	0.210	38.6

RL Analytical reporting limit  
U Undetected at reported detection limit



SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08


Client ID: RGH-SC-07-4-6.8'  
ARI ID: 08-25460 NR16C

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	35.60
Total Organic Carbon	10/29/08 102908#1	Plumb,1981	Percent	0.020	22.6

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Client ID: RGH-SC-08-0-2'  
ARI ID: 08-25461 NR16D

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	38.40
Total Organic Carbon	10/29/08 102908#1	Plumb, 1981	Percent	0.020	14.9

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08


Client ID: RGH-SC-08-2-4'  
ARI ID: 08-25462 NR16E

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	33.80
Total Organic Carbon	10/29/08 102908#1	Plumb, 1981	Percent	0.020	27.3

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

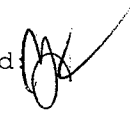
Client ID: RGH-SC-08-4-5.5'  
ARI ID: 08-25463 NR16F

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	29.30
Total Organic Carbon	10/29/08 102908#1	Plumb, 1981	Percent	0.020	18.9

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08


Client ID: RGH-SC-09-0-2'  
ARI ID: 08-25464 NR16G

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	43.40
Total Organic Carbon	10/29/08 102908#1	Plumb,1981	Percent	0.020	3.69

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08


Client ID: RGH-SC-09-2-4'  
ARI ID: 08-25465 NR16H

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	42.10
Total Organic Carbon	10/29/08 102908#1	Plumb, 1981	Percent	0.020	7.41

RL Analytical reporting limit  
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08


Client ID: RGH-SC-09-4-5.5'  
ARI ID: 08-25466 NR16I

Analyte	Date	Method	Units	RL	Sample
Total Solids	09/29/08 092908#2	EPA 160.3	Percent	0.01	41.30
Total Organic Carbon	10/29/08 102908#1	Plumb,1981	Percent	0.020	5.32

RL Analytical reporting limit  
U Undetected at reported detection limit

METHOD BLANK RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08


Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: NA  
Date Received: NA

Analyte	Date	Units	Blank
Total Solids	09/29/08	Percent	< 0.01 U
	09/29/08		< 0.01 U
	09/29/08		< 0.01 U
Total Organic Carbon	10/29/08	Percent	< 0.020 U
	11/06/08		< 0.020 U



LAB CONTROL RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: NA  
Date Received: NA

Analyte	Date	Units	LCS	Spike Added	Recovery
Total Organic Carbon	10/29/08	Percent	0.486	0.500	97.2%
	11/06/08		0.520	0.500	104.0%

STANDARD REFERENCE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.




Matrix: Sediment  
Data Release Authorized: *[Signature]*  
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: NA  
Date Received: NA

Analyte/SRM ID	Date	Units	SRM	True Value	Recovery
Total Organic Carbon	10/29/08	Percent	3.59	3.35	107.2%
NIST #8704	11/06/08		3.46	3.35	103.3%

REPLICATE RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.




Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Analyte	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: NR16A Client ID: RGH-SC-07-0-2'					
Total Solids	09/29/08	Percent	53.80	50.20 54.70	4.5%
Total Organic Carbon	10/29/08	Percent	11.3	11.2 11.5	1.3%

MS/MSD RESULTS-CONVENTIONALS  
NR16-Hart Crowser, Inc.



Matrix: Sediment  
Data Release Authorized:   
Reported: 11/10/08

Project: BELLINGHAM BAY-RG HALEY  
Event: NA  
Date Sampled: 09/24/08  
Date Received: 09/25/08

Analyte	Date	Units	Sample	Spike	Spike Added	Recovery
ARI ID: NR16A Client ID: RGH-SC-07-0-2'						
Total Organic Carbon	10/29/08	Percent	11.3	25.6	16.1	89.0%

**TOTAL SOLIDS**

Extractions Total Solids-extts  
Data By: Alex Choeng  
Created: 10/ 7/08

Worklist: 1809  
Analyst: NTC  
Comments:

	ARI ID CLIENT ID	Tare Wt (g)	Wet Wt (g)	Dry Wt (g)	% Solids	pH
1.	NR16A 08-25458 RGH-SC-07-0-2'	1.16	13.26	7.62	53.4	NR
2.	NR16B 08-25459 RGH-SC-07-2-4'	1.18	11.98	4.29	28.8	NR
3.	NR16C 08-25460 RGH-SC-07-4-6.8'	1.16	14.92	6.59	39.5	NR
4.	NR16D 08-25461 RGH-SC-08-0-2'	1.16	13.08	5.70	38.1	NR
5.	NR16E 08-25462 RGH-SC-08-2-4'	1.16	11.62	4.35	30.5	NR
6.	NR16F 08-25463 RGH-SC-08-4-5.5'	1.16	11.74	4.29	29.6	NR
7.	NR16G 08-25464 RGH-SC-09-0-2'	1.16	12.52	6.16	44.0	NR
8.	NR16H 08-25465 RGH-SC-09-2-4'	1.18	11.34	5.61	43.6	NR
9.	NR16I 08-25466 RGH-SC-09-4-5.5'	1.16	12.20	5.97	43.6	NR

Solids Data Entry Report  
Date: 10/01/08

Checked by: MM Date: 10/01/08  
Data Analyst: DM

Solids Determination performed on 09/30/08 by MH

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
NR16	A	RGH-SC-07-0-2'	1.053	10.281	5.740	50.79
NR16	B	RGH-SC-07-2-4'	1.028	10.429	3.747	28.92
NR16	C	RGH-SC-07-4-6.8'	1.019	10.650	5.057	41.93
NR16	D	RGH-SC-08-0-2'	1.022	10.339	4.449	36.78
NR16	E	RGH-SC-08-2-4'	1.006	10.708	4.216	33.09
NR16	F	RGH-SC-08-4-5.5'	1.009	10.243	3.834	30.59
NR16	G	RGH-SC-09-0-2'	1.045	10.212	4.949	42.59
NR16	H	RGH-SC-09-2-4'	1.034	10.191	4.758	40.67
NR16	I	RGH-SC-09-4-5.5'	1.017	10.951	5.234	42.45



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants

October 30, 2008

Mr. Roger McGinnis  
Hart Crowser, Inc.  
1700 Westlake Avenue N. Suite 200  
Seattle, WA 98109-3256

**RE: Project: Bellingham Bay – 17330-17**  
**ARI Job No: NQ49**

Dear Mr. McGinnis:

Please find enclosed the original Chain-of-Custody record, sample receipt documentation, and the final data package for the samples from the project referenced above. Select samples were placed on hold pending further instructions.

The samples were subcontracted to TestAmerica, West Sacramento and analyzed for Dioxin/Furans, as requested on the COC.

The data for the Dioxin and Furans analysis has been included in this package.

An electronic copy of this data package and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Respectfully,  
ANALYTICAL RESOURCES, INC.

A handwritten signature in black ink, appearing to read "Kelly Bottem".

Kelly Bottem  
Client Services Manager  
206-695-6211  
[kellyb@arilabs.com](mailto:kellyb@arilabs.com)  
[www.arilabs.com](http://www.arilabs.com)

Enclosures

cc: files NQ49



October 13, 2008

**TestAmerica Project Number: G8I240290**

Kelly Bottem  
Analytical Resources Inc  
4611 S 134th Place Suite 100  
Tukwila, WA 98168

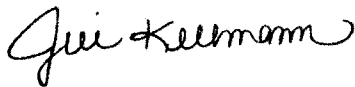
Dear Ms. Bottem,

This report contains the analytical results for the samples received under chain of custody by TestAmerica on September 24, 2008. These samples are associated with your Bellingham Bay project.

The test results in this report meet all NELAC requirements for parameters that accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4402.

Sincerely,



Jill Kellmann  
Project Manager

## Case Narrative

### TestAmerica West Sacramento Project Number G8I240290

#### General comments

The samples were received at 11 degrees Celsius. The laboratory was instructed to proceed with the analysis on September 26, 2008.

Sample BBDX-SS-04 was received in a Ziploc bag with a cracked lid. The lid was taped in sample receiving.

#### **SOLID, 1613B, Dioxins/Furans**

Sample(s): 1, 2, 3, 4, 5, 6

The samples required a confirmation analysis (CON) for 2,3,7,8-TCDF which was performed on October 10, and 11, 2008.

The laboratory control sample (LCS) associated with the samples has recoveries for 1,2,3,6,7,8-HxcDF and 1,2,3,4,6,7,8-HpCDF above the established limits indicating a high bias. The LCS was re-injected and confirmed the elevated results. Following consultation with the client, the laboratory was instructed to report this data set.

Sample(s): 2

The above sample exhibited elevated noise or matrix interferences for 2,3,7,8-TCDF requiring the detection limit to be raised appropriately. This analyte is flagged with a "G" qualifier.

Sample(s): 3

The analyte 2,3,7,8-TCDF has been qualified with a "JA" flag as the ion abundance ratio is outside of criteria. The analyte has been reported as an "estimated maximum possible concentration" (EMPC) because the quantitation is based on the theoretical ion abundance ration for this analyte.

There are no other anomalies associated with this project.

## TestAmerica Laboratories West Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	New York*	11666
Arizona	AZ0616	Oregon*	CA 200005
Arkansas	04-067-0	Pennsylvania	68-1272
California*	01119CA	South Carolina	87014002
Colorado	NA	Texas	TX 270-2004A
Connecticut	PH-0691	Utah*	QUAN1
Florida*	E87570	Virginia	00178
Georgia	960	Washington	C087
Hawaii	NA	West Virginia	9930C, 334
Kansas*	E10375	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Michigan	9947	USACE	NA
Nevada	CA44	USDA Foreign Plant	37-82605
New Jersey*	CA005	USDA Foreign Soil	S-46613

\*NELAP accredited. A more detailed parameter list is available upon request. Updated 9/21/07

### QC Parameter Definitions

**QC Batch:** The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

**Method Blank:** An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

**Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD):**

An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also be used to evaluate the precision of the process.

**Duplicate Sample (DU):** Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

**Surrogates:** Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

**Matrix Spike and Matrix Spike Duplicate (MS/MSD):** An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

**Isotope Dilution:** For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

**Control Limits:** The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

## Sample Summary

### TestAmerica West Sacramento Project Number G8I240290

<u>WO#</u>	<u>Sample #</u>	<u>Client Sample ID</u>	<u>Sampling Date</u>	<u>Received Date</u>
KXH9D	1	BBDX-SS-01	9/19/2008	9/24/2008 09:20 AM
KXH9W	2	BBDX-SS-02	9/19/2008	9/24/2008 09:20 AM
KXH9X	3	BBDX-SS-03	9/19/2008	9/24/2008 09:20 AM
KXH90	4	BBDX-SS-04	9/19/2008	9/24/2008 09:20 AM
KXH91	5	BBDX-SS-05	9/18/2008	9/24/2008 09:20 AM
KXH93	6	BBDX-SS-06	9/18/2008	9/24/2008 09:20 AM

#### Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**SUBCONTRACTOR ANALYSIS REQUEST**  
 CUSTODY TRANSFER 09/23/08



ARI Project: NQ49

Laboratory: Test America  
 Lab Contact: Karen Dahl  
 Lab Address: 980 RIVERSIDE PARKWAY  
 WEST SACRAMENTO, CA 95605  
 Phone: 916-373-5600  
 Fax:

ARI Client: Hart Crowser, Inc.  
 Project ID: BELLINGHAM BAY  
 ARI PM: Kelly Bottem  
 Phone: 206-695-6211  
 Fax: 206-695-6201

Analytical Protocol: In-house  
 Special Instructions:

Requested Turn Around: **10/07/08**  
 Fax Results (Y/N): **Yes**

**Limits of Liability.** Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
08-25130-NQ49A	BBDx-SS-01	09/19/08	Soil	1	Dioxins/Furans 8290 (Su)
Special Instructions: None					
08-25131-NQ49B	BBDx-SS-02	09/19/08	Soil	1	Dioxins/Furans 8290 (Su)
Special Instructions: None					
08-25132-NQ49C	BBDx-SS-03	09/19/08	Soil	1	Dioxins/Furans 8290 (Su)
Special Instructions: None					
08-25133-NQ49D	BBDx-SS-04	09/19/08	Soil	1	Dioxins/Furans 8290 (Su)
Special Instructions: None					
08-25134-NQ49E	BBDx-SS-05	09/18/08	Soil	1	Dioxins/Furans 8290 (Su)
Special Instructions: None					
08-25135-NQ49F	BBDx-SS-06	09/18/08	Soil	1	Dioxins/Furans 8290 (Su)
Special Instructions: None					

- Rec'd w/ a cracked lid. - CV9/24/08

Carrier	Airbill	Date
Relinquished by <i>K. Dahl</i>	Company <b>ARI</b>	Date <b>9/23/08</b>
Received by <i>Chengke</i>	Company <b>TAC-W.Sec</b>	Date <b>9/24/08</b>
		Time <b>1115</b>
		Time <b>1145</b>

CLIENT ART PM VK LOG # 54373

LOT# (QUANTIMS ID) G8I240290 QUOTE# 80669 LOCATION WF1

DATE RECEIVED 9/24/09 TIME RECEIVED 0920 Initials EV Date 9/24/09

- DELIVERED BY
- |   |   |  |
|---|---|--|
| <input type="checkbox"/> FEDEX          | <input type="checkbox"/> CA OVERNIGHT     | <input type="checkbox"/> CLIENT              |
| <input type="checkbox"/> AIRBORNE       | <input type="checkbox"/> GOLDENSTATE      | <input type="checkbox"/> DHL                 |
| <input checked="" type="checkbox"/> UPS | <input type="checkbox"/> BAX GLOBAL       | <input type="checkbox"/> GO-GETTERS          |
| <input type="checkbox"/> TAL COURIER    | <input type="checkbox"/> VALLEY LOGISTICS | <input type="checkbox"/> MORGAN HILL COURIER |
| <input type="checkbox"/> OTHER          |   |  |

CUSTODY SEAL STATUS  INTACT  BROKEN  N/A

CUSTODY SEAL #(S) \_\_\_\_\_

SHIPPING CONTAINER(S)  TAL  CLIENT  N/A

TEMPERATURE RECORD (IN °C) IR 4  5  OTHER \_\_\_\_\_

COC #(S) \_\_\_\_\_

TEMPERATURE BLANK Observed: 10 Corrected: \_\_\_\_\_

SAMPLE TEMPERATURE

Observed: 10 9 10 Average: 10 Corrected Average: 11

COLLECTOR'S NAME:  Verified from COC  Not on COC

pH MEASURED  YES  ANOMALY  N/A

LABELLED BY: \_\_\_\_\_

LABELS CHECKED BY: \_\_\_\_\_

PEER REVIEW  NA

SHORT HOLD TEST NOTIFICATION

SAMPLE RECEIVING

WETCHEM  N/A

VOA-ENCORES  N/A

METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL  N/A

COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES  N/A

CLOUSEAU  TEMPERATURE EXCEEDED (2 °C - 6 °C)<sup>1</sup>  N/A

WET ICE  BLUE ICE  GEL PACK  NO COOLING AGENTS USED  PM NOTIFIED

Notes: \_\_\_\_\_

<sup>1</sup> Acceptable temperature range for State of Wisconsin samples is ≤4°C.

LEAVE NO SPACES BLANK. USE "N/A" IF NOT APPLICABLE.

Lot

ID:

68I240290

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
VOAh*	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
___CGJ																				
500CGJ	/	/	/	/	/	/														
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
___"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				

h = hydrochloric acid    s = sulfuric acid    na = sodium hydroxide    n = nitric acid    zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOAs

Analytical Resources Inc

Client Sample ID: BBDX-SS-01

Trace Level Organic Compounds

Lot-Sample #....: G8I240290-001    Work Order #....: KXH9D2AC    Matrix.....: SOLID  
 Date Sampled....: 09/19/08    Date Received...: 09/24/08  
 Prep Date.....: 10/07/08    Analysis Date...: 10/10/08  
 Prep Batch #....: 8281488  
 Dilution Factor: 1  
 % Moisture.....: 59

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.32	pg/g	EPA-5 1613B
<b>Total TCDD</b>	<b>4.7</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDD	ND	0.61	pg/g	EPA-5 1613B
<b>Total PeCDD</b>	<b>6.3</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDD	ND	2.1	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	ND	1.5	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	1.2 J		pg/g	EPA-5 1613B
<b>Total HxCDD</b>	<b>19</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDD	33		pg/g	EPA-5 1613B
<b>Total HpCDD</b>	<b>68</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDD	280		pg/g	EPA-5 1613B
2,3,7,8-TCDF	0.98 J		pg/g	EPA-5 1613B
<b>Total TCDF</b>	<b>0.98</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDF	ND	0.34	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	0.37	pg/g	EPA-5 1613B
<b>Total PeCDF</b>	<b>0.76</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDF	0.59 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.34	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.32	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.24	pg/g	EPA-5 1613B
<b>Total HxCDF</b>	<b>3.8</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDF	4.7 J		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.39	pg/g	EPA-5 1613B
<b>Total HpCDF</b>	<b>17</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDF	16 J		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: BBDX-SS-01

Trace Level Organic Compounds

Lot-Sample #....: G8I240290-001 Work Order #....: KXH9D2AC Matrix.....: SOLID

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	82	(25 - 164)
13C-1,2,3,7,8-PeCDD	77	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	86	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	99	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	90	(23 - 140)
13C-OCDD	88	(17 - 157)
13C-2,3,7,8-TCDF	80	(24 - 169)
13C-1,2,3,7,8-PeCDF	76	(24 - 185)
13C-2,3,4,7,8-PeCDF	75	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	95	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	95	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	91	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	94	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	92	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	92	(26 - 152)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
37C14-2,3,7,8-TCDD	83	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: BBDX-SS-02

Trace Level Organic Compounds

Lot-Sample #....: G8I240290-002    Work Order #....: KXH9W2AC    Matrix.....: SOLID  
 Date Sampled...: 09/19/08    Date Received...: 09/24/08  
 Prep Date.....: 10/07/08    Analysis Date...: 10/10/08  
 Prep Batch #....: 8281488  
 Dilution Factor: 1  
 % Moisture.....: 49

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.31	pg/g	EPA-5 1613B
<b>Total TCDD</b>	<b>56</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDD	ND	0.92	pg/g	EPA-5 1613B
<b>Total PeCDD</b>	<b>64</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDD	2.3 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	4.8 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	ND	3.0	pg/g	EPA-5 1613B
<b>Total HxCDD</b>	<b>120</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDD	90		pg/g	EPA-5 1613B
<b>Total HpCDD</b>	<b>190</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>OCDD</b>	<b>630</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
2,3,7,8-TCDF	ND CON,G	2.6	pg/g	EPA-5 1613B
<b>Total TCDF</b>	<b>4.2</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDF	ND	0.35	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	0.57 J		pg/g	EPA-5 1613B
<b>Total PeCDF</b>	<b>2.1</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDF	1.4 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.45	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.37	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	0.35 J		pg/g	EPA-5 1613B
<b>Total HxCDF</b>	<b>18</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDF	11		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.69	pg/g	EPA-5 1613B
<b>Total HpCDF</b>	<b>50</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>OCDF</b>	<b>41</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>

(Continued on next page)

Analytical Resources Inc

Client Sample ID: BBDX-SS-02

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-002 Work Order #...: KXH9W2AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	82	(25 - 164)
13C-1,2,3,7,8-PeCDD	79	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	84	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	97	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	88	(23 - 140)
13C-OCDD	82	(17 - 157)
13C-2,3,7,8-TCDF	81	(24 - 169)
13C-1,2,3,7,8-PeCDF	78	(24 - 185)
13C-2,3,4,7,8-PeCDF	77	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	91	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	90	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	91	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	89	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	90	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	90	(26 - 152)
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
<u>SURROGATE</u>		
37Cl4-2,3,7,8-TCDD	90	(35 - 197)

**NOTE (S) :**

- Results and reporting limits have been adjusted for dry weight.
- J Estimated result. Result is less than the reporting limit.
- CON Confirmation analysis.
- G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

Analytical Resources Inc

Client Sample ID: BBDX-SS-03

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-003  
 Date Sampled...: 09/19/08  
 Prep Date.....: 10/07/08  
 Prep Batch #...: 8281488  
 Dilution Factor: 1  
 % Moisture.....: 61

Work Order #...: KXH9X2AC  
 Date Received...: 09/24/08  
 Analysis Date...: 10/10/08

Matrix.....: SOLID

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.62	pg/g	EPA-5 1613B
<b>Total TCDD</b>	<b>640</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDD	ND	3.2	pg/g	EPA-5 1613B
<b>Total PeCDD</b>	<b>780</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDD	16		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	22		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	16		pg/g	EPA-5 1613B
<b>Total HxCDD</b>	<b>1200</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDD	290		pg/g	EPA-5 1613B
<b>Total HpCDD</b>	<b>540</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDD	1300		pg/g	EPA-5 1613B
2,3,7,8-TCDF	23 JA, CON		pg/g	EPA-5 1613B
<b>Total TCDF</b>	<b>74</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDF	ND	1.2	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	1.9	pg/g	EPA-5 1613B
<b>Total PeCDF</b>	<b>11</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDF	4.2 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	1.7 J		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	1.1 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.67	pg/g	EPA-5 1613B
<b>Total HxCDF</b>	<b>30</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDF	27		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	2.7 J		pg/g	EPA-5 1613B
<b>Total HpCDF</b>	<b>130</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDF	110		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: BBDX-SS-03

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-003 Work Order #...: KXH9X2AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	82	(25 - 164)
13C-1,2,3,7,8-PeCDD	78	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	82	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	95	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	85	(23 - 140)
13C-OCDD	84	(17 - 157)
13C-2,3,7,8-TCDF	80	(24 - 169)
13C-1,2,3,7,8-PeCDF	78	(24 - 185)
13C-2,3,4,7,8-PeCDF	76	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	89	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	93	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	85	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	88	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	89	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	89	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	91	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

JA The analyte was positively identified, but the quantitation is an estimate.

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: BBDX-SS-04

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-004    Work Order #...: KXH902AC    Matrix.....: SOLID  
 Date Sampled...: 09/19/08    Date Received...: 09/24/08  
 Prep Date.....: 10/07/08    Analysis Date...: 10/10/08  
 Prep Batch #...: 8281488  
 Dilution Factor: 1  
 % Moisture.....: 62

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	1.5	pg/g	EPA-5 1613B
<b>Total TCDD</b>	<b>490</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDD	ND	3.4	pg/g	EPA-5 1613B
<b>Total PeCDD</b>	<b>660</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDD	14		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	18		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	13 J		pg/g	EPA-5 1613B
<b>Total HxCDD</b>	<b>1200</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDD	220		pg/g	EPA-5 1613B
<b>Total HpCDD</b>	<b>390</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDD	630		pg/g	EPA-5 1613B
2,3,7,8-TCDF	26 CON		pg/g	EPA-5 1613B
<b>Total TCDF</b>	<b>70</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDF	1.8 J		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	1.8	pg/g	EPA-5 1613B
<b>Total PeCDF</b>	<b>8.1</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDF	ND	2.6	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.53	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.85	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.40	pg/g	EPA-5 1613B
<b>Total HxCDF</b>	<b>9.8</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDF	16		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	1.3 J		pg/g	EPA-5 1613B
<b>Total HpCDF</b>	<b>62</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDF	47		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: BBDX-SS-04

Trace Level Organic Compounds

Lot-Sample #....: G8I240290-004 Work Order #....: KXH902AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	82	(25 - 164)
13C-1,2,3,7,8-PeCDD	79	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	85	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	93	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	84	(23 - 140)
13C-OCDD	77	(17 - 157)
13C-2,3,7,8-TCDF	81	(24 - 169)
13C-1,2,3,7,8-PeCDF	79	(24 - 185)
13C-2,3,4,7,8-PeCDF	76	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	92	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	91	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	88	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	88	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	84	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	85	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	86	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

CON Confirmation analysis.

Analytical Resources Inc

Client Sample ID: BBDX-SS-05

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-005    Work Order #...: KXH912AC    Matrix.....: SOLID  
 Date Sampled...: 09/18/08    Date Received...: 09/24/08  
 Prep Date.....: 10/07/08    Analysis Date...: 10/10/08  
 Prep Batch #...: 8281488  
 Dilution Factor: 1  
 % Moisture.....: 70

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	2.5 J		pg/g	EPA-5 1613B
Total TCDD	350		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	3.0 J		pg/g	EPA-5 1613B
Total PeCDD	430		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	8.0 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	ND	11	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	8.8 J		pg/g	EPA-5 1613B
Total HxCDD	610		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	140		pg/g	EPA-5 1613B
Total HpCDD	260		pg/g	EPA-5 1613B
OCDD	540		pg/g	EPA-5 1613B
2,3,7,8-TCDF	18 CON		pg/g	EPA-5 1613B
Total TCDF	49		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	ND	0.85	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	1.6 J		pg/g	EPA-5 1613B
Total PeCDF	7.0		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	2.2 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.88	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.74	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.44	pg/g	EPA-5 1613B
Total HxCDF	20		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	ND	10	pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.74	pg/g	EPA-5 1613B
Total HpCDF	32		pg/g	EPA-5 1613B
OCDF	31 J		pg/g	EPA-5 1613B

(Continued on next page)



Analytical Resources Inc

Client Sample ID: BBDX-SS-05

Trace Level Organic Compounds

Lot-Sample #....: G8I240290-005 Work Order #....: KXH912AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	77	(25 - 164)
13C-1,2,3,7,8-PeCDD	72	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	81	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	96	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	82	(23 - 140)
13C-OCDD	80	(17 - 157)
13C-2,3,7,8-TCDF	76	(24 - 169)
13C-1,2,3,7,8-PeCDF	74	(24 - 185)
13C-2,3,4,7,8-PeCDF	73	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	90	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	89	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	83	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	86	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	84	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	87	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	81	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

CON Confirmation analysis.

Analytical Resources Inc

Client Sample ID: BBDX-SS-06

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-006    Work Order #...: KXH932AC    Matrix.....: SOLID  
 Date Sampled...: 09/18/08    Date Received...: 09/24/08  
 Prep Date.....: 10/07/08    Analysis Date...: 10/10/08  
 Prep Batch #...: 8281488  
 Dilution Factor: 1  
 % Moisture.....: 52

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	1.5 J		pg/g	EPA-5 1613B
Total TCDD	220		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	ND	1.6	pg/g	EPA-5 1613B
Total PeCDD	280		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	ND	5.1	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	8.6 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	8.0 J		pg/g	EPA-5 1613B
Total HxCDD	430		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	120		pg/g	EPA-5 1613B
Total HpCDD	260		pg/g	EPA-5 1613B
OCDD	590		pg/g	EPA-5 1613B
2,3,7,8-TCDF	12 CON		pg/g	EPA-5 1613B
Total TCDF	24		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	ND	0.85	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	1.2	pg/g	EPA-5 1613B
Total PeCDF	ND	1.2	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	ND	1.7	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	1.1 J		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.56	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.43	pg/g	EPA-5 1613B
Total HxCDF	14		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	14		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.87	pg/g	EPA-5 1613B
Total HpCDF	55		pg/g	EPA-5 1613B
OCDF	42		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: BBDX-SS-06

Trace Level Organic Compounds

Lot-Sample #...: G8I240290-006 Work Order #...: KXH932AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	68	(25 - 164)
13C-1,2,3,7,8-PeCDD	62	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	68	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	80	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	72	(23 - 140)
13C-OCDD	69	(17 - 157)
13C-2,3,7,8-TCDF	66	(24 - 169)
13C-1,2,3,7,8-PeCDF	63	(24 - 185)
13C-2,3,4,7,8-PeCDF	62	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	76	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	77	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	73	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	74	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	72	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	73	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	69	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.  
 J Estimated result. Result is less than the reporting limit.  
 CON Confirmation analysis.

# QC DATA ASSOCIATION SUMMARY

G8I240290

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	EPA-5 1613B		8281488	
	SOLID	ASTM D 2216-90		8270241	8270155
002	SOLID	EPA-5 1613B		8281488	
	SOLID	ASTM D 2216-90		8270241	8270155
003	SOLID	EPA-5 1613B		8281488	
	SOLID	ASTM D 2216-90		8270241	8270155
004	SOLID	EPA-5 1613B		8281488	
	SOLID	ASTM D 2216-90		8270241	8270155
005	SOLID	EPA-5 1613B		8281488	
	SOLID	ASTM D 2216-90		8270241	8270155
006	SOLID	EPA-5 1613B		8281488	
	SOLID	ASTM D 2216-90		8270241	8270155

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8I240290  
 MB Lot-Sample #: G8J070000-488

Work Order #...: K0CPW1AA

Matrix.....: SOLID

Prep Date.....: 10/07/08

Analysis Date...: 10/10/08

Prep Batch #...: 8281488

Dilution Factor: 1

PARAMETER	RESULT	DETECTION		METHOD
		LIMIT	UNITS	
2,3,7,8-TCDD	ND	0.11	pg/g	EPA-5 1613B
Total TCDD	ND	0.11	pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	ND	0.22	pg/g	EPA-5 1613B
Total PeCDD	ND	0.22	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	ND	0.078	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	ND	0.070	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	ND	0.064	pg/g	EPA-5 1613B
Total HxCDD	ND	0.078	pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	ND	0.15	pg/g	EPA-5 1613B
Total HpCDD	ND	0.15	pg/g	EPA-5 1613B
OCDD	ND	1.6	pg/g	EPA-5 1613B
2,3,7,8-TCDF	ND	0.26	pg/g	EPA-5 1613B
Total TCDF	ND	0.26	pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	ND	0.12	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	0.13	pg/g	EPA-5 1613B
Total PeCDF	ND	0.19	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	ND	0.090	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.081	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.064	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.079	pg/g	EPA-5 1613B
Total HxCDF	ND	0.090	pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	ND	0.063	pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.087	pg/g	EPA-5 1613B
Total HpCDF	ND	0.087	pg/g	EPA-5 1613B
OCDF	ND	0.27	pg/g	EPA-5 1613B

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METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8I240290

Work Order #...: K0CPW1AA

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>DETECTION LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
	PERCENT	RECOVERY		
<u>INTERNAL STANDARDS</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
13C-2,3,7,8-TCDD	84	(25 - 164)		
13C-1,2,3,7,8-PeCDD	79	(25 - 181)		
13C-1,2,3,4,7,8-HxCDD	91	(32 - 141)		
13C-1,2,3,6,7,8-HxCDD	108	(28 - 130)		
13C-1,2,3,4,6,7,8-HpCDD	98	(23 - 140)		
13C-OCDD	94	(17 - 157)		
13C-2,3,7,8-TCDF	82	(24 - 169)		
13C-1,2,3,7,8-PeCDF	78	(24 - 185)		
13C-2,3,4,7,8-PeCDF	79	(21 - 178)		
13C-1,2,3,6,7,8-HxCDF	99	(26 - 123)		
13C-2,3,4,6,7,8-HxCDF	101	(28 - 136)		
13C-1,2,3,7,8,9-HxCDF	98	(29 - 147)		
13C-1,2,3,4,6,7,8-HpCDF	101	(28 - 143)		
13C-1,2,3,4,7,8,9-HpCDF	100	(26 - 138)		
13C-1,2,3,4,7,8-HxCDF	101	(26 - 152)		
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
37Cl4-2,3,7,8-TCDD	86	(35 - 197)		

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Trace Level Organic Compounds

Client Lot #...: G8I240290      Work Order #...: K0CPW1AD      Matrix.....: SOLID  
 LCS Lot-Sample#: G8J070000-488  
 Prep Date.....: 10/07/08      Analysis Date...: 10/15/08  
 Prep Batch #...: 8281488  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
2,3,7,8-TCDD	123	(67 - 158)	EPA-5 1613B
1,2,3,7,8-PeCDD	130	(70 - 142)	EPA-5 1613B
1,2,3,4,7,8-HxCDD	131	(70 - 164)	EPA-5 1613B
1,2,3,6,7,8-HxCDD	131	(76 - 134)	EPA-5 1613B
1,2,3,7,8,9-HxCDD	130	(64 - 162)	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	131	(70 - 140)	EPA-5 1613B
OCDD	136	(78 - 144)	EPA-5 1613B
2,3,7,8-TCDF	128	(75 - 158)	EPA-5 1613B
1,2,3,7,8-PeCDF	132	(80 - 134)	EPA-5 1613B
2,3,4,7,8-PeCDF	127	(68 - 160)	EPA-5 1613B
1,2,3,4,7,8-HxCDF	133	(72 - 134)	EPA-5 1613B
1,2,3,6,7,8-HxCDF	131 a	(84 - 130)	EPA-5 1613B
2,3,4,6,7,8-HxCDF	130	(70 - 156)	EPA-5 1613B
1,2,3,7,8,9-HxCDF	129	(78 - 130)	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	129 a	(82 - 122)	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	131	(78 - 138)	EPA-5 1613B
OCDF	130	(63 - 170)	EPA-5 1613B

(Continued on next page)

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Trace Level Organic Compounds

Client Lot #...: G8I240290  
 LCS Lot-Sample#: G8J070000-488

Work Order #...: K0CPW1AD

Matrix.....: SOLID

<u>INTERNAL STANDARD</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	63	(25 - 164)
13C-1,2,3,7,8-PeCDD	61	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	65	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	73	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	67	(23 - 140)
13C-OCDD	60	(17 - 157)
13C-2,3,7,8-TCDF	62	(24 - 169)
13C-1,2,3,7,8-PeCDF	57	(24 - 185)
13C-2,3,4,7,8-PeCDF	63	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	75	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	74	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	65	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	67	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	63	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	68	(26 - 152)
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	94	(35 - 197)

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Bold print denotes control parameters  
 a Spiked analyte recovery is outside stated control limits.  
 Results are from a re-injection confirming the elevated results for 1,2,3,6,7,8-HxCDF and 1,2,3,4,6,7,8-HpCDF.



LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #....: G8I240290      Work Order #....: KOCPWLAD      Matrix.....: SOLID  
 LCS Lot-Sample#: G8J070000-488  
 Prep Date.....: 10/07/08      Analysis Date...: 10/15/08  
 Prep Batch #....: 8281488  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE</u> <u>AMOUNT</u>	<u>MEASURED</u> <u>AMOUNT</u>	<u>UNITS</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>METHOD</u>
2,3,7,8-TCDD	20.0	24.6	pg/g	123	EPA-5 1613B
1,2,3,7,8-PeCDD	100	130	pg/g	130	EPA-5 1613B
1,2,3,4,7,8-HxCDD	100	131	pg/g	131	EPA-5 1613B
1,2,3,6,7,8-HxCDD	100	131	pg/g	131	EPA-5 1613B
1,2,3,7,8,9-HxCDD	100	130	pg/g	130	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	100	131	pg/g	131	EPA-5 1613B
OCDD	200	272	pg/g	136	EPA-5 1613B
2,3,7,8-TCDF	20.0	25.6	pg/g	128	EPA-5 1613B
1,2,3,7,8-PeCDF	100	132	pg/g	132	EPA-5 1613B
2,3,4,7,8-PeCDF	100	127	pg/g	127	EPA-5 1613B
1,2,3,4,7,8-HxCDF	100	133	pg/g	133	EPA-5 1613B
1,2,3,6,7,8-HxCDF	100	131 a	pg/g	131	EPA-5 1613B
2,3,4,6,7,8-HxCDF	100	130	pg/g	130	EPA-5 1613B
1,2,3,7,8,9-HxCDF	100	129	pg/g	129	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	100	129 a	pg/g	129	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	100	131	pg/g	131	EPA-5 1613B
OCDF	200	261	pg/g	130	EPA-5 1613B

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LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #...: G8I240290      Work Order #...: KOCPW1AD      Matrix.....: SOLID  
 LCS Lot-Sample#: G8J070000-488

<u>INTERNAL STANDARD</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	63	(25 - 164)
13C-1,2,3,7,8-PeCDD	61	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	65	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	73	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	67	(23 - 140)
13C-OCDD	60	(17 - 157)
13C-2,3,7,8-TCDF	62	(24 - 169)
13C-1,2,3,7,8-PeCDF	57	(24 - 185)
13C-2,3,4,7,8-PeCDF	63	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	75	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	74	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	65	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	67	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	63	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	68	(26 - 152)
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	94	(35 - 197)

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

a Spiked analyte recovery is outside stated control limits.

Results are from a re-injection confirming the elevated results for 1,2,3,6,7,8-HxCDF and 1,2,3,4,6,7,8-HpCDF.

# SOLID, D 2216-90, Percent Moisture

Analytical Resources Inc

Client Sample ID: BBDX-SS-01

General Chemistry

Lot-Sample #....: G8I240290-001    Work Order #....: KXH9D    Matrix.....: SOLID  
Date Sampled...: 09/19/08    Date Received...: 09/24/08  
% Moisture.....: 59

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	59.1	0.10	%	ASTM D 2216-90	09/26-09/27/08	8270241

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: BBDX-SS-02

General Chemistry

Lot-Sample #...: G8I240290-002  
Date Sampled...: 09/19/08  
% Moisture.....: 49

Work Order #...: KXH9W  
Date Received..: 09/24/08

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	49.0	0.10	%	ASTM D 2216-90	09/26-09/27/08	8270241

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: BBDX-SS-03

General Chemistry

Lot-Sample #...: G8I240290-003

Work Order #...: KXH9X

Matrix.....: SOLID

Date Sampled...: 09/19/08

Date Received...: 09/24/08

% Moisture.....: 61

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	61.4	0.10	%	ASTM D 2216-90	09/26-09/27/08	8270241

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: BBDX-SS-04

General Chemistry

Lot-Sample #...: G8I240290-004    Work Order #...: KXH90    Matrix.....: SOLID  
Date Sampled...: 09/19/08    Date Received...: 09/24/08  
% Moisture.....: 62

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION--</u>	<u>PREP</u>
					<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Moisture	62.4	0.10	%	ASTM D 2216-90	09/26-09/27/08	8270241

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: BBDX-SS-05

General Chemistry

Lot-Sample #...: G8I240290-005  
Date Sampled...: 09/18/08  
% Moisture.....: 70

Work Order #...: KXH91  
Date Received...: 09/24/08

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	70.4	0.10	%	ASTM D 2216-90	09/26-09/27/08	8270241

Dilution Factor: 1



Analytical Resources Inc

Client Sample ID: BBDX-SS-06

General Chemistry

Lot-Sample #...: G8I240290-006

Work Order #...: KXH93

Matrix.....: SOLID

Date Sampled...: 09/18/08

Date Received..: 09/24/08

% Moisture.....: 52

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Percent Moisture	51.6	0.10	%	ASTM D 2216-90	09/26-09/27/08	8270241

Dilution Factor: 1

# QC DATA ASSOCIATION SUMMARY

G8I240290

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	ASTM D 2216-90		8270241	8270155
002	SOLID	ASTM D 2216-90		8270241	8270155
003	SOLID	ASTM D 2216-90		8270241	8270155
004	SOLID	ASTM D 2216-90		8270241	8270155
005	SOLID	ASTM D 2216-90		8270241	8270155
006	SOLID	ASTM D 2216-90		8270241	8270155



September 18, 2008

**TestAmerica Project Number: G8I030194**

PO/Contract:

Kelly Bottem  
Analytical Resources Inc  
4611 S 134th Place Suite 100  
Tukwila, WA 98168

Dear Ms. Bottem,

This report contains the analytical results for the samples received under chain of custody by TestAmerica on September 3, 2008. These samples are associated with your R.G. HALEY project.

The test results in this report meet all NELAC requirements for parameters that accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4402.

Sincerely,



Laura Nelson  
for  
Jill Kellmann  
Project Manager

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# TestAmerica West Sacramento Project Number G8I030194

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Laboratory QC Reports

SOLID, D 2216-90, Percent Moisture

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Sample Data Sheets

Laboratory QC Reports

Raw Data Package

## Case Narrative

### TestAmerica West Sacramento Project Number G8I030194

#### **SOLID, 1613B, Dioxins/Furans**

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Samples 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 required Confirmation (CON) analyses, which were performed September 9, 2008. Samples 4, 5, 6, 8, and 9 also required Dilution (D) analysis because of saturated compounds. The D runs were completed September 9 (sample 4), September 10 (samples 5, 6, and 9), and September 17 (sample 8).

Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

The concentrations of 1,2,3,4,6,7,8-HpCDD, OCDF and OCDD in samples 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11 exceeded the upper quantitation level of the initial calibration curve, but the peaks did not saturate the instrument detector. Historical data indicates that for the isotope dilution method, dilution and re-analysis will not produce significantly different results from those reported with the 'E' qualifier.

Samples: 4, 7, 8

The isomers 2,3,7,8-TCDF (in samples 4 and 7) and 1,2,3,4,7,8,9-HpCDF (in sample 8) have been qualified with the "JA" flag due to the ion abundance ratios being outside of criteria. The isomers have been reported as an "estimated maximum possible concentration" (EMPC) because the quantitation is based on the theoretical ion abundance ratios for these analytes.

Samples: 5, 8, 9

The internal standard compounds 13C-OCDD (in samples 5 and 9) and 13C-1,2,3,4,6,7,8-HpCDF (in sample 8) have ion abundance ratios outside of acceptance criteria. The theoretical areas for the internal standards were used to quantitate the recoveries and to quantitate related target analytes. There is no impact on the data quality as a result of this anomaly.

Sample: 12

Sample 12 exhibited elevated noise or matrix interference for 2,3,7,8-TCDF in the confirmation run requiring the detection limit to be raised appropriately. This analyte was flagged with the "G" qualifier.

There are no other anomalies associated with this project.

## TestAmerica Laboratories West Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	New York*	11666
Arizona	AZ0616	Oregon*	CA 200005
Arkansas	04-067-0	Pennsylvania	68-1272
California*	01119CA	South Carolina	87014002
Colorado	NA	Texas	TX 270-2004A
Connecticut	PH-0691	Utah*	QUANI
Florida*	E87570	Virginia	00178
Georgia	960	Washington	C087
Hawaii	NA	West Virginia	9930C, 334
Kansas*	E10375	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Michigan	9947	USACE	NA
Nevada	CA44	USDA Foreign Plant	37-82605
New Jersey*	CA005	USDA Foreign Soil	S-46613

\*NELAP accredited. A more detailed parameter list is available upon request. Updated 9/21/07

### QC Parameter Definitions

**QC Batch:** The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

**Method Blank:** An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

**Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD):**

An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also be used to evaluate the precision of the process.

**Duplicate Sample (DU):** Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

**Surrogates:** Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

**Matrix Spike and Matrix Spike Duplicate (MS/MSD):** An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

**Isotope Dilution:** For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

**Control Limits:** The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

## Sample Summary

### TestAmerica West Sacramento Project Number G8I030194

<u>WO#</u>	<u>Sample #</u>	<u>Client Sample ID</u>	<u>Sampling Date</u>	<u>Received Date</u>
KV67W	1	08-21861-NM56A	8/26/2008	9/3/2008 09:20 AM
KV671	2	08-21862-NM56B	8/26/2008	9/3/2008 09:20 AM
KV672	3	08-21863-NM56C	8/26/2008	9/3/2008 09:20 AM
KV675	4	08-21864-NM56D	8/26/2008	9/3/2008 09:20 AM
KV676	5	08-21865-NM56E	8/26/2008	9/3/2008 09:20 AM
KV677	6	08-21867-NM56G	8/26/2008	9/3/2008 09:20 AM
KV678	7	08-21868-NM56H	8/26/2008	9/3/2008 09:20 AM
KV679	8	08-21870-NM56J	8/27/2008	9/3/2008 09:20 AM
KV68J	9	08-21873-NM56M	8/27/2008	9/3/2008 09:20 AM
KV68L	10	08-21876-NM56P	8/27/2008	9/3/2008 09:20 AM
KV68N	11	08-21879-NM56S	8/27/2008	9/3/2008 09:20 AM
KV68P	12	08-21880-NM56T	8/27/2008	9/3/2008 09:20 AM

#### Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.



**SUBCONTRACTOR ANALYSIS REQUEST**  
 CUSTODY TRANSFER 09/02/08



ARI Project: NM56

Laboratory: SEVERN TRENT LABORATORY-SACRAMENTOARI Client: Hart Crowser, Inc.  
 Lab Contact: JILL KELLMAN Project ID: R.G. Haley  
 Lab Address: 880 RIVERSIDE PARKWAY ARI PM: Kelly Bottem  
 WEST SACRAMENTO, CA 95605 Phone: 206-695-6211  
 Phone: 916-373-5600 Fax: 206-695-6201  
 Fax:

Analytical Protocol: PSSDA Requested Turn Around: **09/11/08**  
 Special Instructions: Fax Results (Y/N): **Yes**

**Limits of Liability.** Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
08-21861-NM56A	RGH-SS-01	08/26/08	Sediment		Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21862-NM56B	RGH-SS-02	08/26/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21863-NM56C	RGH-SS-03	08/26/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21864-NM56D	RGH-SC-01-0-2'	08/26/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21865-NM56E	RGH-SC-01-2-4'	08/26/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
X 08-21867-NM56G	RGH-SC-02-0-2'	08/26/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21868-NM56H	RGH-SC-02-2-4'	08/26/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21870-NM56J	RGH-SC-03-0-2'	08/27/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					

Carrier	Airbill	Date
UPS	1Z9726950145307289	9/2/08
Relinquished by	Company	Date
<i>[Signature]</i>	ART	9/2/08
Received by	Company	Date
<i>[Signature]</i>	TAC-W.S.	9/3/08
		Time
		1600
		1010

Subcontractor Custody Form - NM56

Page 1 of 2

X Rec'd w/ a cracked lid - 9/3/08



Laboratory: SEVERN TRENT LABORATORY-SACRAMENTOARI Client: Hart Crowser, Inc.  
 Lab Contact: JILL KELLMAN Project ID: 17330-17

ARI Sample ID	Client Sample ID/ Add'l Sample ID	Sampled	Matrix	Bottles	Analyses
08-21873-NM56M	RGH-SC-04-0-2'	08/27/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21876-NM56P	RGH-SC-05-0-2'	08/27/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21879-NM56S	RGH-SC-06-0-2'	08/27/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					
08-21880-NM56T	RGH-SC-06-2-4'	08/27/08	Sediment	1	Dioxin/Furans 1613(Sub)
Special Instructions: None					

Carrier	Airbill	Date
Relinquished by <i>B. J. [Signature]</i>	Company <i>ARI</i>	Date <i>9/2/08</i>
Received by <i>C. Kellman</i>	Company <i>TAL W.S.</i>	Date <i>9/2/08</i>
		Time <i>1600</i>
		Time <i>1010</i>



Lot ID: 681030194

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
VOAh*	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AGB	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
___CGJ																				
500CGJ	/	/	/	/	/	/	/	/	/	/	/	/								
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
___"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				

h = hydrochloric acid    s = sulfuric acid    na = sodium hydroxide    n = nitric acid    zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

# SOLID, 1613B, Dioxins/Furans

Analytical Resources Inc

Client Sample ID: 08-21861-NM56A

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-001    Work Order #....: KV67W1AC    Matrix.....: SOLID  
 Date Sampled....: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #....: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 21

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	1.9		pg/g	EPA-5 1613B
Total TCDD	41		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	8.5		pg/g	EPA-5 1613B
Total PeCDD	73		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	17		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	120		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	46		pg/g	EPA-5 1613B
Total HxCDD	520		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	2900 E,B		pg/g	EPA-5 1613B
Total HpCDD	5100		pg/g	EPA-5 1613B
OCDD	24000 E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	3.2 CON		pg/g	EPA-5 1613B
Total TCDF	22		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	6.8		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	7.1		pg/g	EPA-5 1613B
Total PeCDF	83		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	41		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	11		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	6.6		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	1.5		pg/g	EPA-5 1613B
Total HxCDF	780		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	590		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	33		pg/g	EPA-5 1613B
Total HpCDF	2800		pg/g	EPA-5 1613B
OCDF	2300		pg/g	EPA-5 1613B

(Continued on next page)

Analytical Resources Inc

Client Sample ID: 08-21861-NM56A

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-001 Work Order #...: KV67W1AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	80	(25 - 164)
13C-1,2,3,7,8-PeCDD	80	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	93	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	73	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	93	(23 - 140)
13C-OCDD	119	(17 - 157)
13C-2,3,7,8-TCDF	81	(24 - 169)
13C-1,2,3,7,8-PeCDF	87	(24 - 185)
13C-2,3,4,7,8-PeCDF	88	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	75	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	84	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	88	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	89	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	95	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	87	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	83	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

E Estimated result. Result concentration exceeds the calibration range.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21861-NM56A**

Lot-Sample #...: G81030194 - 001  
 Date Sampled...: 08/26/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV67W1AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 21

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	1.9		1	1.900
Total TCDD	41			
1,2,3,7,8-PeCDD	8.5		1	8.500
Total PeCDD	73			
1,2,3,4,7,8-HxCDD	17		0.1	1.700
1,2,3,6,7,8-HxCDD	120		0.1	12.000
1,2,3,7,8,9-HxCDD	46		0.1	4.600
Total HxCDD	520			
1,2,3,4,6,7,8-HpCDD	2900	E B	0.01	29.000
Total HpCDD	5100			
OCDD	24000	E B	0.0003	7.200
2,3,7,8-TCDF	3.2	CON	0.1	0.320
Total TCDF	22			
1,2,3,7,8-PeCDF	6.8		0.03	0.200
2,3,4,7,8-PeCDF	7.1		0.3	2.100
Total PeCDF	83			
1,2,3,4,7,8-HxCDF	41		0.1	4.100
1,2,3,6,7,8-HxCDF	11		0.1	1.100
2,3,4,6,7,8-HxCDF	6.6		0.1	0.660
1,2,3,7,8,9-HxCDF	1.5		0.1	0.150
Total HxCDF	780			
1,2,3,4,6,7,8-HpCDF	590		0.01	5.900
1,2,3,4,7,8,9-HpCDF	33		0.01	0.330
Total HpCDF	2800			
OCDF	2300		0.0003	0.690
Total TEQ Concentration				80.450

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	80	25 - 164
13C-1,2,3,7,8-PeCDD	80	25 - 181
13C-1,2,3,4,7,8-HxCDD	93	32 - 141
13C-1,2,3,6,7,8-HxCDD	73	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	93	23 - 140
13C-OCDD	119	17 - 157
13C-2,3,7,8-TCDF	81	24 - 169
13C-1,2,3,7,8-PeCDF	87	24 - 185
13C-2,3,4,7,8-PeCDF	88	21 - 178
13C-1,2,3,6,7,8-HxCDF	75	26 - 123
13C-2,3,4,6,7,8-HxCDF	84	28 - 136
13C-1,2,3,7,8,9-HxCDF	88	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	89	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	95	26 - 138
13C-1,2,3,4,7,8-HxCDF	87	26 - 152



**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21861-NM56A**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	83	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- E Estimated result. Result concentration exceeds the calibration range.

Analytical Resources Inc

Client Sample ID: 08-21862-NM56B

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-002    Work Order #...: KV6711AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 20

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	28		pg/g	EPA-5 1613B
Total TCDD	200		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	42		pg/g	EPA-5 1613B
Total PeCDD	210		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	230		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	85		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	190		pg/g	EPA-5 1613B
Total HxCDD	990		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	3000 E,B		pg/g	EPA-5 1613B
Total HpCDD	5000		pg/g	EPA-5 1613B
OCDD	21000 E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	3.3 CON		pg/g	EPA-5 1613B
Total TCDF	24		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	8.5		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	5.8		pg/g	EPA-5 1613B
Total PeCDF	51		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	35		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	9.1		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	5.0		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	2.3 J		pg/g	EPA-5 1613B
Total HxCDF	540		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	390		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	23		pg/g	EPA-5 1613B
Total HpCDF	1800		pg/g	EPA-5 1613B
OCDF	1400		pg/g	EPA-5 1613B

(Continued on next page)

Analytical Resources Inc

Client Sample ID: 08-21862-NM56B

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-002 Work Order #...: KV6711AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	76	(25 - 164)
13C-1,2,3,7,8-PeCDD	78	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	87	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	75	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	92	(23 - 140)
13C-OCDD	115	(17 - 157)
13C-2,3,7,8-TCDF	76	(24 - 169)
13C-1,2,3,7,8-PeCDF	83	(24 - 185)
13C-2,3,4,7,8-PeCDF	84	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	73	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	83	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	87	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	86	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	94	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	83	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	76	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

E Estimated result. Result concentration exceeds the calibration range.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)

Client Sample ID: 08-21862-NM56B

Lot-Sample #...: G8I030194 - 002  
Date Sampled...: 08/26/08  
Prep Date.....: 09/04/08  
Prep Batch #...: 8249232

Work Order #...: KV6711AC  
Date Received...: 09/03/08  
Analysis Date...: 09/09/08  
Dilution Factor: 1

Matrix.....: SOLID  
Instrument: 9D5  
Units.....: pg/g  
% Moisture: 20

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	28		1	28.000
Total TCDD	200			
1,2,3,7,8-PeCDD	42		1	42.000
Total PeCDD	210			
1,2,3,4,7,8-HxCDD	230		0.1	23.000
1,2,3,6,7,8-HxCDD	85		0.1	8.500
1,2,3,7,8,9-HxCDD	190		0.1	19.000
Total HxCDD	990			
1,2,3,4,6,7,8-HpCDD	3000	E B	0.01	30.000
Total HpCDD	5000			
OCDD	21000	E B	0.0003	6.300
2,3,7,8-TCDF	3.3	CON	0.1	0.330
Total TCDF	24			
1,2,3,7,8-PeCDF	8.5		0.03	0.250
2,3,4,7,8-PeCDF	5.8		0.3	1.700
Total PeCDF	51			
1,2,3,4,7,8-HxCDF	35		0.1	3.500
1,2,3,6,7,8-HxCDF	9.1		0.1	0.910
2,3,4,6,7,8-HxCDF	5.0		0.1	0.500
1,2,3,7,8,9-HxCDF	2.3	J	0.1	0.230
Total HxCDF	540			
1,2,3,4,6,7,8-HpCDF	390		0.01	3.900
1,2,3,4,7,8,9-HpCDF	23		0.01	0.230
Total HpCDF	1800			
OCDF	1400		0.0003	0.420
Total TEQ Concentration				168.770

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	25 - 164
13C-1,2,3,7,8-PeCDD	78	25 - 181
13C-1,2,3,4,7,8-HxCDD	87	32 - 141
13C-1,2,3,6,7,8-HxCDD	75	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	92	23 - 140
13C-OCDD	115	17 - 157
13C-2,3,7,8-TCDF	76	24 - 169
13C-1,2,3,7,8-PeCDF	83	24 - 185
13C-2,3,4,7,8-PeCDF	84	21 - 178
13C-1,2,3,6,7,8-HxCDF	73	26 - 123
13C-2,3,4,6,7,8-HxCDF	83	28 - 136
13C-1,2,3,7,8,9-HxCDF	87	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	86	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	94	26 - 138
13C-1,2,3,4,7,8-HxCDF	83	26 - 152

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21862-NM56B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	76	35 - 197

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- E Estimated result. Result concentration exceeds the calibration range.
- J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: 08-21863-NM56C

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-003    Work Order #...: KV6721AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 32

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	6.0		pg/g	EPA-5 1613B
Total TCDD	72		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	22		pg/g	EPA-5 1613B
Total PeCDD	170		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	74		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	170		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	66		pg/g	EPA-5 1613B
Total HxCDD	1100		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	4500 E,B		pg/g	EPA-5 1613B
Total HpCDD	8800		pg/g	EPA-5 1613B
OCDD	39000 E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	3.7 CON		pg/g	EPA-5 1613B
Total TCDF	25		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	8.9		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	10		pg/g	EPA-5 1613B
Total PeCDF	110		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	60		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	16		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	11		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	1.7 J		pg/g	EPA-5 1613B
Total HxCDF	1100		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	730		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	42		pg/g	EPA-5 1613B
Total HpCDF	3600		pg/g	EPA-5 1613B
OCDF	3100 E		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21863-NM56C

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-003

Work Order #...: KV6721AC

Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	76	(25 - 164)
13C-1,2,3,7,8-PeCDD	75	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	77	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	69	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	83	(23 - 140)
13C-OCDD	106	(17 - 157)
13C-2,3,7,8-TCDF	76	(24 - 169)
13C-1,2,3,7,8-PeCDF	80	(24 - 185)
13C-2,3,4,7,8-PeCDF	82	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	68	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	76	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	82	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	77	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	84	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	76	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	77	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

E Estimated result. Result concentration exceeds the calibration range.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21863-NM56C**

Lot-Sample #...: G81030194 - 003  
 Date Sampled...: 08/26/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV6721AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 32

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	6.0		1	6.000
Total TCDD	72			
1,2,3,7,8-PeCDD	22		1	22.000
Total PeCDD	170			
1,2,3,4,7,8-HxCDD	74		0.1	7.400
1,2,3,6,7,8-HxCDD	170		0.1	17.000
1,2,3,7,8,9-HxCDD	66		0.1	6.600
Total HxCDD	1100			
1,2,3,4,6,7,8-HpCDD	4500	E B	0.01	45.000
Total HpCDD	8800			
OCDD	39000	E B	0.0003	12.000
2,3,7,8-TCDF	3.7	CON	0.1	0.370
Total TCDF	25			
1,2,3,7,8-PeCDF	8.9		0.03	0.270
2,3,4,7,8-PeCDF	10		0.3	3.000
Total PeCDF	110			
1,2,3,4,7,8-HxCDF	60		0.1	6.000
1,2,3,6,7,8-HxCDF	16		0.1	1.600
2,3,4,6,7,8-HxCDF	11		0.1	1.100
1,2,3,7,8,9-HxCDF	1.7	J	0.1	0.170
Total HxCDF	1100			
1,2,3,4,6,7,8-HpCDF	730		0.01	7.300
1,2,3,4,7,8,9-HpCDF	42		0.01	0.420
Total HpCDF	3600			
OCDF	3100	E	0.0003	0.930
Total TEQ Concentration				137.160

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	25 - 164
13C-1,2,3,7,8-PeCDD	75	25 - 181
13C-1,2,3,4,7,8-HxCDD	77	32 - 141
13C-1,2,3,6,7,8-HxCDD	69	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	83	23 - 140
13C-OCDD	106	17 - 157
13C-2,3,7,8-TCDF	76	24 - 169
13C-1,2,3,7,8-PeCDF	80	24 - 185
13C-2,3,4,7,8-PeCDF	82	21 - 178
13C-1,2,3,6,7,8-HxCDF	68	26 - 123
13C-2,3,4,6,7,8-HxCDF	76	28 - 136
13C-1,2,3,7,8,9-HxCDF	82	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	77	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	84	26 - 138
13C-1,2,3,4,7,8-HxCDF	76	26 - 152



Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21863-NM56C

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	77	35 - 197

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- E Estimated result. Result concentration exceeds the calibration range.
- J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: 08-21864-NM56D

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-004    Work Order #...: KV6751AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 33

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	4.0		pg/g	EPA-5 1613B
Total TCDD	68		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	17		pg/g	EPA-5 1613B
Total PeCDD	130		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	68		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	160		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	57		pg/g	EPA-5 1613B
Total HxCDD	900		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	4500 D,B		pg/g	EPA-5 1613B
Total HpCDD	8000		pg/g	EPA-5 1613B
OCDD	40000 D,E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	3.1 CON,JA		pg/g	EPA-5 1613B
Total TCDF	33		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	10		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	10		pg/g	EPA-5 1613B
Total PeCDF	130		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	62		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	17		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	10		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	4.7		pg/g	EPA-5 1613B
Total HxCDF	1200		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	860		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	47		pg/g	EPA-5 1613B
Total HpCDF	3800		pg/g	EPA-5 1613B
OCDF	3200 D		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21864-NM56D

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-004 Work Order #...: KV6751AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	80	(25 - 164)
13C-1,2,3,7,8-PeCDD	81	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	96	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	72	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	83	(23 - 140)
13C-OCDD	92	(17 - 157)
13C-2,3,7,8-TCDF	80	(24 - 169)
13C-1,2,3,7,8-PeCDF	87	(24 - 185)
13C-2,3,4,7,8-PeCDF	89	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	68	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	86	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	88	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	81	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	86	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	98	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	81	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

D Result was obtained from the analysis of a dilution.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

JA The analyte was positively identified, but the quantitation is an estimate.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21864-NM56D**

Lot-Sample #...: G8I030194 - 004  
 Date Sampled...: 08/26/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV6751AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 33

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	4.0		1	4.000
Total TCDD	68			
1,2,3,7,8-PeCDD	17		1	17.000
Total PeCDD	130			
1,2,3,4,7,8-HxCDD	68		0.1	6.800
1,2,3,6,7,8-HxCDD	160		0.1	16.000
1,2,3,7,8,9-HxCDD	57		0.1	5.700
Total HxCDD	900			
1,2,3,4,6,7,8-HpCDD	4500	D B	0.01	45.000
Total HpCDD	8000			
OCDD	40000	D E B	0.0003	12.000
2,3,7,8-TCDF	3.1	CON JA	0.1	0.310
Total TCDF	33			
1,2,3,7,8-PeCDF	10		0.03	0.300
2,3,4,7,8-PeCDF	10		0.3	3.000
Total PeCDF	130			
1,2,3,4,7,8-HxCDF	62		0.1	6.200
1,2,3,6,7,8-HxCDF	17		0.1	1.700
2,3,4,6,7,8-HxCDF	10		0.1	1.000
1,2,3,7,8,9-HxCDF	4.7		0.1	0.470
Total HxCDF	1200			
1,2,3,4,6,7,8-HpCDF	860		0.01	8.600
1,2,3,4,7,8,9-HpCDF	47		0.01	0.470
Total HpCDF	3800			
OCDF	3200	D	0.0003	0.960
<b>Total TEQ Concentration</b>				<b>129.510</b>

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	80	25 - 164
13C-1,2,3,7,8-PeCDD	81	25 - 181
13C-1,2,3,4,7,8-HxCDD	96	32 - 141
13C-1,2,3,6,7,8-HxCDD	72	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	83	23 - 140
13C-OCDD	92	17 - 157
13C-2,3,7,8-TCDF	80	24 - 169
13C-1,2,3,7,8-PeCDF	87	24 - 185
13C-2,3,4,7,8-PeCDF	89	21 - 178
13C-1,2,3,6,7,8-HxCDF	68	26 - 123
13C-2,3,4,6,7,8-HxCDF	86	28 - 136
13C-1,2,3,7,8,9-HxCDF	88	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	81	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	86	26 - 138
13C-1,2,3,4,7,8-HxCDF	98	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21864-NM56D**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	81	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- D Result was obtained from the analysis of a dilution.
- E Estimated result. Result concentration exceeds the calibration range.
- JA The analyte was positively identified, but the quantitation is an estimate.

Analytical Resources Inc

Client Sample ID: 08-21865-NM56E

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-005    Work Order #...: KV6761AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 27

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	3.1		pg/g	EPA-5 1613B
Total TCDD	68		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	25		pg/g	EPA-5 1613B
Total PeCDD	200		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	66		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	310		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	100		pg/g	EPA-5 1613B
Total HxCDD	1500		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	7900 D,E,B		pg/g	EPA-5 1613B
Total HpCDD	13000		pg/g	EPA-5 1613B
OCDD	63000 D,E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	9.5 CON		pg/g	EPA-5 1613B
Total TCDF	61		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	20		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	19		pg/g	EPA-5 1613B
Total PeCDF	270		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	130		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	42		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	22		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	8.2		pg/g	EPA-5 1613B
Total HxCDF	2200		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	1500 D		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	85 D		pg/g	EPA-5 1613B
Total HpCDF	6100		pg/g	EPA-5 1613B
OCDF	5300 D		pg/g	EPA-5 1613B

(Continued on next page)

Analytical Resources Inc

Client Sample ID: 08-21865-NM56E

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-005 Work Order #....: KV6761AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	77	(25 - 164)
13C-1,2,3,7,8-PeCDD	78	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	83	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	76	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	82	(23 - 140)
13C-OCDD	88	(17 - 157)
13C-2,3,7,8-TCDF	78	(24 - 169)
13C-1,2,3,7,8-PeCDF	84	(24 - 185)
13C-2,3,4,7,8-PeCDF	86	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	73	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	82	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	85	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	78	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	79	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	84	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	77	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

D Result was obtained from the analysis of a dilution.

E Estimated result. Result concentration exceeds the calibration range.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21865-NM56E

Lot-Sample #...: G8I030194 - 005  
Date Sampled...: 08/26/08  
Prep Date.....: 09/04/08  
Prep Batch #...: 8249232

Work Order #...: KV6761AC  
Date Received...: 09/03/08  
Analysis Date...: 09/09/08  
Dilution Factor: 1

Matrix.....: SOLID  
Instrument: 9D5  
Units.....: pg/g  
% Moisture: 27

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	3.1		1	3.100
Total TCDD	68			
1,2,3,7,8-PeCDD	25		1	25.000
Total PeCDD	200			
1,2,3,4,7,8-HxCDD	66		0.1	6.600
1,2,3,6,7,8-HxCDD	310		0.1	31.000
1,2,3,7,8,9-HxCDD	100		0.1	10.000
Total HxCDD	1500			
1,2,3,4,6,7,8-HpCDD	7900	D E B	0.01	79.000
Total HpCDD	13000			
OCDD	63000	D E B	0.0003	19.000
2,3,7,8-TCDF	9.5	CON	0.1	0.950
Total TCDF	61			
1,2,3,7,8-PeCDF	20		0.03	0.600
2,3,4,7,8-PeCDF	19		0.3	5.700
Total PeCDF	270			
1,2,3,4,7,8-HxCDF	130		0.1	13.000
1,2,3,6,7,8-HxCDF	42		0.1	4.200
2,3,4,6,7,8-HxCDF	22		0.1	2.200
1,2,3,7,8,9-HxCDF	8.2		0.1	0.820
Total HxCDF	2200			
1,2,3,4,6,7,8-HpCDF	1500	D	0.01	15.000
1,2,3,4,7,8,9-HpCDF	85	D	0.01	0.850
Total HpCDF	6100			
OCDF	5300	D	0.0003	1.600
Total TEQ Concentration				218.620

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	77	25 - 164
13C-1,2,3,7,8-PeCDD	78	25 - 181
13C-1,2,3,4,7,8-HxCDD	83	32 - 141
13C-1,2,3,6,7,8-HxCDD	76	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	82	23 - 140
13C-OCDD	88	17 - 157
13C-2,3,7,8-TCDF	78	24 - 169
13C-1,2,3,7,8-PeCDF	84	24 - 185
13C-2,3,4,7,8-PeCDF	86	21 - 178
13C-1,2,3,6,7,8-HxCDF	73	26 - 123
13C-2,3,4,6,7,8-HxCDF	82	28 - 136
13C-1,2,3,7,8,9-HxCDF	85	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	78	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	79	26 - 138
13C-1,2,3,4,7,8-HxCDF	84	26 - 152



**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21865-NM56E**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	77	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland. June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- D Result was obtained from the analysis of a dilution.
- E Estimated result. Result concentration exceeds the calibration range.

Analytical Resources Inc

Client Sample ID: 08-21867-NM56G

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-006    Work Order #....: KV6771AC    Matrix.....: SOLID  
 Date Sampled....: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #....: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 32

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	39		pg/g	EPA-5 1613B
Total TCDD	250		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	34		pg/g	EPA-5 1613B
Total PeCDD	240		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	250		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	160		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	110		pg/g	EPA-5 1613B
Total HxCDD	1500		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	4400 D,B		pg/g	EPA-5 1613B
Total HpCDD	7800		pg/g	EPA-5 1613B
OCDD	36000 D,E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	5.5 CON		pg/g	EPA-5 1613B
Total TCDF	81		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	13		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	8.6		pg/g	EPA-5 1613B
Total PeCDF	110		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	48		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	12		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	7.5		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	5.6		pg/g	EPA-5 1613B
Total HxCDF	990		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	710		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	40		pg/g	EPA-5 1613B
Total HpCDF	3300		pg/g	EPA-5 1613B
OCDF	3200 D		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21867-NM56G

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-006

Work Order #....: KV6771AC

Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	75	(25 - 164)
13C-1,2,3,7,8-PeCDD	78	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	100	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	62	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	78	(23 - 140)
13C-OCDD	80	(17 - 157)
13C-2,3,7,8-TCDF	77	(24 - 169)
13C-1,2,3,7,8-PeCDF	85	(24 - 185)
13C-2,3,4,7,8-PeCDF	86	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	66	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	84	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	86	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	86	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	90	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	98	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	82	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

D Result was obtained from the analysis of a dilution.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21867-NM56G

Lot-Sample #...: G81030194 - 006  
Date Sampled...: 08/26/08  
Prep Date.....: 09/04/08  
Prep Batch #...: 8249232

Work Order #...: KV6771AC  
Date Received...: 09/03/08  
Analysis Date...: 09/09/08  
Dilution Factor: 1

Matrix.....: SOLID  
Instrument: 9D5  
Units.....: pg/g  
% Moisture: 32

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	39		1	39.000
Total TCDD	250			
1,2,3,7,8-PeCDD	34		1	34.000
Total PeCDD	240			
1,2,3,4,7,8-HxCDD	250		0.1	25.000
1,2,3,6,7,8-HxCDD	160		0.1	16.000
1,2,3,7,8,9-HxCDD	110		0.1	11.000
Total HxCDD	1500			
1,2,3,4,6,7,8-HpCDD	4400	D B	0.01	44.000
Total HpCDD	7800			
OCDD	36000	D E B	0.0003	11.000
2,3,7,8-TCDF	5.5	CON	0.1	0.550
Total TCDF	81			
1,2,3,7,8-PeCDF	13		0.03	0.390
2,3,4,7,8-PeCDF	8.6		0.3	2.600
Total PeCDF	110			
1,2,3,4,7,8-HxCDF	48		0.1	4.800
1,2,3,6,7,8-HxCDF	12		0.1	1.200
2,3,4,6,7,8-HxCDF	7.5		0.1	0.750
1,2,3,7,8,9-HxCDF	5.6		0.1	0.560
Total HxCDF	990			
1,2,3,4,6,7,8-HpCDF	710		0.01	7.100
1,2,3,4,7,8,9-HpCDF	40		0.01	0.400
Total HpCDF	3300			
OCDF	3200	D	0.0003	0.960
Total TEQ Concentration				199.310

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	25 - 164
13C-1,2,3,7,8-PeCDD	78	25 - 181
13C-1,2,3,4,7,8-HxCDD	100	32 - 141
13C-1,2,3,6,7,8-HxCDD	62	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	78	23 - 140
13C-OCDD	80	17 - 157
13C-2,3,7,8-TCDF	77	24 - 169
13C-1,2,3,7,8-PeCDF	85	24 - 185
13C-2,3,4,7,8-PeCDF	86	21 - 178
13C-1,2,3,6,7,8-HxCDF	66	26 - 123
13C-2,3,4,6,7,8-HxCDF	84	28 - 136
13C-1,2,3,7,8,9-HxCDF	86	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	86	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	90	26 - 138
13C-1,2,3,4,7,8-HxCDF	98	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21867-NM56G**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	82	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland. June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- D Result was obtained from the analysis of a dilution.
- E Estimated result. Result concentration exceeds the calibration range.

Analytical Resources Inc

Client Sample ID: 08-21868-NM56H

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-007    Work Order #...: KV6781AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 13

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	3.3		pg/g	EPA-5 1613B
Total TCDD	62		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	14		pg/g	EPA-5 1613B
Total PeCDD	160		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	24		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	99		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	44		pg/g	EPA-5 1613B
Total HxCDD	730		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	2700 E,B		pg/g	EPA-5 1613B
Total HpCDD	5000		pg/g	EPA-5 1613B
OCDD	23000 E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	1.2 CON,JA		pg/g	EPA-5 1613B
Total TCDF	20		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	5.3		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	5.8		pg/g	EPA-5 1613B
Total PeCDF	74		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	38		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	9.3		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	5.7		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	2.9		pg/g	EPA-5 1613B
Total HxCDF	670		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	480		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	26		pg/g	EPA-5 1613B
Total HpCDF	2300		pg/g	EPA-5 1613B
OCDF	2200		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21868-NM56H

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-007

Work Order #...: KV6781AC

Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	41	(25 - 164)
13C-1,2,3,7,8-PeCDD	42	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	46	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	46	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	54	(23 - 140)
13C-OCDD	68	(17 - 157)
13C-2,3,7,8-TCDF	41	(24 - 169)
13C-1,2,3,7,8-PeCDF	47	(24 - 185)
13C-2,3,4,7,8-PeCDF	47	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	45	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	49	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	52	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	52	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	55	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	48	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	73	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

E Estimated result. Result concentration exceeds the calibration range.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

JA The analyte was positively identified, but the quantitation is an estimate.

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)

Client Sample ID: 08-21868-NM56H

Lot-Sample #...: G81030194 - 007  
Date Sampled...: 08/26/08  
Prep Date.....: 09/04/08  
Prep Batch #...: 8249232

Work Order #...: KV6781AC  
Date Received...: 09/03/08  
Analysis Date...: 09/09/08  
Dilution Factor: 1

Matrix.....: SOLID  
Instrument: 9D5  
Units.....: pg/g  
% Moisture: 13

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	3.3		1	3.300
Total TCDD	62			
1,2,3,7,8-PeCDD	14		1	14.000
Total PeCDD	160			
1,2,3,4,7,8-HxCDD	24		0.1	2.400
1,2,3,6,7,8-HxCDD	99		0.1	9.900
1,2,3,7,8,9-HxCDD	44		0.1	4.400
Total HxCDD	730			
1,2,3,4,6,7,8-HpCDD	2700	E B	0.01	27.000
Total HpCDD	5000			
OCDD	23000	E B	0.0003	6.900
2,3,7,8-TCDF	1.2	CON JA	0.1	0.120
Total TCDF	20			
1,2,3,7,8-PeCDF	5.3		0.03	0.160
2,3,4,7,8-PeCDF	5.8		0.3	1.700
Total PeCDF	74			
1,2,3,4,7,8-HxCDF	38		0.1	3.800
1,2,3,6,7,8-HxCDF	9.3		0.1	0.930
2,3,4,6,7,8-HxCDF	5.7		0.1	0.570
1,2,3,7,8,9-HxCDF	2.9		0.1	0.290
Total HxCDF	670			
1,2,3,4,6,7,8-HpCDF	480		0.01	4.800
1,2,3,4,7,8,9-HpCDF	26		0.01	0.260
Total HpCDF	2300			
OCDF	2200		0.0003	0.660
Total TEQ Concentration				81.190

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	41	25 - 164
13C-1,2,3,7,8-PeCDD	42	25 - 181
13C-1,2,3,4,7,8-HxCDD	46	32 - 141
13C-1,2,3,6,7,8-HxCDD	46	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	54	23 - 140
13C-OCDD	68	17 - 157
13C-2,3,7,8-TCDF	41	24 - 169
13C-1,2,3,7,8-PeCDF	47	24 - 185
13C-2,3,4,7,8-PeCDF	47	21 - 178
13C-1,2,3,6,7,8-HxCDF	45	26 - 123
13C-2,3,4,6,7,8-HxCDF	49	28 - 136
13C-1,2,3,7,8,9-HxCDF	52	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	52	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	55	26 - 138
13C-1,2,3,4,7,8-HxCDF	48	26 - 152



**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21868-NM56H**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	73	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- E Estimated result. Result concentration exceeds the calibration range.
- JA The analyte was positively identified, but the quantitation is an estimate.

Analytical Resources Inc

Client Sample ID: 08-21870-NM56J

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-008    Work Order #...: KV6791AC    Matrix.....: SOLID  
 Date Sampled...: 08/27/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 59

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	58		pg/g	EPA-5 1613B
Total TCDD	730		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	110		pg/g	EPA-5 1613B
Total PeCDD	1000		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	260		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	580		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	150		pg/g	EPA-5 1613B
Total HxCDD	4100		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	15000 D,B		pg/g	EPA-5 1613B
Total HpCDD	29000		pg/g	EPA-5 1613B
OCDD	220000 D,E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	22 CON		pg/g	EPA-5 1613B
Total TCDF	150		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	32		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	32		pg/g	EPA-5 1613B
Total PeCDF	340		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	210		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	51		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	31		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	7.2		pg/g	EPA-5 1613B
Total HxCDF	3900		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	2600 D		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	140 D,JA		pg/g	EPA-5 1613B
Total HpCDF	13000		pg/g	EPA-5 1613B
OCDF	13000 D		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21870-NM56J

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-008 Work Order #...: KV6791AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	82	(25 - 164)
13C-1,2,3,7,8-PeCDD	79	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	94	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	77	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	120	(23 - 140)
13C-OCDD	115	(17 - 157)
13C-2,3,7,8-TCDF	81	(24 - 169)
13C-1,2,3,7,8-PeCDF	88	(24 - 185)
13C-2,3,4,7,8-PeCDF	88	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	80	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	88	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	94	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	85	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	96	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	93	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	84	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

D Result was obtained from the analysis of a dilution.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

JA The analyte was positively identified, but the quantitation is an estimate.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21870-NM56J**

Lot-Sample #...: G81030194 - 008  
 Date Sampled...: 08/27/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV6791AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9105  
 Units.....: pg/g  
 % Moisture: 59

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	58		1	58.000
Total TCDD	730			
1,2,3,7,8-PeCDD	110		1	110.000
Total PeCDD	1000			
1,2,3,4,7,8-HxCDD	260		0.1	26.000
1,2,3,6,7,8-HxCDD	580		0.1	58.000
1,2,3,7,8,9-HxCDD	150		0.1	15.000
Total HxCDD	4100			
1,2,3,4,6,7,8-HpCDD	15000	D B	0.01	150.000
Total HpCDD	29000			
OCDD	220000	D E B	0.0003	66.000
2,3,7,8-TCDF	22	CON	0.1	2.200
Total TCDF	150			
1,2,3,7,8-PeCDF	32		0.03	0.960
2,3,4,7,8-PeCDF	32		0.3	9.600
Total PeCDF	340			
1,2,3,4,7,8-HxCDF	210		0.1	21.000
1,2,3,6,7,8-HxCDF	51		0.1	5.100
2,3,4,6,7,8-HxCDF	31		0.1	3.100
1,2,3,7,8,9-HxCDF	7.2		0.1	0.720
Total HxCDF	3900			
1,2,3,4,6,7,8-HpCDF	2600	D	0.01	26.000
1,2,3,4,7,8,9-HpCDF	140	D JA	0.01	1.400
Total HpCDF	13000			
OCDF	13000	D	0.0003	3.900
Total TEQ Concentration				556.980

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	82	25 - 164
13C-1,2,3,7,8-PeCDD	79	25 - 181
13C-1,2,3,4,7,8-HxCDD	94	32 - 141
13C-1,2,3,6,7,8-HxCDD	77	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	120	23 - 140
13C-OCDD	115	17 - 157
13C-2,3,7,8-TCDF	81	24 - 169
13C-1,2,3,7,8-PeCDF	88	24 - 185
13C-2,3,4,7,8-PeCDF	88	21 - 178
13C-1,2,3,6,7,8-HxCDF	80	26 - 123
13C-2,3,4,6,7,8-HxCDF	88	28 - 136
13C-1,2,3,7,8,9-HxCDF	94	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	85	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	96	26 - 138
13C-1,2,3,4,7,8-HxCDF	93	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21870-NM56J**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	84	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- D Result was obtained from the analysis of a dilution.
- E Estimated result. Result concentration exceeds the calibration range.
- JA The analyte was positively identified, but the quantitation is an estimate.

Analytical Resources Inc

Client Sample ID: 08-21873-NM56M

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-009    Work Order #...: KV68J1AC    Matrix.....: SOLID  
 Date Sampled...: 08/27/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 42

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	19		pg/g	EPA-5 1613B
Total TCDD	260		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	39		pg/g	EPA-5 1613B
Total PeCDD	330		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	68		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	230		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	72		pg/g	EPA-5 1613B
Total HxCDD	1300		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	5500 D,B		pg/g	EPA-5 1613B
Total HpCDD	10000		pg/g	EPA-5 1613B
OCDD	49000 D,E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	8.4 CON		pg/g	EPA-5 1613B
Total TCDF	79		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	14		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	14		pg/g	EPA-5 1613B
Total PeCDF	180		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	72		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	24		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	13		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	6.4		pg/g	EPA-5 1613B
Total HxCDF	1300		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	910		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	51		pg/g	EPA-5 1613B
Total HpCDF	3700		pg/g	EPA-5 1613B
OCDF	3400 D		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21873-NM56M

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-009 Work Order #....: KV68J1AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	73	(25 - 164)
13C-1,2,3,7,8-PeCDD	73	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	85	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	68	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	73	(23 - 140)
13C-OCDD	74	(17 - 157)
13C-2,3,7,8-TCDF	74	(24 - 169)
13C-1,2,3,7,8-PeCDF	82	(24 - 185)
13C-2,3,4,7,8-PeCDF	83	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	70	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	80	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	84	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	85	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	91	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	83	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	75	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

D Result was obtained from the analysis of a dilution.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21873-NM56M

Lot-Sample #...: G8I030194 - 009  
Date Sampled...: 08/27/08  
Prep Date.....: 09/04/08  
Prep Batch #...: 8249232

Work Order #...: KV68JIAC  
Date Received...: 09/03/08  
Analysis Date...: 09/09/08  
Dilution Factor: 1

Matrix.....: SOLID  
Instrument: 9D5  
Units.....: pg/g  
% Moisture: 42

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	19		1	19.000
Total TCDD	260			
1,2,3,7,8-PeCDD	39		1	39.000
Total PeCDD	330			
1,2,3,4,7,8-HxCDD	68		0.1	6.800
1,2,3,6,7,8-HxCDD	230		0.1	23.000
1,2,3,7,8,9-HxCDD	72		0.1	7.200
Total HxCDD	1300			
1,2,3,4,6,7,8-HpCDD	5500	D B	0.01	55.000
Total HpCDD	10000			
OCDD	49000	D E B	0.0003	15.000
2,3,7,8-TCDF	8.4	CON	0.1	0.840
Total TCDF	79			
1,2,3,7,8-PeCDF	14		0.03	0.420
2,3,4,7,8-PeCDF	14		0.3	4.200
Total PeCDF	180			
1,2,3,4,7,8-HxCDF	72		0.1	7.200
1,2,3,6,7,8-HxCDF	24		0.1	2.400
2,3,4,6,7,8-HxCDF	13		0.1	1.300
1,2,3,7,8,9-HxCDF	6.4		0.1	0.640
Total HxCDF	1300			
1,2,3,4,6,7,8-HpCDF	910		0.01	9.100
1,2,3,4,7,8,9-HpCDF	51		0.01	0.510
Total HpCDF	3700			
OCDF	3400	D	0.0003	1.000
Total TEQ Concentration				192.610

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	73	25 - 164
13C-1,2,3,7,8-PeCDD	73	25 - 181
13C-1,2,3,4,7,8-HxCDD	85	32 - 141
13C-1,2,3,6,7,8-HxCDD	68	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	73	23 - 140
13C-OCDD	74	17 - 157
13C-2,3,7,8-TCDF	74	24 - 169
13C-1,2,3,7,8-PeCDF	82	24 - 185
13C-2,3,4,7,8-PeCDF	83	21 - 178
13C-1,2,3,6,7,8-HxCDF	70	26 - 123
13C-2,3,4,6,7,8-HxCDF	80	28 - 136
13C-1,2,3,7,8,9-HxCDF	84	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	85	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	91	26 - 138
13C-1,2,3,4,7,8-HxCDF	83	26 - 152



**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21873-NM56M**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	75	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- D Result was obtained from the analysis of a dilution.
- E Estimated result. Result concentration exceeds the calibration range.

Analytical Resources Inc

Client Sample ID: 08-21876-NM56P

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-010    Work Order #...: KV68L1AC    Matrix.....: SOLID  
 Date Sampled...: 08/27/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 58

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	1.4		pg/g	EPA-5 1613B
Total TCDD	150		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	5.1 J		pg/g	EPA-5 1613B
Total PeCDD	180		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	11		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	45		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	13		pg/g	EPA-5 1613B
Total HxCDD	1000		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	1500 B		pg/g	EPA-5 1613B
Total HpCDD	6700		pg/g	EPA-5 1613B
OCDD	10000 E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	6.4 CON		pg/g	EPA-5 1613B
Total TCDF	71		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	3.9 J		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	4.1 J		pg/g	EPA-5 1613B
Total PeCDF	39		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	12		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	4.2 J		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	2.6 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	1.3 J		pg/g	EPA-5 1613B
Total HxCDF	230		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	130		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	7.4		pg/g	EPA-5 1613B
Total HpCDF	610		pg/g	EPA-5 1613B
OCDF	570		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21876-NM56P

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-010 Work Order #...: KV68L1AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	67	(25 - 164)
13C-1,2,3,7,8-PeCDD	67	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	77	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	63	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	80	(23 - 140)
13C-OCDD	88	(17 - 157)
13C-2,3,7,8-TCDF	68	(24 - 169)
13C-1,2,3,7,8-PeCDF	75	(24 - 185)
13C-2,3,4,7,8-PeCDF	77	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	63	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	71	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	77	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	75	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	83	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	78	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	68	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**

**Client Sample ID: 08-21876-NM56P**

Lot-Sample #...: G81030194 - 010  
 Date Sampled...: 08/27/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV68LIAC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 58

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	1.4		1	1.400
Total TCDD	150			
1,2,3,7,8-PeCDD	5.1	J	1	5.100
Total PeCDD	180			
1,2,3,4,7,8-HxCDD	11		0.1	1.100
1,2,3,6,7,8-HxCDD	45		0.1	4.500
1,2,3,7,8,9-HxCDD	13		0.1	1.300
Total HxCDD	1000			
1,2,3,4,6,7,8-HpCDD	1500	B	0.01	15.000
Total HpCDD	6700			
OCDD	10000	E B	0.0003	3.000
2,3,7,8-TCDF	6.4	CON	0.1	0.640
Total TCDF	71			
1,2,3,7,8-PeCDF	3.9	J	0.03	0.120
2,3,4,7,8-PeCDF	4.1	J	0.3	1.200
Total PeCDF	39			
1,2,3,4,7,8-HxCDF	12		0.1	1.200
1,2,3,6,7,8-HxCDF	4.2	J	0.1	0.420
2,3,4,6,7,8-HxCDF	2.6	J	0.1	0.260
1,2,3,7,8,9-HxCDF	1.3	J	0.1	0.130
Total HxCDF	230			
1,2,3,4,6,7,8-HpCDF	130		0.01	1.300
1,2,3,4,7,8,9-HpCDF	7.4		0.01	0.074
Total HpCDF	610			
OCDF	570		0.0003	0.170
Total TEQ Concentration				36.914

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	67	25 - 164
13C-1,2,3,7,8-PeCDD	67	25 - 181
13C-1,2,3,4,7,8-HxCDD	77	32 - 141
13C-1,2,3,6,7,8-HxCDD	63	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	80	23 - 140
13C-OCDD	88	17 - 157
13C-2,3,7,8-TCDF	68	24 - 169
13C-1,2,3,7,8-PeCDF	75	24 - 185
13C-2,3,4,7,8-PeCDF	77	21 - 178
13C-1,2,3,6,7,8-HxCDF	63	26 - 123
13C-2,3,4,6,7,8-HxCDF	71	28 - 136
13C-1,2,3,7,8,9-HxCDF	77	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	75	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	83	26 - 138
13C-1,2,3,4,7,8-HxCDF	78	26 - 152

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21876-NM56P

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	68	35 - 197

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- E Estimated result. Result concentration exceeds the calibration range.
- J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: 08-21879-NM56S

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-011      Work Order #....: KV68N1AC      Matrix.....: SOLID  
 Date Sampled....: 08/27/08      Date Received...: 09/03/08  
 Prep Date.....: 09/04/08      Analysis Date...: 09/09/08  
 Prep Batch #....: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 55

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	0.78 J		pg/g	EPA-5 1613B
Total TCDD	67		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	2.7 J		pg/g	EPA-5 1613B
Total PeCDD	110		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	6.5		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	28		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	9.3		pg/g	EPA-5 1613B
Total HxCDD	600		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	990 B		pg/g	EPA-5 1613B
Total HpCDD	3400		pg/g	EPA-5 1613B
OCDD	7500 E,B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	5.1 CON		pg/g	EPA-5 1613B
Total TCDF	35		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	2.2 J		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	2.4 J		pg/g	EPA-5 1613B
Total PeCDF	21		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	8.0		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	2.5	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	1.9 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	2.3 J		pg/g	EPA-5 1613B
Total HxCDF	140		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	89		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	5.4 J		pg/g	EPA-5 1613B
Total HpCDF	410		pg/g	EPA-5 1613B
OCDF	420		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21879-NM56S

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-011 Work Order #...: KV68N1AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	61	(25 - 164)
13C-1,2,3,7,8-PeCDD	62	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	70	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	62	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	78	(23 - 140)
13C-OCDD	84	(17 - 157)
13C-2,3,7,8-TCDF	62	(24 - 169)
13C-1,2,3,7,8-PeCDF	68	(24 - 185)
13C-2,3,4,7,8-PeCDF	69	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	62	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	70	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	72	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	74	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	81	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	73	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	63	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21879-NM56S**

Lot-Sample #...: G81030194 - 011  
 Date Sampled...: 08/27/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV68N1AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 55

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	0.78	J	1	0.780
Total TCDD	67			
1,2,3,7,8-PeCDD	2.7	J	1	2.700
Total PeCDD	110			
1,2,3,4,7,8-HxCDD	6.5		0.1	0.650
1,2,3,6,7,8-HxCDD	28		0.1	2.800
1,2,3,7,8,9-HxCDD	9.3		0.1	0.930
Total HxCDD	600			
1,2,3,4,6,7,8-HpCDD	990	B	0.01	9.900
Total HpCDD	3400			
OCDD	7500	E B	0.0003	2.200
2,3,7,8-TCDF	5.1	CON	0.1	0.510
Total TCDF	35			
1,2,3,7,8-PeCDF	2.2	J	0.03	0.066
2,3,4,7,8-PeCDF	2.4	J	0.3	0.720
Total PeCDF	21			
1,2,3,4,7,8-HxCDF	8.0		0.1	0.800
1,2,3,6,7,8-HxCDF	ND		0.1	0
2,3,4,6,7,8-HxCDF	1.9	J	0.1	0.190
1,2,3,7,8,9-HxCDF	2.3	J	0.1	0.230
Total HxCDF	140			
1,2,3,4,6,7,8-HpCDF	89		0.01	0.890
1,2,3,4,7,8,9-HpCDF	5.4	J	0.01	0.054
Total HpCDF	410			
OCDF	420		0.0003	0.130
Total TEQ Concentration				23.550

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	61	25 - 164
13C-1,2,3,7,8-PeCDD	62	25 - 181
13C-1,2,3,4,7,8-HxCDD	70	32 - 141
13C-1,2,3,6,7,8-HxCDD	62	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	78	23 - 140
13C-OCDD	84	17 - 157
13C-2,3,7,8-TCDF	62	24 - 169
13C-1,2,3,7,8-PeCDF	68	24 - 185
13C-2,3,4,7,8-PeCDF	69	21 - 178
13C-1,2,3,6,7,8-HxCDF	62	26 - 123
13C-2,3,4,6,7,8-HxCDF	70	28 - 136
13C-1,2,3,7,8,9-HxCDF	72	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	74	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	81	26 - 138
13C-1,2,3,4,7,8-HxCDF	73	26 - 152



Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21879-NM56S

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	63	35 - 197

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- E Estimated result. Result concentration exceeds the calibration range.
- J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: 08-21880-NM56T

Trace Level Organic Compounds

Lot-Sample #...: G8I030194-012    Work Order #...: KV68P1AC    Matrix.....: SOLID  
 Date Sampled...: 08/27/08    Date Received...: 09/03/08  
 Prep Date.....: 09/04/08    Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1  
 % Moisture.....: 51

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.23	pg/g	EPA-5 1613B
<b>Total TCDD</b>	<b>15</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDD	ND	0.49	pg/g	EPA-5 1613B
<b>Total PeCDD</b>	<b>14</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDD	ND	0.35	pg/g	EPA-5 1613B
<b>1,2,3,6,7,8-HxCDD</b>	<b>1.2 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,7,8,9-HxCDD</b>	<b>1.1 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>Total HxCDD</b>	<b>28</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,4,6,7,8-HpCDD</b>	<b>26 B</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>Total HpCDD</b>	<b>73</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>OCDD</b>	<b>250 B</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
2,3,7,8-TCDF	ND CON,G	1.4	pg/g	EPA-5 1613B
<b>Total TCDF</b>	<b>15</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,7,8-PeCDF</b>	<b>0.70 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
2,3,4,7,8-PeCDF	ND	0.72	pg/g	EPA-5 1613B
<b>Total PeCDF</b>	<b>2.2</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,4,7,8-HxCDF</b>	<b>1.7 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,6,7,8-HxCDF</b>	<b>0.64 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>2,3,4,6,7,8-HxCDF</b>	<b>0.74 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,7,8,9-HxCDF</b>	<b>0.25 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>Total HxCDF</b>	<b>8.7</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>1,2,3,4,6,7,8-HpCDF</b>	<b>6.5</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8,9-HpCDF	ND	0.43	pg/g	EPA-5 1613B
<b>Total HpCDF</b>	<b>16</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
<b>OCDF</b>	<b>12</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>

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Analytical Resources Inc

Client Sample ID: 08-21880-NM56T

Trace Level Organic Compounds

Lot-Sample #....: G8I030194-012

Work Order #....: KV68P1AC

Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	86	(25 - 164)
13C-1,2,3,7,8-PeCDD	86	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	97	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	87	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	104	(23 - 140)
13C-OCDD	104	(17 - 157)
13C-2,3,7,8-TCDF	88	(24 - 169)
13C-1,2,3,7,8-PeCDF	94	(24 - 185)
13C-2,3,4,7,8-PeCDF	97	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	86	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	96	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	102	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	99	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	110	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	99	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	90	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

G Elevated reporting limit. The reporting limit is elevated due to matrix interference.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**

**Client Sample ID: 08-21880-NM56T**

Lot-Sample #...: G8I030194 - 012  
 Date Sampled...: 08/27/08  
 Prep Date.....: 09/04/08  
 Prep Batch #...: 8249232

Work Order #...: KV68P1AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/09/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 51

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND	0.23	1	0
<b>Total TCDD</b>	<b>15</b>			
1,2,3,7,8-PeCDD	ND	0.49	1	0
<b>Total PeCDD</b>	<b>14</b>			
1,2,3,4,7,8-HxCDD	ND	0.35	0.1	0
<b>1,2,3,6,7,8-HxCDD</b>	<b>1.2</b>	<b>J</b>	<b>0.1</b>	<b>0.120</b>
<b>1,2,3,7,8,9-HxCDD</b>	<b>1.1</b>	<b>J</b>	<b>0.1</b>	<b>0.110</b>
<b>Total HxCDD</b>	<b>28</b>			
<b>1,2,3,4,6,7,8-HpCDD</b>	<b>26</b>	<b>B</b>	<b>0.01</b>	<b>0.260</b>
<b>Total HpCDD</b>	<b>73</b>			
<b>OCDD</b>	<b>250</b>	<b>B</b>	<b>0.0003</b>	<b>0.075</b>
2,3,7,8-TCDF	ND	CON G 1.4	0.1	0
<b>Total TCDF</b>	<b>15</b>			
<b>1,2,3,7,8-PeCDF</b>	<b>0.70</b>	<b>J</b>	<b>0.03</b>	<b>0.021</b>
2,3,4,7,8-PeCDF	ND	0.72	0.3	0
<b>Total PeCDF</b>	<b>2.2</b>			
<b>1,2,3,4,7,8-HxCDF</b>	<b>1.7</b>	<b>J</b>	<b>0.1</b>	<b>0.170</b>
<b>1,2,3,6,7,8-HxCDF</b>	<b>0.64</b>	<b>J</b>	<b>0.1</b>	<b>0.064</b>
<b>2,3,4,6,7,8-HxCDF</b>	<b>0.74</b>	<b>J</b>	<b>0.1</b>	<b>0.074</b>
<b>1,2,3,7,8,9-HxCDF</b>	<b>0.25</b>	<b>J</b>	<b>0.1</b>	<b>0.025</b>
<b>Total HxCDF</b>	<b>8.7</b>			
<b>1,2,3,4,6,7,8-HpCDF</b>	<b>6.5</b>		<b>0.01</b>	<b>0.065</b>
1,2,3,4,7,8,9-HpCDF	ND	0.43	0.01	0
<b>Total HpCDF</b>	<b>16</b>			
<b>OCDF</b>	<b>12</b>		<b>0.0003</b>	<b>0.004</b>
<b>Total TEQ Concentration</b>				<b>0.988</b>

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	86	25 - 164
13C-1,2,3,7,8-PeCDD	86	25 - 181
13C-1,2,3,4,7,8-HxCDD	97	32 - 141
13C-1,2,3,6,7,8-HxCDD	87	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	104	23 - 140
13C-OCDD	104	17 - 157
13C-2,3,7,8-TCDF	88	24 - 169
13C-1,2,3,7,8-PeCDF	94	24 - 185
13C-2,3,4,7,8-PeCDF	97	21 - 178
13C-1,2,3,6,7,8-HxCDF	86	26 - 123
13C-2,3,4,6,7,8-HxCDF	96	28 - 136
13C-1,2,3,7,8,9-HxCDF	102	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	99	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	110	26 - 138
13C-1,2,3,4,7,8-HxCDF	99	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21880-NM56T**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	90	35 - 197

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- G Elevated reporting limit. The reporting limit is elevated due to matrix interference.
- J Estimated result. Result is less than the reporting limit.

# QC DATA ASSOCIATION SUMMARY

G8I030194

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
002	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
003	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
004	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
005	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
006	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
007	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
008	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
009	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
010	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
011	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
012	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8I030194  
 MB Lot-Sample #: G8I050000-232

Work Order #...: KWCK01AA

Matrix.....: SOLID

Analysis Date...: 09/09/08  
 Dilution Factor: 1

Prep Date.....: 09/04/08

Prep Batch #...: 8249232

PARAMETER	RESULT	DETECTION		METHOD
		LIMIT	UNITS	
2,3,7,8-TCDD	ND	0.082	pg/g	EPA-5 1613B
Total TCDD	ND	0.082	pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	ND	0.16	pg/g	EPA-5 1613B
Total PeCDD	ND	0.16	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	ND	0.10	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	ND	0.093	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	ND	0.090	pg/g	EPA-5 1613B
Total HxCDD	ND	0.10	pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	0.19 J		pg/g	EPA-5 1613B
Total HpCDD	0.19		pg/g	EPA-5 1613B
OCDD	1.8 J		pg/g	EPA-5 1613B
2,3,7,8-TCDF	ND	0.16	pg/g	EPA-5 1613B
Total TCDF	ND	0.16	pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	ND	0.080	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	0.091	pg/g	EPA-5 1613B
Total PeCDF	ND	0.13	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	ND	0.064	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.060	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.057	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.063	pg/g	EPA-5 1613B
Total HxCDF	ND	0.064	pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	ND	0.091	pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.078	pg/g	EPA-5 1613B
Total HpCDF	ND	0.091	pg/g	EPA-5 1613B
OCDF	ND	0.17	pg/g	EPA-5 1613B

(Continued on next page)

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8I030194

Work Order #...: KWCK01AA

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>DETECTION LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
	PERCENT	RECOVERY		
<u>INTERNAL STANDARDS</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
13C-2,3,7,8-TCDD	52	(25 - 164)		
13C-1,2,3,7,8-PeCDD	48	(25 - 181)		
13C-1,2,3,4,7,8-HxCDD	57	(32 - 141)		
13C-1,2,3,6,7,8-HxCDD	52	(28 - 130)		
13C-1,2,3,4,6,7,8-HpCDD	62	(23 - 140)		
13C-OCDD	62	(17 - 157)		
13C-2,3,7,8-TCDF	52	(24 - 169)		
13C-1,2,3,7,8-PeCDF	54	(24 - 185)		
13C-2,3,4,7,8-PeCDF	55	(21 - 178)		
13C-1,2,3,6,7,8-HxCDF	54	(26 - 123)		
13C-2,3,4,6,7,8-HxCDF	56	(28 - 136)		
13C-1,2,3,7,8,9-HxCDF	61	(29 - 147)		
13C-1,2,3,4,6,7,8-HpCDF	61	(28 - 143)		
13C-1,2,3,4,7,8,9-HpCDF	64	(26 - 138)		
13C-1,2,3,4,7,8-HxCDF	54	(26 - 152)		
	PERCENT	RECOVERY		
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>		
37Cl4-2,3,7,8-TCDD	84	(35 - 197)		

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

J Estimated result. Result is less than the reporting limit.



**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**Trace Level Organic Compounds**

Client Lot #...: G8I030194      Work Order #...: KWCK01AC      Matrix.....: SOLID  
 LCS Lot-Sample#: G8I050000-232  
 Prep Date.....: 09/04/08      Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>
2,3,7,8-TCDD	106	(67 - 158)	EPA-5 1613B
1,2,3,7,8-PeCDD	115	(70 - 142)	EPA-5 1613B
1,2,3,4,7,8-HxCDD	111	(70 - 164)	EPA-5 1613B
1,2,3,6,7,8-HxCDD	109	(76 - 134)	EPA-5 1613B
1,2,3,7,8,9-HxCDD	115	(64 - 162)	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	109	(70 - 140)	EPA-5 1613B
OCDD	112	(78 - 144)	EPA-5 1613B
2,3,7,8-TCDF	103	(75 - 158)	EPA-5 1613B
1,2,3,7,8-PeCDF	104	(80 - 134)	EPA-5 1613B
2,3,4,7,8-PeCDF	102	(68 - 160)	EPA-5 1613B
1,2,3,4,7,8-HxCDF	107	(72 - 134)	EPA-5 1613B
1,2,3,6,7,8-HxCDF	107	(84 - 130)	EPA-5 1613B
2,3,4,6,7,8-HxCDF	108	(70 - 156)	EPA-5 1613B
1,2,3,7,8,9-HxCDF	108	(78 - 130)	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	104	(82 - 122)	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	106	(78 - 138)	EPA-5 1613B
OCDF	114	(63 - 170)	EPA-5 1613B

(Continued on next page)

**LABORATORY CONTROL SAMPLE EVALUATION REPORT**

**Trace Level Organic Compounds**

**Client Lot #...**: G8I030194      **Work Order #...**: KWCK01AC      **Matrix.....**: SOLID  
**LCS Lot-Sample#**: G8I050000-232

<u>INTERNAL STANDARD</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	76	(25 - 164)
13C-1,2,3,7,8-PeCDD	76	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	83	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	80	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	91	(23 - 140)
13C-OCDD	93	(17 - 157)
13C-2,3,7,8-TCDF	77	(24 - 169)
13C-1,2,3,7,8-PeCDF	82	(24 - 185)
13C-2,3,4,7,8-PeCDF	85	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	78	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	85	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	90	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	90	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	94	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	83	(26 - 152)
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	78	(35 - 197)

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #...: G8I030194      Work Order #...: KWCK01AC      Matrix.....: SOLID  
 LCS Lot-Sample#: G8I050000-232  
 Prep Date.....: 09/04/08      Analysis Date...: 09/09/08  
 Prep Batch #...: 8249232  
 Dilution Factor: 1

<u>PARAMETER</u>	<u>SPIKE AMOUNT</u>	<u>MEASURED AMOUNT</u>	<u>UNITS</u>	<u>PERCENT RECOVERY</u>	<u>METHOD</u>
2,3,7,8-TCDD	20.0	21.3	pg/g	106	EPA-5 1613B
1,2,3,7,8-PeCDD	100	115	pg/g	115	EPA-5 1613B
1,2,3,4,7,8-HxCDD	100	111	pg/g	111	EPA-5 1613B
1,2,3,6,7,8-HxCDD	100	109	pg/g	109	EPA-5 1613B
1,2,3,7,8,9-HxCDD	100	115	pg/g	115	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	100	109	pg/g	109	EPA-5 1613B
OCDD	200	223	pg/g	112	EPA-5 1613B
2,3,7,8-TCDF	20.0	20.5	pg/g	103	EPA-5 1613B
1,2,3,7,8-PeCDF	100	104	pg/g	104	EPA-5 1613B
2,3,4,7,8-PeCDF	100	102	pg/g	102	EPA-5 1613B
1,2,3,4,7,8-HxCDF	100	107	pg/g	107	EPA-5 1613B
1,2,3,6,7,8-HxCDF	100	107	pg/g	107	EPA-5 1613B
2,3,4,6,7,8-HxCDF	100	108	pg/g	108	EPA-5 1613B
1,2,3,7,8,9-HxCDF	100	108	pg/g	108	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	100	104	pg/g	104	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	100	106	pg/g	106	EPA-5 1613B
OCDF	200	227	pg/g	114	EPA-5 1613B

(Continued on next page)

**LABORATORY CONTROL SAMPLE DATA REPORT**

**Trace Level Organic Compounds**

Client Lot #...: G8I030194      Work Order #...: KWCK01AC      Matrix.....: SOLID  
 LCS Lot-Sample#: G8I050000-232

<u>INTERNAL STANDARD</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	76	(25 - 164)
13C-1,2,3,7,8-PeCDD	76	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	83	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	80	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	91	(23 - 140)
13C-OCDD	93	(17 - 157)
13C-2,3,7,8-TCDF	77	(24 - 169)
13C-1,2,3,7,8-PeCDF	82	(24 - 185)
13C-2,3,4,7,8-PeCDF	85	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	78	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	85	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	90	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	90	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	94	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	83	(26 - 152)
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	78	(35 - 197)

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.  
 Bold print denotes control parameters

# SOLID, D 2216-90, Percent Moisture

Analytical Resources Inc

Client Sample ID: 08-21861-NM56A

General Chemistry

Lot-Sample #...: G81030194-001  
Date Sampled...: 08/26/08  
% Moisture.....: 21

Work Order #...: KV67W  
Date Received...: 09/03/08

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
					<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Moisture	21.4	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21862-NM56B

General Chemistry

Lot-Sample #...: G8I030194-002    Work Order #...: KV671    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 20

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
					<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Moisture	20.2	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21863-NM56C

General Chemistry

Lot-Sample #...: G8I030194-003  
Date Sampled...: 08/26/08  
% Moisture.....: 32

Work Order #...: KV672  
Date Received...: 09/03/08

Matrix.....: SOLID

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	32.0	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1



Analytical Resources Inc

Client Sample ID: 08-21864-NM56D

General Chemistry

Lot-Sample #....: G8I030194-004    Work Order #....: KV675    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 33

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	FREP BATCH #
Percent Moisture	33.4	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21865-NM56E

General Chemistry

Lot-Sample #....: 08I030194-005    Work Order #....: KV676    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 27

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	26.5	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21867-NM56G

General Chemistry

Lot-Sample #...: G8I030194-006  
Date Sampled...: 08/26/08  
% Moisture.....: 32

Work Order #...: KV677  
Date Received...: 09/03/08

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	31.6	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21868-NM56H

General Chemistry

Lot-Sample #...: G8I030194-007    Work Order #...: KV678    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 13

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	12.8	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21870-NM56J

General Chemistry

Lot-Sample #...: G8I030194-008  
Date Sampled...: 08/27/08  
% Moisture.....: 59

Work Order #...: KV679  
Date Received...: 09/03/08

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	58.9	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21873-NM56M

General Chemistry

Lot-Sample #...: G8I030194-009    Work Order #...: KV68J    Matrix.....: SOLID  
Date Sampled...: 08/27/08    Date Received...: 09/03/08  
% Moisture.....: 42

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	41.9	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21876-NM56P

General Chemistry

Lot-Sample #...: G8I030194-010    Work Order #...: KV68L    Matrix.....: SOLID  
Date Sampled...: 08/27/08    Date Received...: 09/03/08  
% Moisture.....: 58

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	58.4	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21879-NM56S

General Chemistry

Lot-Sample #...: G8I030194-011    Work Order #...: KV68N    Matrix.....: SOLID  
Date Sampled...: 08/27/08    Date Received...: 09/03/08  
% Moisture.....: 55

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	55.1	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1



Analytical Resources Inc

Client Sample ID: 08-21880-NM56T

General Chemistry

Lot-Sample #...: G8I030194-012  
Date Sampled...: 08/27/08  
% Moisture.....: 51

Work Order #...: KV68P  
Date Received...: 09/03/08

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
					<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Moisture	51.4	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

# QC DATA ASSOCIATION SUMMARY

G8I030194

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
002	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
003	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
004	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
005	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
006	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
007	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
008	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
009	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
010	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
011	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304
012	SOLID	EPA-5 1613B		8249232	
	SOLID	ASTM D 2216-90		8253485	8253304

**SAMPLE DUPLICATE EVALUATION REPORT**

**General Chemistry**

Client Lot #....: G8I030194

Work Order #....: KV781-SMP  
KV781-DUP

Matrix.....: SOLID

Date Sampled...: 08/26/08

Date Received...: 09/03/08

% Moisture.....: 30

PARAM RESULT	DUPLICATE RESULT	UNITS	RPD	RPD LIMIT	METHOD	PREPARATION- ANALYSIS DATE	PREP BATCH #
Percent Moisture	30.3	%	0.94	(0-20)	SD Lot-Sample #: G8I030305-C01 ASTM D 2216-90	09/09-09/10/08	8253485
Dilution Factor: 1							

September 18, 2008

**TestAmerica Project Number: G81030305**

PO/Contract:

Kelly Bottem  
Analytical Resources Inc  
4611 S 134th Place Suite 100  
Tukwila, WA 98168

Dear Ms. Bottem,

This report contains the analytical results for the samples received under chain of custody by TestAmerica on September 3, 2008. These samples are associated with your NM66 project.

The test results in this report meet all NELAC requirements for parameters that accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4402.

Sincerely,



Laura Nelson  
for  
Jill Kellmann  
Project Manager

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## Case Narrative

### TestAmerica West Sacramento Project Number G8I030305

#### General Comments

Please note that the chain of custody (COC) was not relinquished to the lab with the samples by the appropriate agent.

#### **SOLID, 1613B, Dioxins/Furans**

Sample: 1, 2, 3, 4

Samples 1, 2, 3, and 4 required a Confirmation (CON) analysis, which was performed on September 10, 2008

The method blank associated with this extraction batch has OCDD detected with a concentration below the Reporting Limit (RL) but above the Estimated Detection Limit (EDL). OCDD is a common laboratory contaminant. Any field sample within this batch demonstrating a concentration for OCDD is assigned the "B" qualifier.

There are no other anomalies associated with this project.

## TestAmerica Laboratories West Sacramento Certifications/Accreditations

Certifying State	Certificate #	Certifying State	Certificate #
Alaska	UST-055	New York*	11666
Arizona	AZ0616	Oregon*	CA 200005
Arkansas	04-067-0	Pennsylvania	68-1272
California*	01119CA	South Carolina	87014002
Colorado	NA	Texas	TX 270-2004A
Connecticut	PH-0691	Utah*	QUANI
Florida*	E87570	Virginia	00178
Georgia	960	Washington	C087
Hawaii	NA	West Virginia	9930C, 334
Kansas*	E10375	Wisconsin	998204680
Louisiana*	01944	NFESC	NA
Michigan	9947	USACE	NA
Nevada	CA44	USDA Foreign Plant	37-82605
New Jersey*	CA005	USDA Foreign Soil	S-46613

\*NELAP accredited. A more detailed parameter list is available upon request. Updated 9/21/07

### QC Parameter Definitions

**QC Batch:** The QC batch consists of a set of up to 20 field samples that behave similarly (i.e., same matrix) and are processed using the same procedures, reagents, and standards at the same time.

**Method Blank:** An analytical control consisting of all reagents, which may include internal standards and surrogates, and is carried through the entire analytical procedure. The method blank is used to define the level of laboratory background contamination.

**Laboratory Control Sample and Laboratory Control Sample Duplicate (LCS/LCSD):**

An aliquot of blank matrix spiked with known amounts of representative target analytes. The LCS (and LCSD as required) is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects. If an LCSD is performed, it may also be used to evaluate the precision of the process.

**Duplicate Sample (DU):** Different aliquots of the same sample are analyzed to evaluate the precision of an analysis.

**Surrogates:** Organic compounds not expected to be detected in field samples, which behave similarly to target analytes. These are added to every sample within a batch at a known concentration to determine the efficiency of the sample preparation and analytical process.

**Matrix Spike and Matrix Spike Duplicate (MS/MSD):** An MS is an aliquot of a matrix fortified with known quantities of specific compounds and subjected to an entire analytical procedure in order to indicate the appropriateness of the method for a particular matrix. The percent recovery for the respective compound(s) is then calculated. The MSD is a second aliquot of the same matrix as the matrix spike, also spiked, in order to determine the precision of the method.

**Isotope Dilution:** For isotope dilution methods, isotopically labeled analogs (internal standards) of the native target analytes are spiked into the sample at time of extraction. These internal standards are used for quantitation, and monitor and correct for matrix effects. Since matrix effects on method performance can be judged by the recovery of these analogs, there is little added benefit of performing MS/MSD for these methods. MS/MSD are only performed for client or QAPP requirements.

**Control Limits:** The reported control limits are either based on laboratory historical data, method requirements, or project data quality objectives. The control limits represent the estimated uncertainty of the test results.

## Sample Summary

### TestAmerica West Sacramento Project Number G8I030305

<u>WO#</u>	<u>Sample #</u>	<u>Client Sample ID</u>	<u>Sampling Date</u>	<u>Received Date</u>
KV781	1	08-21963-NM66A	8/26/2008 10:30 AM	9/3/2008 09:25 AM
KV785	2	08-21964-NM66B	8/26/2008 11:42 AM	9/3/2008 09:25 AM
KV789	3	08-21965-NM66C	8/26/2008 01:29 PM	9/3/2008 09:25 AM
KV79A	4	08-21966-NM66D	8/26/2008 07:20 PM	9/3/2008 09:25 AM

#### Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.





Laboratory: SEVERN TRENT LABORATORY-SACRAMENTOARI Client: Hart Crowser, Inc.  
 Lab Contact: JILL KELLMAN Project ID: Bellingham Bay Piles  
 Lab Address: 880 RIVERSIDE PARKWAY ARI PM: Kelly Bottem  
 WEST SACRAMENTO, CA 95605 Phone: 206-695-6211  
 Phone: 916-373-5600 Fax: 206-695-6201  
 Fax:

Analytical Protocol: PSDDA Requested Turn Around:  
 Special Instructions: Fax Results (Y/N): **Yes**

**Limits of Liability.** Subcontractor is expected to perform all requested services in accordance with appropriate methodology following Standard Operating Procedures that meet standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the negotiated amount for said services. The agreement by the Subcontractor to perform services requested by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Subcontractor.

ARI ID	Client ID/ Add'l ID	Sampled	Matrix	Bottles	Analyses
08-21963-NM66A	BBP-SS-01	08/26/08 1030	Sediment	1	Dioxins/Furans 8290 (Su) 1613
Special Instructions: None					
08-21964-NM66B	BBP-SS-02	08/26/08 1142	Sediment	1	Dioxins/Furans 8290 (Su) 1613
Special Instructions: None					
08-21965-NM66C	BBP-SS-03	08/26/08 1329	Sediment	1	Dioxins/Furans 8290 (Su) 1613
Special Instructions: None					
08-21966-NM66D	BBP-SC-01	08/27/08 1920	Sediment	1	Dioxins/Furans 8290 (Su) 1613
Special Instructions: None					

Carrier	Airbill		Date
Relinquished by	Company	Date	Time
Received by <i>Chris</i>	Company <i>TRC</i>	Date <i>9-3-08</i>	Time <i>1315</i>

CLIENT Analytical Resources PM JK LOG # 53957

LOT# (QUANTIMS ID) G81030305 QUOTE# 80669 LOCATION WIAFWC

DATE RECEIVED 9-3-08 TIME RECEIVED 925 Initials JK Date 9-3-08

DELIVERED BY  FEDEX  CA OVERNIGHT  CLIENT  
 AIRBORNE  GOLDENSTATE  DHL  
 UPS  BAX GLOBAL  GO-GETTERS  
 TAL COURIER  VALLEY LOGISTICS  MORGAN HILL COURIER  
 OTHER

CUSTODY SEAL STATUS  INTACT  BROKEN  N/A

CUSTODY SEAL #(S) \_\_\_\_\_

SHIPPING CONTAINER(S)  TAL  CLIENT  N/A

TEMPERATURE RECORD (IN °C) IR 4  5  OTHER \_\_\_\_\_

COC #(S) \_\_\_\_\_

TEMPERATURE BLANK Observed: N/A Corrected: \_\_\_\_\_

SAMPLE TEMPERATURE  
Observed: 2 3 4 Average: 3 Corrected Average: 4

COLLECTOR'S NAME:  Verified from COC  Not on COC

pH MEASURED  YES  ANOMALY  N/A

LABELED BY.....

LABELS CHECKED BY.....

PEER REVIEW  NA

SHORT HOLD TEST NOTIFICATION SAMPLE RECEIVING  
WETCHEM  N/A  
VOA-ENCORES  N/A

METALS NOTIFIED OF FILTER/PRESERVE VIA VERBAL & EMAIL  N/A

COMPLETE SHIPMENT RECEIVED IN GOOD CONDITION WITH APPROPRIATE TEMPERATURES, CONTAINERS, PRESERVATIVES  N/A

CLOUSEAU  TEMPERATURE EXCEEDED (2 °C - 6 °C)<sup>1</sup>  N/A

WET ICE  BLUE ICE  GEL PACK  NO COOLING AGENTS USED  PM NOTIFIED

Notes: Coc not relinquished

\*1 Acceptable temperature range for State of Wisconsin samples is <4°C.

# Bottle Lot Inventory

Lot ID: 68E030305

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOA*	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
VOAh*	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
AGB																				
AGBs																				
250AGB																				
250AGBs																				
250AGBn																				
500AGB																				
___AGJ																				
500AGJ																				
250AGJ																				
125AGJ																				
___CGJ																				
500CGJ	(	)	(	)																
250CGJ																				
125CGJ																				
PJ																				
PJn																				
500PJ																				
500PJn																				
500PJna																				
500PJzn/na																				
250PJ																				
250PJn																				
250PJna																				
250PJzn/na																				
Acetate Tube																				
___"CT																				
Encore																				
Folder/filter																				
PUF																				
Petri/Filter																				
XAD Trap																				
Ziploc																				

h = hydrochloric acid    s = sulfuric acid    na = sodium hydroxide    n = nitric acid    zn = zinc acetate

Number of VOAs with air bubbles present / total number of VOA's

# SOLID, 1613B, Dioxins/Furans

Analytical Resources Inc

Client Sample ID: 08-21963-NM66A

Trace Level Organic Compounds

Lot-Sample #...: G8I030305-001    Work Order #...: KV7811AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/08/08    Analysis Date...: 09/10/08  
 Prep Batch #...: 8252477  
 Dilution Factor: 1  
 % Moisture.....: 30

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.093	pg/g	EPA-5 1613B
<b>Total TCDD</b>	<b>6.3</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDD	ND	0.19	pg/g	EPA-5 1613B
<b>Total PeCDD</b>	<b>10</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDD	0.53 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	1.5 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	1.1 J		pg/g	EPA-5 1613B
<b>Total HxCDD</b>	<b>23</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDD	32		pg/g	EPA-5 1613B
<b>Total HpCDD</b>	<b>76</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDD	350 B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	0.78 CON		pg/g	EPA-5 1613B
<b>Total TCDF</b>	<b>2.3</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,7,8-PeCDF	ND	0.14	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	0.14	pg/g	EPA-5 1613B
<b>Total PeCDF</b>	<b>1.7</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,7,8-HxCDF	0.43 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.19	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.23	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.079	pg/g	EPA-5 1613B
<b>Total HxCDF</b>	<b>6.2</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
1,2,3,4,6,7,8-HpCDF	5.1		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	0.34 J		pg/g	EPA-5 1613B
<b>Total HpCDF</b>	<b>18</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
OCDF	19		pg/g	EPA-5 1613B

(Continued on next page)

Analytical Resources Inc

Client Sample ID: 08-21963-NM66A

Trace Level Organic Compounds

Lot-Sample #...: G8I030305-001 Work Order #...: KV7811AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	87	(25 - 164)
13C-1,2,3,7,8-PeCDD	70	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	80	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	90	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	84	(23 - 140)
13C-OCDD	62	(17 - 157)
13C-2,3,7,8-TCDF	70	(24 - 169)
13C-1,2,3,7,8-PeCDF	74	(24 - 185)
13C-2,3,4,7,8-PeCDF	75	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	86	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	89	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	94	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	83	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	85	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	86	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	85	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21963-NM66A**

Lot-Sample #...: G8I030305 - 001  
 Date Sampled...: 08/26/08  
 Prep Date.....: 09/08/08  
 Prep Batch #...: 8252477

Work Order #...: KV7811AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/10/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 30

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND	0.093	1	0
<b>Total TCDD</b>	<b>6.3</b>			
1,2,3,7,8-PeCDD	ND	0.19	1	0
<b>Total PeCDD</b>	<b>10</b>			
<b>1,2,3,4,7,8-HxCDD</b>	<b>0.53</b>	<b>J</b>	<b>0.1</b>	<b>0.053</b>
<b>1,2,3,6,7,8-HxCDD</b>	<b>1.5</b>	<b>J</b>	<b>0.1</b>	<b>0.150</b>
<b>1,2,3,7,8,9-HxCDD</b>	<b>1.1</b>	<b>J</b>	<b>0.1</b>	<b>0.110</b>
<b>Total HxCDD</b>	<b>23</b>			
<b>1,2,3,4,6,7,8-HpCDD</b>	<b>32</b>		<b>0.01</b>	<b>0.320</b>
<b>Total HpCDD</b>	<b>76</b>			
<b>OCDD</b>	<b>350</b>	<b>B</b>	<b>0.0003</b>	<b>0.100</b>
<b>2,3,7,8-TCDF</b>	<b>0.78</b>	<b>CON</b>	<b>0.1</b>	<b>0.078</b>
<b>Total TCDF</b>	<b>2.3</b>			
1,2,3,7,8-PeCDF	ND	0.14	0.03	0
2,3,4,7,8-PeCDF	ND	0.14	0.3	0
<b>Total PeCDF</b>	<b>1.7</b>			
<b>1,2,3,4,7,8-HxCDF</b>	<b>0.43</b>	<b>J</b>	<b>0.1</b>	<b>0.043</b>
1,2,3,6,7,8-HxCDF	ND	0.19	0.1	0
2,3,4,6,7,8-HxCDF	ND	0.23	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.079	0.1	0
<b>Total HxCDF</b>	<b>6.2</b>			
<b>1,2,3,4,6,7,8-HpCDF</b>	<b>5.1</b>		<b>0.01</b>	<b>0.051</b>
<b>1,2,3,4,7,8,9-HpCDF</b>	<b>0.34</b>	<b>J</b>	<b>0.01</b>	<b>0.003</b>
<b>Total HpCDF</b>	<b>18</b>			
<b>OCDF</b>	<b>19</b>		<b>0.0003</b>	<b>0.006</b>
<b>Total TEQ Concentration</b>				<b>0.914</b>

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	87	25 - 164
13C-1,2,3,7,8-PeCDD	70	25 - 181
13C-1,2,3,4,7,8-HxCDD	80	32 - 141
13C-1,2,3,6,7,8-HxCDD	90	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	84	23 - 140
13C-OCDD	62	17 - 157
13C-2,3,7,8-TCDF	70	24 - 169
13C-1,2,3,7,8-PeCDF	74	24 - 185
13C-2,3,4,7,8-PeCDF	75	21 - 178
13C-1,2,3,6,7,8-HxCDF	86	26 - 123
13C-2,3,4,6,7,8-HxCDF	89	28 - 136
13C-1,2,3,7,8,9-HxCDF	94	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	83	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	85	26 - 138
13C-1,2,3,4,7,8-HxCDF	86	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21963-NM66A**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	85	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland. June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- J Estimated result. Result is less than the reporting limit.



Analytical Resources Inc

Client Sample ID: 08-21964-NM66B

Trace Level Organic Compounds

Lot-Sample #....: G8I030305-002    Work Order #....: KV7851AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/08/08    Analysis Date...: 09/10/08  
 Prep Batch #....: 8252477  
 Dilution Factor: 1  
 % Moisture.....: 37

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	0.17	pg/g	EPA-5 1613B
Total TCDD	20		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	0.66 J		pg/g	EPA-5 1613B
Total PeCDD	33		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	1.3 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	3.1 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	2.2 J		pg/g	EPA-5 1613B
Total HxCDD	61		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	59		pg/g	EPA-5 1613B
Total HpCDD	140		pg/g	EPA-5 1613B
OCDD	540 B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	1.8 CON		pg/g	EPA-5 1613B
Total TCDF	9.0		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	0.32 J		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	0.38 J		pg/g	EPA-5 1613B
Total PeCDF	4.4		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	1.0 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	0.51 J		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	0.73 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	0.30 J		pg/g	EPA-5 1613B
Total HxCDF	15		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	9.5		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.54	pg/g	EPA-5 1613B
Total HpCDF	33		pg/g	EPA-5 1613B
OCDF	31		pg/g	EPA-5 1613B

(Continued on next page)

Analytical Resources Inc

Client Sample ID: 08-21964-NM66B

Trace Level Organic Compounds

Lot-Sample #...: G8I030305-002 Work Order #...: KV7851AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	88	(25 - 164)
13C-1,2,3,7,8-PeCDD	72	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	87	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	82	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	83	(23 - 140)
13C-OCDD	68	(17 - 157)
13C-2,3,7,8-TCDF	72	(24 - 169)
13C-1,2,3,7,8-PeCDF	76	(24 - 185)
13C-2,3,4,7,8-PeCDF	78	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	81	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	87	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	90	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	79	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	85	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	88	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	85	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21964-NM66B**

Lot-Sample #...: G81030305 - 002  
 Date Sampled...: 08/26/08  
 Prep Date.....: 09/08/08  
 Prep Batch #...: 8252477

Work Order #...: KV7851AC  
 Date Received...: 09/03/08  
 Analysis Date...: 09/10/08  
 Dilution Factor: 1

Matrix.....: SOLID  
 Instrument: 9D5  
 Units.....: pg/g  
 % Moisture: 37

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND	0.17	1	0
<b>Total TCDD</b>	<b>20</b>			
1,2,3,7,8-PeCDD	0.66 J		1	0.660
<b>Total PeCDD</b>	<b>33</b>			
1,2,3,4,7,8-HxCDD	1.3 J		0.1	0.130
1,2,3,6,7,8-HxCDD	3.1 J		0.1	0.310
1,2,3,7,8,9-HxCDD	2.2 J		0.1	0.220
<b>Total HxCDD</b>	<b>61</b>			
1,2,3,4,6,7,8-HpCDD	59		0.01	0.590
<b>Total HpCDD</b>	<b>140</b>			
OCDD	540 B		0.0003	0.160
2,3,7,8-TCDF	1.8 CON		0.1	0.180
<b>Total TCDF</b>	<b>9.0</b>			
1,2,3,7,8-PeCDF	0.32 J		0.03	0.010
2,3,4,7,8-PeCDF	0.38 J		0.3	0.110
<b>Total PeCDF</b>	<b>4.4</b>			
1,2,3,4,7,8-HxCDF	1.0 J		0.1	0.100
1,2,3,6,7,8-HxCDF	0.51 J		0.1	0.051
2,3,4,6,7,8-HxCDF	0.73 J		0.1	0.073
1,2,3,7,8,9-HxCDF	0.30 J		0.1	0.030
<b>Total HxCDF</b>	<b>15</b>			
1,2,3,4,6,7,8-HpCDF	9.5		0.01	0.095
1,2,3,4,7,8,9-HpCDF	ND	0.54	0.01	0
<b>Total HpCDF</b>	<b>33</b>			
<b>OCDF</b>	<b>31</b>		<b>0.0003</b>	<b>0.009</b>
<b>Total TEQ Concentration</b>				<b>2.728</b>

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	88	25 - 164
13C-1,2,3,7,8-PeCDD	72	25 - 181
13C-1,2,3,4,7,8-HxCDD	87	32 - 141
13C-1,2,3,6,7,8-HxCDD	82	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	83	23 - 140
13C-OCDD	68	17 - 157
13C-2,3,7,8-TCDF	72	24 - 169
13C-1,2,3,7,8-PeCDF	76	24 - 185
13C-2,3,4,7,8-PeCDF	78	21 - 178
13C-1,2,3,6,7,8-HxCDF	81	26 - 123
13C-2,3,4,6,7,8-HxCDF	87	28 - 136
13C-1,2,3,7,8,9-HxCDF	90	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	79	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	85	26 - 138
13C-1,2,3,4,7,8-HxCDF	88	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21964-NM66B**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	85	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- J Estimated result. Result is less than the reporting limit.

Analytical Resources Inc

Client Sample ID: 08-21965-NM66C

Trace Level Organic Compounds

Lot-Sample #...: G8I030305-003    Work Order #...: KV7891AC    Matrix.....: SOLID  
 Date Sampled...: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/08/08    Analysis Date...: 09/10/08  
 Prep Batch #...: 8252477  
 Dilution Factor: 1  
 % Moisture.....: 80

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	1.6 J		pg/g	EPA-5 1613B
Total TCDD	93		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	ND	4.6	pg/g	EPA-5 1613B
Total PeCDD	95		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	4.6 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	19		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	12 J		pg/g	EPA-5 1613B
Total HxCDD	190		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	410		pg/g	EPA-5 1613B
Total HpCDD	740		pg/g	EPA-5 1613B
OCDD	5800 B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	7.0 CON		pg/g	EPA-5 1613B
Total TCDF	56		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	ND	2.2	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	2.2 J		pg/g	EPA-5 1613B
Total PeCDF	25		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	5.1 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	2.0	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	2.3 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.81	pg/g	EPA-5 1613B
Total HxCDF	73		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	46		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	3.3	pg/g	EPA-5 1613B
Total HpCDF	180		pg/g	EPA-5 1613B
OCDF	220		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21965-NM66C

Trace Level Organic Compounds

Lot-Sample #...: G8I030305-003 Work Order #...: KV7891AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	90	(25 - 164)
13C-1,2,3,7,8-PeCDD	74	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	94	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	84	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	84	(23 - 140)
13C-OCDD	64	(17 - 157)
13C-2,3,7,8-TCDF	72	(24 - 169)
13C-1,2,3,7,8-PeCDF	79	(24 - 185)
13C-2,3,4,7,8-PeCDF	82	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	84	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	91	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	92	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	81	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	83	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	95	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	87	(35 - 197)

**NOTE (S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21965-NM66C**

Lot-Sample #...: G8I030305 - 003	Work Order #...: KV7891AC	Matrix....: SOLID
Date Sampled...: 08/26/08	Date Received...: 09/03/08	Instrument: 9D5
Prep Date.....: 09/08/08	Analysis Date...: 09/10/08	Units.....: pg/g
Prep Batch #...: 8252477	Dilution Factor: 1	% Moisture: 80

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
<b>2,3,7,8-TCDD</b>	<b>1.6</b>	<b>J</b>	<b>1</b>	<b>1.600</b>
<b>Total TCDD</b>	<b>93</b>			
1,2,3,7,8-PeCDD	ND	4.6	1	0
<b>Total PeCDD</b>	<b>95</b>			
<b>1,2,3,4,7,8-HxCDD</b>	<b>4.6</b>	<b>J</b>	<b>0.1</b>	<b>0.460</b>
<b>1,2,3,6,7,8-HxCDD</b>	<b>19</b>		<b>0.1</b>	<b>1.900</b>
<b>1,2,3,7,8,9-HxCDD</b>	<b>12</b>	<b>J</b>	<b>0.1</b>	<b>1.200</b>
<b>Total HxCDD</b>	<b>190</b>			
<b>1,2,3,4,6,7,8-HpCDD</b>	<b>410</b>		<b>0.01</b>	<b>4.100</b>
<b>Total HpCDD</b>	<b>740</b>			
<b>OCDD</b>	<b>5800</b>	<b>B</b>	<b>0.0003</b>	<b>1.700</b>
<b>2,3,7,8-TCDF</b>	<b>7.0</b>	<b>CON</b>	<b>0.1</b>	<b>0.700</b>
<b>Total TCDF</b>	<b>56</b>			
1,2,3,7,8-PeCDF	ND	2.2	0.03	0
<b>2,3,4,7,8-PeCDF</b>	<b>2.2</b>	<b>J</b>	<b>0.3</b>	<b>0.660</b>
<b>Total PeCDF</b>	<b>25</b>			
<b>1,2,3,4,7,8-HxCDF</b>	<b>5.1</b>	<b>J</b>	<b>0.1</b>	<b>0.510</b>
1,2,3,6,7,8-HxCDF	ND	2.0	0.1	0
<b>2,3,4,6,7,8-HxCDF</b>	<b>2.3</b>	<b>J</b>	<b>0.1</b>	<b>0.230</b>
1,2,3,7,8,9-HxCDF	ND	0.81	0.1	0
<b>Total HxCDF</b>	<b>73</b>			
<b>1,2,3,4,6,7,8-HpCDF</b>	<b>46</b>		<b>0.01</b>	<b>0.460</b>
1,2,3,4,7,8,9-HpCDF	ND	3.3	0.01	0
<b>Total HpCDF</b>	<b>180</b>			
<b>OCDF</b>	<b>220</b>		<b>0.0003</b>	<b>0.066</b>
<b>Total TEQ Concentration</b>				<b>13.586</b>

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	90	25 - 164
13C-1,2,3,7,8-PeCDD	74	25 - 181
13C-1,2,3,4,7,8-HxCDD	94	32 - 141
13C-1,2,3,6,7,8-HxCDD	84	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	84	23 - 140
13C-OCDD	64	17 - 157
13C-2,3,7,8-TCDF	72	24 - 169
13C-1,2,3,7,8-PeCDF	79	24 - 185
13C-2,3,4,7,8-PeCDF	82	21 - 178
13C-1,2,3,6,7,8-HxCDF	84	26 - 123
13C-2,3,4,6,7,8-HxCDF	91	28 - 136
13C-1,2,3,7,8,9-HxCDF	92	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	81	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	83	26 - 138
13C-1,2,3,4,7,8-HxCDF	95	26 - 152

Analytical Resources Inc  
Dioxins/Furans, HRGC/HRMS (1613B)  
Client Sample ID: 08-21965-NM66C

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	87	35 - 197

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- J Estimated result. Result is less than the reporting limit.



Analytical Resources Inc

Client Sample ID: 08-21966-NM66D

Trace Level Organic Compounds

Lot-Sample #....: G8I030305-004    Work Order #....: KV79A1AC    Matrix.....: SOLID  
 Date Sampled....: 08/26/08    Date Received...: 09/03/08  
 Prep Date.....: 09/08/08    Analysis Date...: 09/10/08  
 Prep Batch #....: 8252477  
 Dilution Factor: 1  
 % Moisture.....: 32

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	1.6		pg/g	EPA-5 1613B
Total TCDD	27		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	0.54 J		pg/g	EPA-5 1613B
Total PeCDD	35		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	0.88 J		pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	2.1 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	1.4 J		pg/g	EPA-5 1613B
Total HxCDD	45		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	31		pg/g	EPA-5 1613B
Total HpCDD	65		pg/g	EPA-5 1613B
OCDD	250 B		pg/g	EPA-5 1613B
2,3,7,8-TCDF	1.6 CON		pg/g	EPA-5 1613B
Total TCDF	14		pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	0.35 J		pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	0.38 J		pg/g	EPA-5 1613B
Total PeCDF	4.4		pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	ND	0.53	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	0.28 J		pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	0.18 J		pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.12	pg/g	EPA-5 1613B
Total HxCDF	7.5		pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	5.4		pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	0.29 J		pg/g	EPA-5 1613B
Total HpCDF	18		pg/g	EPA-5 1613B
OCDF	16		pg/g	EPA-5 1613B

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Analytical Resources Inc

Client Sample ID: 08-21966-NM66D

Trace Level Organic Compounds

Lot-Sample #...: G8I030305-004 Work Order #...: KV79A1AC Matrix.....: SOLID

<u>INTERNAL STANDARDS</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	86	(25 - 164)
13C-1,2,3,7,8-PeCDD	76	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	97	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	86	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	90	(23 - 140)
13C-OCDD	76	(17 - 157)
13C-2,3,7,8-TCDF	69	(24 - 169)
13C-1,2,3,7,8-PeCDF	80	(24 - 185)
13C-2,3,4,7,8-PeCDF	82	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	87	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	91	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	94	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	85	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	89	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	93	(26 - 152)

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	85	(35 - 197)

**NOTE(S) :**

Results and reporting limits have been adjusted for dry weight.

J Estimated result. Result is less than the reporting limit.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

CON Confirmation analysis.

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21966-NM66D**

Lot-Sample #...: G8I030305 - 004	Work Order #...: KV79A1AC	Matrix...: SOLID
Date Sampled...: 08/26/08	Date Received...: 09/03/08	Instrument: 9D5
Prep Date.....: 09/08/08	Analysis Date..: 09/10/08	Units.....: pg/g
Prep Batch #...: 8252477	Dilution Factor: 1	% Moisture: 32

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	1.6		1	1.600
Total TCDD	27			
1,2,3,7,8-PeCDD	0.54	J	1	0.540
Total PeCDD	35			
1,2,3,4,7,8-HxCDD	0.88	J	0.1	0.088
1,2,3,6,7,8-HxCDD	2.1	J	0.1	0.210
1,2,3,7,8,9-HxCDD	1.4	J	0.1	0.140
Total HxCDD	45			
1,2,3,4,6,7,8-HpCDD	31		0.01	0.310
Total HpCDD	65			
OCDD	250	B	0.0003	0.075
2,3,7,8-TCDF	1.6	CON	0.1	0.160
Total TCDF	14			
1,2,3,7,8-PeCDF	0.35	J	0.03	0.011
2,3,4,7,8-PeCDF	0.38	J	0.3	0.110
Total PeCDF	4.4			
1,2,3,4,7,8-HxCDF	ND		0.53	0
1,2,3,6,7,8-HxCDF	0.28	J	0.1	0.028
2,3,4,6,7,8-HxCDF	0.18	J	0.1	0.018
1,2,3,7,8,9-HxCDF	ND		0.12	0
Total HxCDF	7.5			
1,2,3,4,6,7,8-HpCDF	5.4		0.01	0.054
1,2,3,4,7,8,9-HpCDF	0.29	J	0.01	0.003
Total HpCDF	18			
OCDF	16		0.0003	0.005
Total TEQ Concentration				3.352

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	86	25 - 164
13C-1,2,3,7,8-PeCDD	76	25 - 181
13C-1,2,3,4,7,8-HxCDD	97	32 - 141
13C-1,2,3,6,7,8-HxCDD	86	28 - 130
13C-1,2,3,4,6,7,8-HpCDD	90	23 - 140
13C-OCDD	76	17 - 157
13C-2,3,7,8-TCDF	69	24 - 169
13C-1,2,3,7,8-PeCDF	80	24 - 185
13C-2,3,4,7,8-PeCDF	82	21 - 178
13C-1,2,3,6,7,8-HxCDF	87	26 - 123
13C-2,3,4,6,7,8-HxCDF	91	28 - 136
13C-1,2,3,7,8,9-HxCDF	94	29 - 147
13C-1,2,3,4,6,7,8-HpCDF	85	28 - 143
13C-1,2,3,4,7,8,9-HpCDF	89	26 - 138
13C-1,2,3,4,7,8-HxCDF	93	26 - 152

**Analytical Resources Inc**  
**Dioxins/Furans, HRGC/HRMS (1613B)**  
**Client Sample ID: 08-21966-NM66D**

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37C14-2,3,7,8-TCDD	85	35 - 197

**Notes:**

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Geneva, Switzerland, June 2005.

- B Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- CON Confirmation analysis.
- J Estimated result. Result is less than the reporting limit.

# QC DATA ASSOCIATION SUMMARY

G8I030305

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	EPA-5 1613B		8252477	
002	SOLID	EPA-5 1613B		8252477	
003	SOLID	EPA-5 1613B		8252477	
004	SOLID	EPA-5 1613B		8252477	

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8I030305  
 MB Lot-Sample #: G8I080000-477

Work Order #...: KWGL91AE

Matrix.....: SOLID

Prep Date.....: 09/08/08

Analysis Date..: 09/10/08

Prep Batch #...: 8252477

Dilution Factor: 1

PARAMETER	RESULT	DETECTION		METHOD
		LIMIT	UNITS	
2,3,7,8-TCDD	ND	0.059	pg/g	EPA-5 1613B
Total TCDD	ND	0.059	pg/g	EPA-5 1613B
1,2,3,7,8-PeCDD	ND	0.16	pg/g	EPA-5 1613B
Total PeCDD	ND	0.16	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDD	ND	0.12	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDD	ND	0.11	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDD	ND	0.10	pg/g	EPA-5 1613B
Total HxCDD	ND	0.15	pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDD	ND	0.39	pg/g	EPA-5 1613B
Total HpCDD	ND	0.39	pg/g	EPA-5 1613B
<b>OCDD</b>	<b>0.80 J</b>		<b>pg/g</b>	<b>EPA-5 1613B</b>
2,3,7,8-TCDF	ND	0.081	pg/g	EPA-5 1613B
Total TCDF	ND	0.081	pg/g	EPA-5 1613B
1,2,3,7,8-PeCDF	ND	0.066	pg/g	EPA-5 1613B
2,3,4,7,8-PeCDF	ND	0.074	pg/g	EPA-5 1613B
Total PeCDF	ND	0.095	pg/g	EPA-5 1613B
1,2,3,4,7,8-HxCDF	ND	0.061	pg/g	EPA-5 1613B
1,2,3,6,7,8-HxCDF	ND	0.056	pg/g	EPA-5 1613B
2,3,4,6,7,8-HxCDF	ND	0.055	pg/g	EPA-5 1613B
1,2,3,7,8,9-HxCDF	ND	0.069	pg/g	EPA-5 1613B
Total HxCDF	ND	0.069	pg/g	EPA-5 1613B
1,2,3,4,6,7,8-HpCDF	ND	0.19	pg/g	EPA-5 1613B
1,2,3,4,7,8,9-HpCDF	ND	0.31	pg/g	EPA-5 1613B
Total HpCDF	ND	0.31	pg/g	EPA-5 1613B
OCDF	ND	0.37	pg/g	EPA-5 1613B

(Continued on next page)

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G8I030305

Work Order #...: KWGL91AE

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>DETECTION LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>		
<u>INTERNAL STANDARDS</u>				
13C-2,3,7,8-TCDD	87	(25 - 164)		
13C-1,2,3,7,8-PeCDD	68	(25 - 181)		
13C-1,2,3,4,7,8-HxCDD	82	(32 - 141)		
13C-1,2,3,6,7,8-HxCDD	91	(28 - 130)		
13C-1,2,3,4,6,7,8-HpCDD	90	(23 - 140)		
13C-OCDD	63	(17 - 157)		
13C-2,3,7,8-TCDF	70	(24 - 169)		
13C-1,2,3,7,8-PeCDF	73	(24 - 185)		
13C-2,3,4,7,8-PeCDF	75	(21 - 178)		
13C-1,2,3,6,7,8-HxCDF	92	(26 - 123)		
13C-2,3,4,6,7,8-HxCDF	95	(28 - 136)		
13C-1,2,3,7,8,9-HxCDF	95	(29 - 147)		
13C-1,2,3,4,6,7,8-HpCDF	87	(28 - 143)		
13C-1,2,3,4,7,8,9-HpCDF	87	(26 - 138)		
13C-1,2,3,4,7,8-HxCDF	89	(26 - 152)		
	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>		
<u>SURROGATE</u>				
37Cl4-2,3,7,8-TCDD	84	(35 - 197)		

**NOTE (S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

J Estimated result. Result is less than the reporting limit.

**LABORATORY CONTROL SAMPLE DATA REPORT**

**Trace Level Organic Compounds**

**Client Lot #...**: G8I030305

**Work Order #...**: KWGL91AC

**Matrix.....**: SOLID

**LCS Lot-Sample#**: G8I080000-477

<u>INTERNAL STANDARD</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
13C-2,3,7,8-TCDD	89	(25 - 164)
13C-1,2,3,7,8-PeCDD	71	(25 - 181)
13C-1,2,3,4,7,8-HxCDD	84	(32 - 141)
13C-1,2,3,6,7,8-HxCDD	90	(28 - 130)
13C-1,2,3,4,6,7,8-HpCDD	90	(23 - 140)
13C-OCDD	69	(17 - 157)
13C-2,3,7,8-TCDF	72	(24 - 169)
13C-1,2,3,7,8-PeCDF	77	(24 - 185)
13C-2,3,4,7,8-PeCDF	81	(21 - 178)
13C-1,2,3,6,7,8-HxCDF	87	(26 - 123)
13C-2,3,4,6,7,8-HxCDF	90	(28 - 136)
13C-1,2,3,7,8,9-HxCDF	95	(29 - 147)
13C-1,2,3,4,6,7,8-HpCDF	88	(28 - 143)
13C-1,2,3,4,7,8,9-HpCDF	91	(26 - 138)
13C-1,2,3,4,7,8-HxCDF	89	(26 - 152)
<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
37Cl4-2,3,7,8-TCDD	86	(35 - 197)

**NOTE(S) :**

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters



# SOLID, D 2216-90, Percent Moisture

Analytical Resources Inc

Client Sample ID: 08-21963-NM66A

General Chemistry

Lot-Sample #...: G8I030305-001

Work Order #...: KV781

Matrix.....: SOLID

Date Sampled...: 08/26/08

Date Received...: 09/03/08

% Moisture.....: 30

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	30.3	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21964-NM66B

General Chemistry

Lot-Sample #....: G8I030305-002    Work Order #....: KV785    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 37

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION- ANALYSIS DATE	PREF BATCH #
Percent Moisture	36.8	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21965-NM66C

General Chemistry

Lot-Sample #....: G8I030305-003    Work Order #....: KV789    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 80

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	80.1	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

Analytical Resources Inc

Client Sample ID: 08-21966-NM66D

General Chemistry

Lot-Sample #....: G8I030305-004    Work Order #....: KV79A    Matrix.....: SOLID  
Date Sampled...: 08/26/08    Date Received...: 09/03/08  
% Moisture.....: 32

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
					<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Moisture	31.7	0.10	%	ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

# QC DATA ASSOCIATION SUMMARY

G81030305

Sample Preparation and Analysis Control Numbers

<u>SAMPLE#</u>	<u>MATRIX</u>	<u>ANALYTICAL METHOD</u>	<u>LEACH BATCH #</u>	<u>PREP BATCH #</u>	<u>MS RUN#</u>
001	SOLID	EPA-5 1613B		8252477	
	SOLID	ASTM D 2216-90		8253485	8253304
002	SOLID	EPA-5 1613B		8252477	
	SOLID	ASTM D 2216-90		8253485	8253304
003	SOLID	EPA-5 1613B		8252477	
	SOLID	ASTM D 2216-90		8253485	8253304
004	SOLID	EPA-5 1613B		8252477	
	SOLID	ASTM D 2216-90		8253485	8253304

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: G8I030305

Work Order #...: KV781-SMP  
KV781-DUP

Matrix.....: SOLID

Date Sampled...: 08/26/08

Date Received..: 09/03/08

% Moisture.....: 30

<u>PARAM RESULT</u>	<u>DUPLICATE RESULT</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD LIMIT</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Percent Moisture	30.1	%	0.94	(0-20)	SD Lot-Sample #: G8I030305-001 ASTM D 2216-90	09/09-09/10/08	8253485

Dilution Factor: 1

**APPENDIX C**  
**SEDIMENT TOXICITY TESTING DATA QUALITY REVIEW**  
**AND LABORATORY REPORTS**  
**NORTHWESTERN AQUATIC SCIENCES**



**APPENDIX C  
SEDIMENT TOXICITY TESTING DATA QUALITY REVIEW  
AND LABORATORY REPORTS  
NORTHWESTERN AQUATIC SCIENCES**

Sediments were evaluated based on Sediment Management Standards (SMS) biological criteria. These criteria are based on both statistical significance (a statistical comparison) and the degree of biological response (a numerical comparison). The SMS criteria are derived from Chapter 173-204 WAC and the Ecology SAPA (Ecology 2003). Two numerical comparisons are made under SMS, the Sediment Quality Standards (SQS) and the Cleanup Screening Level (CSL). The SQS is more stringent than the CSL, allowing for a smaller biological response in the test treatments.

Suitability determinations are based on a comparison of responses observed in the test treatments versus those in the reference treatment. Reference site selection is based on sediment grain size. Based on similarity in grain size, reference sample Samish Bay Ref1 was used for comparison to test treatments.

***Amphipod (Eohaustorius estuarius) 10-Day Toxicity Test***

Under the SMS program, a test treatment fails SQS if mean mortality is statistically significantly higher than that of the reference treatment, and mean mortality in the test sediment is greater than 25 percent. Treatments fail the CSL if the test treatment mortality is both statistically significantly different and 30 percent greater than the reference sediment. Percent mortality for all samples was not significantly greater than in the associated reference samples and mean mortality for test sediment samples was less than the 25 and 30 percent criteria. Therefore, all test sediments passed both SQS and the one-test criterion for CSL.

The test quality control parameters described below were within acceptance criteria, and data are acceptable for use in making decisions under SMS.

**Controls**

The test met acceptance criteria of less than 10 percent for mean control mortality; average mortality for the five replicates was 1.0 percent. Replicate control acceptability criteria (less than 20 percent mortality in any one replicate) were also met with individual mortalities of 0.0, 5.0, 0.0, 5.0, and 0.0 percent in the replicate samples.

## Reference Sediment

The response in reference sediment samples met SMS criteria of less than 25 percent mean mortality. The mean mortality was 6.0 percent for sample Samish Bay Ref1.

## Reference Toxicant

The reference toxicant (ammonia) test result was within laboratory control chart warning limits.

### ***Juvenile Polychaete (Neanthes arenaceodentata) 20-Day Toxicity Test***

Suitability determinations for the juvenile polychaete test were based on mean individual growth (MIG) rates. A test treatment will fail SQS if MIG is statistically lower in the test treatment, relative to the reference, and MIG in the test treatment is 70 percent less than the reference treatment. The treatments will fail CSL if MIG is significantly lower than the reference treatment and is 50 percent less than the reference treatment.

The MIG for the samples was not significantly lower (and not less than 70 or 50 percent lower) than the corresponding reference sediment. The test sediments passed both SQS and the one-test criterion for CSL.

The test quality control parameters described below were within acceptance criteria, and data are acceptable for use in making decisions under SMS.

## Controls

The test met acceptance criteria of greater than 90 percent for mean control survival; average survival for the five replicates was 100 percent.

The individual growth rate for the controls was 1.09 mg/day/worm, above the SMS minimum of 0.72 mg/day/worm for *Neanthes*.

## Reference Sediment

The response in the reference sediment sample met SMS of less than 20 percent mean mortality. The mean mortality was 0.0 percent for reference sample Samish Bay Ref1.

The growth rate criterion for reference sediments (greater than 80 percent of the control growth weight) was also met. The growth rate for Samish Bay Ref1 was 83.5 percent of the control.

### **Reference Toxicant**

The reference toxicant (ammonia) test result was within laboratory control chart warning limits.

### ***Larval (Mytilus galloprovincialis) 10-Day Toxicity Test***

For the larval test, treatments fail SQS if the mean number of normal larvae in the test treatment is significantly less than that of the reference and the combined mortality and abnormality (CMA) in the test treatment is greater than 15 percent of the CMA in the reference. Treatments fail CSL criteria if the CMA is greater than 30 percent of the response observed in the reference.

The number of normal larvae in test sediments BBP-SS-01 and BBP-SS-02 was not significantly lower than the reference sediment so these samples met the numeric threshold for both SQS and CSL, thus passing overall.

Statistically significant decreases in normal development were observed in test sediment samples RGH-SS-01 and RGH-SS-03 relative to reference sample Samish Bay Ref1 (68.9 and 77.6 percent, respectively). Therefore, both of these sediment samples failed the SQS. In addition, since sample RGH-SS-01 normal development was less than 70 percent of reference, this sample failed the one-test criteria for CSL as defined by the SMS guidelines.

The test quality control parameters described below were within acceptance criteria, and data are acceptable for use in making decisions under SMS.

### **Controls**

The test met acceptance criteria of greater than 70 percent normality in the seawater control; control percent normality was 91.6 percent.

### **Reference Toxicant**

The reference toxicant (copper sulfate) test result was within laboratory control chart warning limits.

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**SUMMARY REPORT**  
of  
Tests 774-1, -2, and -3

**Submitted to**

**Hart Crowser, Inc.**  
1700 Westlake Ave. N, Suite 200  
Seattle, WA 98109-3056

**Submitted by**

**Northwestern Aquatic Sciences**  
3814 Yaquina Bay Road  
P.O. Box 1437  
Newport, OR 97365

**October 29, 2008**

## SUMMARY OF SEDIMENT BIOASSAYS

### INTRODUCTION

Northwestern Aquatic Sciences (NAS) conducted toxicity tests on five sediment samples (4 samples from Bellingham Bay, Washington, and 1 reference sediment) for Hart Crowser, Inc. Testing was performed in accordance with the standard test methods described in Ecology's Sediment Management Standards (Ch. 173-204 WAC, 1995) and Sampling and Analysis Plan Appendix (2008), Puget Sound Estuary Program (PSEP) Protocols and Guidelines (1995) and minor clarifications to the latter from Sediment Management Annual Review Meetings. The tests conducted were the 10-day amphipod survival test using *Eohaustorius estuarius* (test no. 774-1); the 20-day polychaete survival and growth test using *Neanthes arenaceodentata* (test no. 774-2); and the larval sediment test using *Mytilus galloprovincialis* (test no. 774-3).

Biological endpoint data for each test were compared against those in the control and in the reference sediment. Data interpretation was conducted based on guidelines from the "Sediment Sampling and Analysis Plan Appendix," February 2008 (Washington Department of Ecology).

### RESULTS SUMMARY

Primary biological endpoint data, those used in statistical comparisons, are summarized in Table 1; results of statistical comparisons to the reference sediment are included.

### SMS INTERPRETATION

Tables 2-4 present an interpretation of the amphipod, polychaete, and larval test data (NAS test numbers 774-1, -2, and -3), for single test failures of the Sediment Quality Standards (SQS) and the Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), and Minimum Cleanup Levels (MCL). There were no single test failures in the amphipod or polychaete tests. In the sediment larval test, test sediment RGH-SS-01 failed under both SQS and SIZML/CSL/MCL; RGH-SS-03 failed under the SQS but not under SIZML/CSL/MCL.

Because there were no single test failures under SQS for the amphipod or polychaete tests, there were no failures under SIZML, CSL, and MCL based on the criterion of multiple test failures of SQS.

### STUDY APPROVAL

Michelle S. Redmond 10-30-08  
Project Manager Date

Linda K. Nemeth 10/27/08  
Assistant Laboratory Director Date

Table 1. Summary of biological endpoint data from toxicity tests with marine sediments from Bellingham Bay. Means and standard deviations (n=5) of endpoints summarized are percent mortality for the *Eohaustorius estuarius* 10-day survival test, average individual growth rate for the *Neanthes arenaceodentata* 20-day survival and growth test, and number normal larvae for the *Mytilus galloprovincialis* larval test.

Sample description	<i>Eohaustorius</i> Percent mortality	<i>Neanthes</i> Individual growth rate (mg/day/worm)	<i>Mytilus</i> Number normal larvae
Sediment Control (NAS #2046G)	2.0 ± 2.7	1.09 ± 0.09	---
Seawater Control	---	---	231 ± 12
Samish Bay Ref (NAS #2041G)	6.0 ± 6.5	0.91 ± 0.16	196 ± 32
BBP-SS-01 (NAS #2042G)	5.0 ± 3.5	0.88 ± 0.23	185 ± 25
BBP-SS-02 (NAS #2043G)	11.0 ± 8.2	0.83 ± 0.26	173 ± 20
RGH-SS-01 (NAS #2044G)	4.0 ± 6.5	0.81 ± 0.20	135 ± 42 a
RGH-SS-03 (NAS #2045G)	6.0 ± 4.2	0.86 ± 0.03	152 ± 39 a

a Test sediment result was significantly different from that in the reference sediment (p<0.05, except p<0.10 for the *Mytilus* test).

Table 2. Interpretation of *Eohaustorius* test data from exposure to marine sediments from Bellingham Bay, based on SMS (WDOE 2008) guidelines.

Sample description	Percent mortality (Mean ± SD)	Significantly higher than reference sediment at $\alpha=0.05$ ?	Percent higher (absolute) than reference sediment	Failure under SQS? <sup>1</sup>	Failure under SIZML, CSL, or MCL? <sup>2</sup>
Control (NAS #2046G)	2.0 ± 2.7	---	---	---	---
Samish Bay Ref (NAS #2041G)	6.0 ± 6.5	---	---	---	---
BBP-SS-01 (NAS #2042G)	5.0 ± 3.5	NO	-1.0	NO	NO
BBP-SS-02 (NAS #2043G)	11.0 ± 8.2	NO	5.0	NO	NO
RGH-SS-01 (NAS #2044G)	4.0 ± 6.5	NO	-2.0	NO	NO
RGH-SS-03 (NAS #2045G)	6.0 ± 4.2	NO	0.0	NO	NO

<sup>1</sup> Sediment Quality Standards (SQS) failure if the test sediment mean amphipod mortality is significantly higher (1-tailed t-test at P≤0.05) than the reference sediment mean amphipod mortality and the absolute difference is >25%.

<sup>2</sup> Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) failure (one-test criteria) if the test sediment mean amphipod mortality is significantly higher (1-tailed t-test at P≤0.05) than the reference sediment mean amphipod mortality and the absolute difference is >30%.

Table 3. Interpretation of *Neanthes* test data from exposure to marine sediments based on SMS (WDOE 2008) guidelines.

Sample description	Individual growth rate (mg/day, mean $\pm$ SD)	Significantly lower than reference sediment at $\alpha=0.05$ ?	Percent of reference sediment	Failure under SQS? <sup>1</sup>	Failure under SIZML, CSL, or MCL? <sup>2</sup>
Control (NAS #2046G)	1.09 $\pm$ 0.09	---	---	---	---
Samish Bay Ref (NAS #2041G)	0.91 $\pm$ 0.16	---	---	---	---
BBP-SS-01 (NAS #2042G)	0.88 $\pm$ 0.23	NO	96.7	NO	NO
BBP-SS-02 (NAS #2043G)	0.83 $\pm$ 0.26	NO	91.2	NO	NO
RGH-SS-01 (NAS #2044G)	0.81 $\pm$ 0.20	NO	89.0	NO	NO
RGH-SS-03 (NAS #2045G)	0.86 $\pm$ 0.03	NO	94.5	NO	NO

<sup>1</sup> Sediment Quality Standards (SQS) failure if the mean growth rate in the test sediment is significantly lower (1-tailed t-test at  $P \leq 0.05$ ) than that in the reference sediment, and  $<70\%$  of the mean reference sediment response.

<sup>2</sup> Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) failure (one-test criteria) if the mean individual growth rate in the test sediment is significantly lower (1-tailed t-test at  $P \leq 0.05$ ) than that in the reference sediment, and  $<50\%$  of the mean reference sediment response.

Table 4. Interpretation of *Mytilus galloprovincialis* test data from exposure to marine sediments, based on SMS (WDOE 2008) guidelines.

Sample description	Number normal (mean $\pm$ SD)	Significantly less than reference sediment at $\alpha = 0.10$ ?	Percent of reference sediment	Failure under SQS? <sup>1</sup>	Failure under SIZML, CSL, or MCL? <sup>2</sup>
Seawater control	231 $\pm$ 12	---	---	---	---
Samish Bay Ref (NAS #2041G)	196 $\pm$ 32	---	---	---	---
BBP-SS-01 (NAS #2042G)	185 $\pm$ 25	NO	94.4	NO	NO
BBP-SS-02 (NAS #2043G)	173 $\pm$ 20	NO	88.3	NO	NO
RGH-SS-01 (NAS #2044G)	135 $\pm$ 42	YES	68.9	<b>YES</b>	<b>YES</b>
RGH-SS-03 (NAS #2045G)	152 $\pm$ 39	YES	77.6	<b>YES</b>	NO

<sup>1</sup> Sediment Quality Standards (SQS) failure if the mean number of normal survivors in the test sediment is significantly less (1-tailed t-test at  $P \leq 0.10$ ) than the mean number of normal survivors in the reference sediment, and  $<85\%$  of the mean number of normal survivors in the reference sediment.

<sup>2</sup> Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) failure (one-test criteria) if the mean number of normal survivors in the test sediment is significantly less (1-tailed t-test at  $P \leq 0.10$ ) than the mean number of normal survivors in the reference sediment and  $<70\%$  of the mean number of normal survivors in the reference sediment.

**Report**

**of**

**Test No. 774-1**

***Eohaustorius estuarius* 10-Day Toxicity  
Test of Marine Sediments**

**Submitted to**

**Hart Crowser, Inc.  
1700 Westlake Ave. N, Suite 200  
Seattle, WA 98109-3056**

**Submitted by**

**Northwestern Aquatic Sciences  
3814 Yaquina Bay Road  
P.O. Box 1437  
Newport, OR 97365**

**October 29, 2008**



## TOXICITY TEST REPORT

## TEST IDENTIFICATION

Test No.: 774-1

Title: *Eohaustorius estuarius* 10-day sediment toxicity test of marine sediments

Protocol: NAS-XXX-EE4, February 20, 1992. Rev.3 (March 1, 2005). Based on: Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments (PSEP 1995), with modifications as specified by the Dredged Material Management Program (DMMP, formerly Puget Sound Dredged Disposal Analysis Program or PSDDA) and Washington State Sediment Management Standards (SMS).

## STUDY MANAGEMENT

Study Sponsor: Hart Crowser, Inc., 1700 Westlake Ave. N, Suite 200, Seattle, WA 98109-3056

Sponsor's Study Monitor: Mr. Roger McGinnis

Testing Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, Oregon 97365.

Test Location: Newport Laboratory.

Laboratory's Study Personnel: M.S. Redmond, M.S., Proj. Mngr./ Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; G.J. Irissarri, B.S., Aq. Toxicol.; G.A. Buhler, B.S., Aq. Toxicol.; S. J. Gage, B.A., Sr. Tech.; L.P. Sandoval, B.S., Tech.

Study Schedule:

Test Beginning: 9-9-08, 1100 hrs.

Test Ending: 9-19-08, 1030 hrs.

Disposition of Study Records: All specimens, raw data, reports and other study records are stored according to Good Laboratory Practice regulations at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.

Good Laboratory Practices: The test was conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

## TEST MATERIAL

Control Sediment: Control sediment (NAS Sample #2046G) was collected from the *Eohaustorius estuarius* amphipod collection site, Yaquina Bay, Oregon, on 9-4-08. Interstitial salinity was 33.5 ‰. The sediment was sieved through a 0.5-mm stainless steel screen and stored at 4°C in the dark.

Test Sediments: Four test sediments and one reference sediment were tested. Details follow:

NAS Sample No.	2041G	2042G	2043G	2044G
Sample Description	Samish Bay Ref	BBP-SS-01	BBP-SS-02	RGH-SS-01
Collection Date	8-29-08	8-26-08	8-26-08	8-26-08
Receipt Date	9-4-08	9-4-08	9-4-08	9-4-08
Interstitial Salinity (‰)	30.5	24.5	25.0	23.5

NAS Sample No.	2045G
Sample Description	RGH-SS-03
Collection Date	8-26-08
Receipt Date	9-4-08
Interstitial Salinity (‰)	25.0

Storage: Upon receipt, headspace in sample containers was flushed with nitrogen, and samples were stored at 4°C in the dark.

Treatments: The samples were minimally homogenized by mixing with stainless steel implements.

**TEST WATER**

Source: Yaquina Bay, Oregon

Date of Collection: 9-8-08

Water Quality: Salinity 27.5 ‰, pH 8.1

Pretreatment: Filtered to  $\leq 0.40 \mu\text{m}$ , salinity adjusted with MilliQ® deionized water, aerated.

**TEST ORGANISMS**

Species: *Eohaustorius estuarius*, amphipod

Age: adult

Source: Yaquina Bay, Oregon

Acclimation: Amphipods were collected on 9-4-08 at interstitial water conditions of 15.0 °C and 33.0 ‰. They were acclimated to test temperature and salinity over the five days before addition to the test. Average holding conditions during this time were: temperature,  $15.3 \pm 0.2$  °C; pH,  $8.1 \pm 0.1$ ; salinity,  $28.7 \pm 0.7$  ‰; and dissolved oxygen  $8.5 \pm 0.2$  mg/L. The photoperiod was constant light.

**TEST PROCEDURES AND CONDITIONS**

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 1 L covered borosilicate glass beakers

Test Volumes: 175 ml of test, reference, or control sediment; 950 ml total volume.

Replicates/Treatment: 5 (plus one water quality replicate, also used to measure interstitial water ammonia-N on day 10)

Salinity adjustment: none

Organisms/Treatment: 100 (20/replicate)

Water Volume Changes per 24 hr: None.

Aeration: Provided through a 1-mL glass pipette placed not closer than 2 cm from sediment, bubbled at a minimal rate (about 100 bubbles/minute) that did not disturb the sediment surface.

Feeding: None.

Acceptance Criteria: Results are valid if mean control mortality does not exceed 10%, and does not exceed 20% in any one control replicate.

Performance Criteria: For SMS testing, mean percent mortality in the reference sediment should be  $<25\%$ .

Effects Criteria: 1) mortality after 10 days, 2) daily emergence of amphipods from the test sediments, and 3) failure of surviving amphipods to rebury at the end of the exposure period. Death is defined as no visible appendage movement or response to tactile stimulation. Unrecovered animals at the end of the exposure period were considered dead.

Water Quality and Other Test Conditions: The temperature, pH, salinity, and dissolved oxygen were measured in the water quality replicate test chamber daily. Total soluble sulfide and total ammonia-N were measured in the overlying water of the water quality replicate test chamber on days 0 and 10. Interstitial total ammonia-N, pH, and salinity were measured in bulk sediments and from the water quality beaker on test day 10. Interstitial water samples were obtained by centrifugation or by settling. Total soluble sulfide and total ammonia-N were measured using Hach reagents based on the methylene blue (EPA Method 376.2) and salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric methods, respectively; samples were not distilled prior to analysis. Un-ionized ammonia-N was computed using "Un-ionized Ammonia Calculator", v1.0 (Dr. Landon Ross, Florida Department of Environmental Protection). The photoperiod was constant light.

**DATA ANALYSIS METHODS**

The percent amphipod mortality, percent of surviving amphipods failing to rebury at the end of the test, and percent total effective mortality were determined from the final observations according to the formulas:

$$\text{Percent Mortality} = 100 \times ([\text{initial amphipods} - \text{surviving amphipods}]/\text{initial amphipods})$$

$$\text{Percent Survivors not Reburied} = 100 \times ([\text{surviving amphipods} - \text{number survivors reburied}]/\text{surviving amphipods})$$

$$\text{Percent Total Effective Mortality} = 100 \times \frac{([\text{initial amphipods} - \text{surviving amphipods}] + [\text{surviving amphipods} - \text{number survivors reburied}])}{\text{initial amphipods}}$$

Another endpoint was the sum of observed daily sediment emergence events in a test beaker throughout the test. Control and treatment means and standard deviations for the biological endpoints described above and for water quality data were computed using Microsoft EXCEL 2000. Percent mortality in each test sediment was compared against that in the control and in the reference sediment. Generally, an arcsine square root transformation was performed on percentage data before analysis. In some cases, a rank order transformation was necessary. The software used for statistical comparisons was BioStat (Beta v.4.1 (EXCEL)) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District. Following determination of normality and homogeneity of variances, a one-tailed Student T-test, Approximate T-test, One-sample T-test, Mann Whitney test, or Rankit Analysis was conducted at the 0.05 level of significance.

### PROTOCOL DEVIATIONS

1. Three overlying water salinity measurements, at 29.5 ‰, were slightly above the protocol-specified range of  $28.0 \pm 1.0\text{‰}$ .

### REFERENCE TOXICANT TEST

The reference toxicant test is a standard multi-concentration toxicity test using ammonia expressed as  $\text{NH}_3\text{-N}$  and administered as  $\text{NH}_3\text{Cl}$ , to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix II.

Test No.: 999-2471

Reference Toxicant and Source: Ammonia as ammonium chloride, 7.12 mg/ml stock prepared 7-25-06

Test Date: 9-9-08

Dilution Water Used: Yaquina Bay, Oregon, seawater; 27.5 ‰

Result: The 96-hr LC50 was 202 mg  $\text{NH}_3\text{-N/L}$ . This result is within the laboratory's control chart warning limits (7.68–310 mg  $\text{NH}_3\text{-N/L}$ ).

### RESULTS AND DISCUSSION

Observations of overlying water quality parameters during the test are summarized in Table 1. Interstitial water quality measurements during the test are summarized in Table 2. Individual water quality measurements are located in the raw data (Appendix II).

Except as noted above, all measurements of standard water quality parameters were within protocol-specified ranges. Dissolved sulfide was not detected in the overlying water (detection limit 0.02 mg/L). Total ammonia-N concentrations in the overlying water ranged from 0.1 mg/L to 6.1 mg/L (maximum 0.591 mg/L un-ionized ammonia).

In the bulk sediment samples, interstitial total ammonia-N concentrations ranged from 0.8 to 13.0 mg/L (maximum 0.310 mg/L un-ionized ammonia). In samples taken on day 10 of the bioassay, interstitial total ammonia-N concentrations ranged from 0.9 mg/L to 12.0 mg/L, with a maximum un-ionized ammonia concentration of 0.082 mg/L (Table 2).

Table 3 shows the effects of test sediment exposures on emergence, mortality, and reburial. The test met the acceptability criterion ( $\leq 10\%$ ) for mean control mortality; mean mortality in the control was 2.0%. In addition, replicate control mortality was 0.0, 5.0, 0.0, 5.0, and 0.0%; therefore, the control replicate acceptability criterion was met ( $\leq 20\%$  in any one replicate). The response in the reference sediment met SMS criteria; mean mortality in reference sediment "Samish Bay Ref" (6.0%) was  $< 25\%$ . The reference toxicant test result (202 mg  $\text{NH}_3\text{-N/L}$ ) was within the laboratory's control chart warning limits. It is concluded, therefore, that the test has developed fully acceptable data for use in making management decisions.

Data interpretation was conducted based on guidelines from the "Sediment Sampling and Analysis Plan Appendix," February 2008 (Washington Department of Ecology). For a test sediment from the amphipod test to fail the Sediment Quality Standards under these guidelines, the mean test mortality must be >25% absolute higher than the mean reference sediment response, and statistically higher than ( $\alpha = 0.05$ ) the reference sediment. For a test sediment from the amphipod test to fail the Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) under the one-test criteria in these guidelines, the mean test mortality must be >30% absolute over the mean reference sediment response, and statistically higher than ( $\alpha = 0.05$ ) the reference sediment.

In no case was the percent mortality in a test sediment significantly higher than that in reference sediment "Samish Bay Ref," and in no test sediment was mean percent mortality 25% or 30% higher than that in the reference sediment (Table 4). Therefore, both test sediments passed both Sediment Quality Standards and one-test criteria for SIZML/CSL/MCL as defined by the SMS guidelines. Percent mortality in BBP-SS-02 was significantly higher than that in the control (Table 3).

#### STUDY APPROVAL

*Michelle J. Redmond* 10-30-08  
Project Manager/ Study Director Date

*Julie R. Fane* 10-30-08  
Quality Assurance Unit Date

*Sandra K. Jewett* 10/27/08  
Assistant Laboratory Director Date

Table 1. Summary of overlying water quality conditions during exposure of amphipods, *Eohaustorius estuarius*, to marine sediments.

Parameter	Mean $\pm$ SD	Minimum	Maximum	N
Temperature ( $^{\circ}$ C)	15.1 $\pm$ 0.3	14.7	15.8	66
pH	8.2 $\pm$ 0.2	7.6	8.8	66
Salinity (‰)	28.2 $\pm$ 0.7	27.0	29.5	66
Dissolved oxygen (mg/L)	7.6 $\pm$ 0.5	5.9	8.5	69
Total soluble sulfide (mg/L)	---	<0.02	<0.02	12
Total ammonia-N (mg/L)	---	0.1	6.1	12
Un-ionized ammonia (mg/L)	---	0.005	0.591	12

Table 2. Summary of interstitial water quality conditions on day 10 of exposure of amphipods, *Eohaustorius estuarius*, to marine sediments.

Parameter	Mean $\pm$ SD	Minimum	Maximum	N
Salinity (‰)	28.5 $\pm$ 0.8	27.5	29.5	6
pH	7.5 $\pm$ 0.2	7.2	7.7	6
Total ammonia-N (mg/L)	---	0.9	12.0	6
Un-ionized ammonia (mg/L)	---	0.010	0.082	6

Table 3. Means and standard deviations (n=5) of sediment emergence, percent mortality, percent of survivors failing to rebury, and percent total effective mortality of *Eohaustorius estuarius* exposed to marine sediments.

Sample description	Emergence <sup>1</sup> (no./replicate)	Percent mortality	Percent Survivors Failing to Rebury	Percent Total Effective Mortality
Control (NAS #2046G)	2.0 $\pm$ 2.5	2.0 $\pm$ 2.7	0.0 $\pm$ 0.0	2.0 $\pm$ 2.7
Samish Bay Ref (NAS #2041G)	0.6 $\pm$ 0.9	6.0 $\pm$ 6.5	0.0 $\pm$ 0.0	6.0 $\pm$ 6.5
BBP-SS-01 (NAS #2042G)	3.2 $\pm$ 3.3	5.0 $\pm$ 3.5	0.0 $\pm$ 0.0	5.0 $\pm$ 3.5
BBP-SS-02 (NAS #2043G)	4.4 $\pm$ 4.0	11.0 $\pm$ 8.2 <b>b</b>	0.0 $\pm$ 0.0	11.0 $\pm$ 8.2
RGH-SS-01 (NAS #2044G)	0.8 $\pm$ 1.1	4.0 $\pm$ 6.5	0.0 $\pm$ 0.0	4.0 $\pm$ 6.5
RGH-SS-03 (NAS #2045G)	4.6 $\pm$ 4.4	6.0 $\pm$ 4.2	0.0 $\pm$ 0.0	6.0 $\pm$ 4.2

<sup>1</sup> Daily emergence counts include all amphipods observed on or above the sediment surface, whether living or dead.

a Percent mortality significantly higher than that in reference sediment "Samish Bay Ref" ( $p < 0.05$ )

b Percent mortality significantly higher than that in the control sediment ( $p < 0.05$ )

Table 4. Interpretation of *Eohaustorius* test data from exposure to marine sediments, based on SMS (WDOE 2008) guidelines.

Sample description	Percent mortality (Mean $\pm$ SD)	Significantly higher than reference sediment at $\alpha=0.05$ ?	Percent higher (absolute) than reference sediment	Failure under SQS? <sup>1</sup>	Failure under SIZML, CSL, or MCL? <sup>2</sup>
Control (NAS #2046G)	2.0 $\pm$ 2.7	---	---	---	---
Samish Bay Ref (NAS #2041G)	6.0 $\pm$ 6.5	---	---	---	---
BBP-SS-01 (NAS #2042G)	5.0 $\pm$ 3.5	NO	-1.0	NO	NO
BBP-SS-02 (NAS #2043G)	11.0 $\pm$ 8.2	NO	5.0	NO	NO
RGH-SS-01 (NAS #2044G)	4.0 $\pm$ 6.5	NO	-2.0	NO	NO
RGH-SS-03 (NAS #2045G)	6.0 $\pm$ 4.2	NO	0.0	NO	NO

<sup>1</sup> Sediment Quality Standards (SQS) failure if the test sediment mean amphipod mortality is significantly higher (1-tailed t-test at  $P \leq 0.05$ ) than the reference sediment mean amphipod mortality and the absolute difference is  $>25\%$ .

<sup>2</sup> Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) failure (one-test criteria) if the test sediment mean amphipod mortality is significantly higher (1-tailed t-test at  $P \leq 0.05$ ) than the reference sediment mean amphipod mortality and the absolute difference is  $>30\%$ .

**Report**

**of**

**Test No. 774-2**

**Juvenile *Neanthes* 20-Day Sediment Toxicity  
Test of Marine Sediments**

**Submitted to**

**Hart Crowser, Inc.  
1700 Westlake Ave. N, Suite 200  
Seattle, WA 98109-3056**

**Submitted by**

**Northwestern Aquatic Sciences  
3814 Yaquina Bay Road  
P.O. Box 1437  
Newport, OR 97365**

**October 29, 2008**

## TOXICITY TEST REPORT

## TEST IDENTIFICATION

Test No.: 774-2Title: Juvenile *Neanthes* 20-day sediment toxicity test of marine sediments.Protocol: NAS-XXX-NA4, June 20, 1990. Rev.4 (3-1-05). Based on: Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments (PSEP 1995), with modifications as specified by the Dredged Material Management Program (DMMP, formerly Puget Sound Dredged Disposal Analysis Program or PSDDA) and Washington State Sediment Management Standards (SMS).

## STUDY MANAGEMENT

Study Sponsor: Hart Crowser, Inc., 1700 Westlake Ave. N, Suite 200, Seattle, WA 98109-3056Sponsor's Study Monitor: Mr. Roger McGinnisTesting Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, Oregon 97365.Test Location: Newport Laboratory.Laboratory's Study Personnel: M.S. Redmond, M.S., Proj. Mngr./ Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; G.J. Irissarri, B.S., Aq. Toxicol.; G.A. Buhler, B.S., Aq. Toxicol.; S J. Gage, B.A., Sr.Tech.; L.P. Sandoval, B.S., Tech.Study Schedule:

Test Beginning: 9-10-08, 1115 hrs.

Test Ending: 9-30-08, 1030 hrs.

Disposition of Study Records: All specimens, raw data, reports and other study records are stored according to Good Laboratory Practice regulations at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.Good Laboratory Practices: The test was conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

## TEST MATERIAL

Control Sediment: Control sediment (NAS Sample #2046G) was collected from the *Eohaustorius estuarius* amphipod collection site, Yaquina Bay, Oregon, on 9-4-08. Interstitial salinity was 33.5 ‰. The sediment was sieved through a 0.5-mm stainless steel screen and stored at 4°C in the dark.Test Sediments: Four test sediments and one reference sediment were tested. Details follow:

NAS Sample No.	2041G	2042G	2043G	2044G
Sample Description	Samish Bay Ref	BBP-SS-01	BBP-SS-02	RGH-SS-01
Collection Date	8-29-08	8-26-08	8-26-08	8-26-08
Receipt Date	9-4-08	9-4-08	9-4-08	9-4-08
Interstitial Salinity (‰)	30.5	24.5	25.0	23.5
NAS Sample No.	2045G			
Sample Description	RGH-SS-03			
Collection Date	8-26-08			
Receipt Date	9-4-08			
Interstitial Salinity (‰)	25.0			

Storage: Upon receipt, headspace in sample containers was flushed with nitrogen, and samples were stored at 4°C in the dark.Treatments: The samples were minimally homogenized by mixing with stainless steel implements.



**TEST WATER**

Source: Yaquina Bay, Oregon

Date(s) of Collection: 9-9-08

Water Quality: Salinity 27.0‰, pH 8.1

Pretreatment: Filtered to  $\leq 0.40 \mu\text{m}$ , salinity-adjusted with MilliQ® deionized water, aerated.

**TEST ORGANISMS**

Species: *Neanthes arenaceodentata*, marine polychaete worm

Age: 2-3 week post-emergence juveniles

Initial wt.: 0.56 mg

Source: Laboratory cultures at the Department of Biology, California State University, Long Beach, California. Worms were received on 9-9-08.

Acclimation: Average conditions during the day prior to testing were: temperature, 19.6 °C; pH, 7.8; salinity, 28.3 ‰; dissolved oxygen, 7.0 mg/L. Photoperiod was constant light.

**TEST PROCEDURES AND CONDITIONS**

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 1 L covered borosilicate glass beakers.

Test Volumes: 175 ml of test, reference, or control sediment; 950 ml total volume.

Replicates/Treatment: 5 (plus one water-quality replicate)

Sediment Salinity Adjustment: None

Organisms/Treatment: 25 (5/replicate)

Water Volume Changes: One third of the seawater in each beaker was replaced every third day.

Aeration: Provided through a 1-mL glass pipette placed not closer than 2 cm from sediment, bubbled at a minimal rate (about 100 bubbles/minute) that did not disturb the sediment surface.

Feeding: Animals were fed 40 mg TetraMarine® per beaker every other day.

Acceptance Criteria: Results are valid if mean control survival is at least 90%. DMMP and SMS require control sediment mortality of  $\leq 10\%$  and a growth rate of  $> 0.38 \text{ mg/individual/day}$ .

Performance Criteria: For DMMP and SMS testing, the reference sediment mortality should be  $\leq 20\%$  with a growth rate of  $\geq 80\%$  that of the negative control sediment.

Effects Criteria: 1) survival after 20 days, 2) average individual biomass, and 3) average individual growth rate. Death is defined as no visible appendage movement or response to tactile stimulation. Missing worms are considered dead.

Water Quality and Other Test Conditions: The temperature, pH, salinity, and dissolved oxygen were measured in the overlying water of one replicate water quality beaker on test days 0 and 20, and on test days 3, 6, 9, 12, 15, and 18 prior to test solution renewal. Total dissolved sulfide and total ammonia-N were measured in the overlying water of the water quality replicate test chamber on days 0 and 20. Total ammonia-N was also measured in the overlying water of the water quality replicate test chamber on day 3 prior to water renewal. Total soluble sulfide and total ammonia-N were measured using Hach reagents based on the methylene blue (EPA Method 376.2) and salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric methods, respectively; samples were not distilled prior to analysis. Un-ionized ammonia-N was computed using "Un-ionized Ammonia Calculator", v1.0 (Dr. Landon Ross, Florida Department of Environmental Protection). The photoperiod was constant light.

**DATA ANALYSIS METHODS**

Percent survival, individual biomass, and individual growth rate at the end of the test were determined from the final observations according to the formulas:

Percent survival =  $100 \times (\text{no. of surviving worms}/\text{initial number of worms})$

Individual biomass =  $\text{total dry wt. of worms}/\text{number of surviving worms weighed}$

Individual growth rate =  $(\text{individual biomass} - \text{the initial dry wt.})/\text{the number of test days}$

The means and standard deviations were then calculated for each treatment level. The statistical software employed for these calculations was Microsoft Excel 2000. Individual growth rate in each test sediment was compared against that in the control and in the reference sediment. The software used for statistical comparisons was BioStat (Beta v.4.1 (EXCEL)) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District. Following determination of normality and homogeneity of variances, a one-tailed Student T-test, Approximate T-test, One-sample T-test, Mann Whitney test, or Rankit Analysis was conducted at the 0.05 level of significance.

#### PROTOCOL DEVIATIONS

1. Several overlying water salinity measurements exceeded the protocol-specified  $28.0 \pm 2.0\%$  (maximum 30.5%).
2. On test day 5, air delivery was interrupted to one water quality beaker, and dissolved oxygen dropped to 1.8 mg/L. Aeration was restarted. This beaker was not used for biological endpoint measurements.

#### REFERENCE TOXICANT TEST

The reference toxicant test is a standard multi-concentration toxicity test using ammonia expressed as  $\text{NH}_3\text{-N}$  and administered as  $\text{NH}_3\text{Cl}$ , to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix II.

Test No.: 999-2473

Reference Toxicant and Source: Ammonia as ammonium chloride, 7.12 mg/ml stock prepared 7-25-06

Test Date: 9-10-08

Dilution Water Used: Yaquina Bay, Oregon, seawater; 27.0 ‰

Result: The 96-hr LC50 was 145 mg  $\text{NH}_3\text{-N/L}$ . This result is within the laboratory's control chart warning limits (135–335 mg  $\text{NH}_3\text{-N/L}$ ).

#### RESULTS AND DISCUSSION

Observations of water quality parameters during the test are summarized in Table 1. Individual water quality measurements are located in the raw data (Appendix II).

Except as noted above, all measurements of standard water quality parameters were within protocol-specified ranges. Dissolved sulfide was not detected in the overlying water (detection limit 0.02 mg/L). Total ammonia-N concentrations in the overlying water ranged from 0.2 mg/L to 6.9 mg/L (maximum 0.302 mg/L un-ionized ammonia).

Table 2 shows the effects of test sediment exposures on survival and growth of *Neanthes*. The test met the acceptability criterion ( $\geq 90\%$ ) for control survival; mean survival in the control was 100.0%. The individual growth rate in the controls averaged 1.09 mg/day/worm. This meets the SMS recommendation for a minimum growth rate of 0.72 mg/day/worm for *Neanthes*. The average initial weight of worms was 0.56 mg, within the recommended range of 0.5 - 1.0 mg. The reference sediment included in the study met the performance standard requirement that mortality in the reference sediment should be  $\leq 20\%$  (mortality was 0.0% in Samish Bay Ref). The growth rate criterion was also met. According to SMS criteria, the mean individual growth rate in the reference sediment should be  $\geq 80\%$  of the mean individual growth rate in the control sediment. Control growth rate was 1.09 mg/day/worm, and that in reference sediment "Samish Bay Ref" was 0.91 mg/day/worm, corresponding to 83.5% of the control growth rate.

The test control acceptance criteria and reference sediment performance criteria for survival and growth were met. Positive control performance was within the laboratory's acceptance limits. It is concluded, therefore, that the test has developed fully acceptable data for use in making management decisions.

Data interpretation was conducted based on guidelines from the "Sediment Sampling and Analysis Plan Appendix," February 2008 (Washington Department of Ecology). For a test sediment from the polychaete test to

fail the Sediment Quality Standards under these guidelines, the mean individual growth rate in the test sediment must be statistically lower ( $\alpha = 0.05$ ) than the mean individual growth rate in the reference sediment, and <70% of the mean reference sediment response. For a test sediment from the polychaete test to fail the Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) under the one-test criteria in these guidelines, the mean individual growth rate in the test sediment must be significantly lower ( $\alpha = 0.05$ ) than that in the reference sediment, and <50% of the mean reference sediment response.

In no test sediment was mean individual growth rate significantly lower, or 70% or 50% lower, than that in reference sediment "Samish Bay Ref" (Tables 2 and 3). Therefore, all test sediments passed both Sediment Quality Standards and one-test criteria for SIZML/CSL/MCL as defined by the SMS guidelines (Table 3).

**STUDY APPROVAL**

Michelle S. Redmond 10-30-08  
Project Manager/ Study Director Date

Julie R. Fane 10-30-08  
Quality Assurance Unit Date

Sandra K. Nemeth 10/27/08  
Assistant Laboratory Director Date

Table 1. Summary of overlying water quality conditions during tests of the polychaete, *Neanthes arenaceodentata*, exposed to marine sediments.

Parameter	Mean $\pm$ SD	Minimum	Maximum	N
Temperature ( $^{\circ}$ C)	20.5 $\pm$ 0.2	20.1	20.9	48
pH	8.1 $\pm$ 0.2	7.8	8.5	48
Salinity (‰)	29.2 $\pm$ 1.2	27.0	30.5	48
Dissolved Oxygen (mg/L)	6.0 $\pm$ 0.8	1.8	7.3	50
Total soluble sulfide (mg/L)	---	<0.02	<0.02	12
Total Ammonia-N (mg/L)	---	0.2	6.9	18
Un-ionized Ammonia (mg/L)	---	0.008	0.302	18

Table 2. Means and standard deviations (n=5) of percent survival, individual dry weight, and individual growth rate of *Neanthes arenaceodentata* exposed for 20 days to marine sediments.

Sample description	Percent Survival (20-days)	Individual dry wt. (mg)	Individual growth rate (mg/day/worm)	
Control (NAS #2046G)	100.0 $\pm$ 0.0	22.4 $\pm$ 1.9	1.09 $\pm$ 0.09	
Samish Bay Ref (NAS #2041G)	100.0 $\pm$ 0.0	18.8 $\pm$ 3.1	0.91 $\pm$ 0.16	b
BBP-SS-01 (NAS #2042G)	100.0 $\pm$ 0.0	18.3 $\pm$ 4.7	0.88 $\pm$ 0.23	
BBP-SS-02 (NAS #2043G)	100.0 $\pm$ 0.0	17.2 $\pm$ 5.1	0.83 $\pm$ 0.26	b
RGH-SS-01 (NAS #2044G)	96.0 $\pm$ 8.9	16.7 $\pm$ 4.1	0.81 $\pm$ 0.20	b
RGH-SS-03 (NAS #2045G)	92.0 $\pm$ 17.9	17.7 $\pm$ 0.6	0.86 $\pm$ 0.03	b

a Growth rate significantly lower than in reference sediment "Samish Bay Ref" (p<0.05)  
b Growth rate significantly lower than in the control sediment (p<0.05)

Table 3. Interpretation of *Neanthes* test data from exposure to marine sediments based on SMS (WDOE 2008) guidelines.

Sample description	Individual growth rate (mg/day, mean $\pm$ SD)	Significantly lower than reference sediment at $\alpha=0.05$ ?	Percent of reference sediment	Failure under SQS? <sup>1</sup>	Failure under SIZML, CSL, or MCL? <sup>2</sup>
Control (NAS #2046G)	1.09 $\pm$ 0.09	---	---	---	---
Samish Bay Ref (NAS #2041G)	0.91 $\pm$ 0.16	---	---	---	---
BBP-SS-01 (NAS #2042G)	0.88 $\pm$ 0.23	NO	96.7	NO	NO
BBP-SS-02 (NAS #2043G)	0.83 $\pm$ 0.26	NO	91.2	NO	NO
RGH-SS-01 (NAS #2044G)	0.81 $\pm$ 0.20	NO	89.0	NO	NO
RGH-SS-03 (NAS #2045G)	0.86 $\pm$ 0.03	NO	94.5	NO	NO

<sup>1</sup> Sediment Quality Standards (SQS) failure if the mean growth rate in the test sediment is significantly lower (1-tailed t-test at  $P \leq 0.05$ ) than that in the reference sediment, and  $<70\%$  of the mean reference sediment response.

<sup>2</sup> Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) failure (one-test criteria) if the mean individual growth rate in the test sediment is significantly lower (1-tailed t-test at  $P \leq 0.05$ ) than that in the reference sediment, and  $<50\%$  of the mean reference sediment response.

**Report**

**of**

**Test No. 774-3**

**Larval Sediment Toxicity Test with  
*Mytilus galloprovincialis***

**Submitted to**

**Hart Crowser, Inc.  
1700 Westlake Ave. N, Suite 200  
Seattle, WA 98109-3056**

**Submitted by**

**Northwestern Aquatic Sciences  
3814 Yaquina Bay Road  
P.O. Box 1437  
Newport, OR 97365**

**October 29, 2008**

## TOXICITY TEST REPORT

## TEST IDENTIFICATION

Test No.: 774-3

Title: *Mytilus galloprovincialis* larval sediment toxicity test of marine sediments.

Protocol: NAS-XXX-CG4/MG4, June 20, 1990. Rev. 2, Feb.10, 1997. Based on: Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments (PSEP 1995), with modifications as specified by the Dredged Material Management Program (DMMP, formerly Puget Sound Dredged Disposal Analysis Program or PSDDA) and Washington State Sediment Management Standards (SMS).

## STUDY MANAGEMENT

Study Sponsor: Hart Crowser, Inc., 1700 Westlake Ave. N, Suite 200, Seattle, WA 98109-3056

Sponsor's Study Monitor: Mr. Roger McGinnis

Testing Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, Oregon 97365.

Test Location: Newport Laboratory.

Laboratory's Study Personnel: M.S. Redmond, M.S., Proj. Mngr.; G.J. Irissarri, B.S., Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; R.S. Caldwell, Ph.D., Sr. Aq. Toxicol.; S. J. Gage, B.A., Sr.Tech.

Study Schedule:

Test Beginning: 9-9-08, 1400 hrs.

Test Ending: 9-11-08, 1530 hrs.

Disposition of Study Records: All specimens, raw data, reports and other study records are stored according to Good Laboratory Practice regulations at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.

Good Laboratory Practices: The test was conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

## TEST MATERIAL

Test Sediments: Four test sediments and one reference sediment were tested. Details follow:

NAS Sample No.	2041G	2042G	2043G	2044G
Sample Description	Samish Bay Ref	BBP-SS-01	BBP-SS-02	RGH-SS-01
Collection Date	8-29-08	8-26-08	8-26-08	8-26-08
Receipt Date	9-4-08	9-4-08	9-4-08	9-4-08
Interstitial Salinity (‰)	30.5	24.5	25.0	23.5

NAS Sample No.	2045G
Sample Description	RGH-SS-03
Collection Date	8-26-08
Receipt Date	9-4-08
Interstitial Salinity (‰)	25.0

Storage: Upon receipt, headspace in sample containers was flushed with nitrogen, and samples were stored at 4°C in the dark.

Treatments: The samples were minimally homogenized by mixing with stainless steel implements.

## TEST WATER

Source: Yaquina Bay, Oregon

Date of Collection: 9-8-08

Water Quality: Salinity 27.5 ‰, pH 8.1

Pretreatment: Filtered to  $\leq 0.40 \mu\text{m}$ , salinity-adjusted with MilliQ® deionized water, aerated.

**TEST ORGANISMS**

Species: *Mytilus galloprovincialis*

Age: 1.9 hrs post-fertilization

Source: Mussels were purchased from Carlsbad Aquafarms, Carlsbad, CA, and received on 8-13-08.

Acclimation: Upon receipt, adult animals were placed in trays of flowing seawater and held under outside ambient conditions. Average conditions during the eleven days prior to testing were: temperature,  $16.7 \pm 1.4^\circ\text{C}$ ; pH,  $8.0 \pm 0.1$ , salinity,  $33.8 \pm 0.5$  ‰, and dissolved oxygen  $8.7 \pm 0.6$  mg/L.

Source of Gametes: 6 females, 4 males

**TEST PROCEDURES AND CONDITIONS**

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 1 L covered borosilicate glass beakers

Test Volumes: 18 g of test or reference sediment with 900 ml of test water added. Sediment was allowed to settle for the normal period of 4 hours as specified in the protocol.

Replicates/Treatment: 5 (plus a 6th water quality replicate).

Sediment Salinity Adjustment: None required.

Initial Concentration of Test Organisms: 25.2/ml

Water volume changes per 24 hours: None

Volume of Subsamples Taken for Counting: 10 ml

Aeration: Provided through a 1-mL glass pipette placed not closer than 2 cm from sediment, bubbled at a minimal rate (about 100 bubbles/minute) that did not disturb the sediment.

Feeding: None

Acceptance Criteria: The percent normal larvae in the seawater control must be  $\geq 70\%$  at the end of the test.

Performance Criteria: For DMMP projects, the combined mortality and abnormality in the reference sediments must be  $\leq 35\%$  of the seawater control value. SMS projects do not have a specified reference performance criterion.

Effects Criteria: The effects criteria used were: 1) mortality; 2) abnormal development to the fully-shelled stage; and 3) the combined mortality/abnormality endpoint. Normal development is defined as transformation to the fully shelled, straight-hinged, D-shaped prodissoconch I stage. Data collected were: 1) the initial embryo density; 2) the number of abnormal larvae observed, and 3) the number of normal larvae observed. The results were expressed as: 1) percent abnormality; 2) percent mortality; 3) combined percent mortality and abnormality; and 4) normalized (to the seawater control) a) percent mortality and b) combined percent mortality and abnormality.

Water Quality and Other Test Conditions: The temperature, pH, salinity, and dissolved oxygen were measured in the water quality replicate test chamber daily. Total soluble sulfide and total ammonia-N were measured in the overlying water of the water quality replicate test chamber on days 0 and 2. Total soluble sulfide and total ammonia-N were measured using Hach reagents based on the methylene blue (EPA Method 376.2) and salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric methods, respectively; samples were not distilled prior to analysis. The photoperiod was 14:10, L:D.

**DATA ANALYSIS METHODS**

All three standard endpoints, percent abnormal, percent combined mortality/abnormality, and percent mortality have occasionally been computed both with, and without, normalization for the seawater control. Endpoints in this report have been computed according to the following formulas:

$$\text{PABN (Percent Abnormality)} = 100 \cdot (A/T)$$

$$\text{PABND (Combined Percent Mortality/Abnormality)} = 100 \cdot ((I-N)/I)$$

$$\text{PMORT (Percent Mortality)} = 100 \cdot ((I-T)/I)$$

$$\text{NPM (Normalized Percent Mortality)} = 100 \cdot (1 - (T/TS))$$

$$\text{NCMA (Normalized Combined Percent Mortality/Abnormality)} = 100 \cdot (1 - (N/NS))$$



where the following are counts per 10 ml subsample:

N = normal larvae counted

A = abnormal larvae counted

T = N+A (total larvae counted)

I = number of inoculated embryos (from average of zero time counts)

TS = average of total larvae counted in seawater controls

NS = average of normal larvae counted in seawater controls

The means and standard deviations were then calculated for each treatment level. The statistical software employed for these calculations was Microsoft Excel 2000. The number normal in each test sediment was compared against that in the control and in the reference sediment. The software used for statistical comparisons was BioStat (Beta v.4.1 (EXCEL)) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District. Following determination of normality and homogeneity of variances, a one-tailed Student T-test, Approximate T-test, One-sample T-test, Mann Whitney test, or Rankit Analysis was conducted at the 0.10 level of significance.

### PROTOCOL DEVIATIONS

None.

### REFERENCE TOXICANT TEST

The routine reference toxicant test is a standard multi-concentration toxicity test using copper as  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix II. The reference toxicant test is conducted following EPA/600/R-95/136 (Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, August 1995).

Test No.: 999-2472

Reference Toxicant and Source: Copper as copper sulfate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , Argent Lot #0195, 1.0 mg/ml stock prepared 8-3-07.

Test Date: 9-9-08

Dilution Water Used: Yaquina Bay, Oregon, seawater at 30.0‰

Result: 48-hr EC50, 10.4  $\mu\text{g/L}$  Cu. This result is within the laboratory's control chart warning limits (7.52 to 12.3  $\mu\text{g/L}$  Cu).

### RESULTS AND DISCUSSION

Observations of water quality parameters during the test are summarized in Table 1. Individual water quality measurements are located in the raw data (Appendix II).

All measurements of standard water quality parameters were all within protocol specified ranges (Table 1). Sulfides were not detected in the overlying bioassay water (detection limit 0.02 mg/L). Total ammonia-N ranged from 0.1 mg/L to 0.5 mg/L.

Means and standard deviations of the number normal and the normalized combined percent mortality and abnormality (NCMA) endpoint for sediments are summarized in Table 2. Detailed data organized by sample and replicate, including the larval counts, for all calculated endpoints are given in Appendix II. Five replicate subsamples were recounted (QC counts) as a check on the acceptability of the initial counts (Appendix II). In all instances the QC counts were close (coefficients of variation from 1 to 7 for counts of normal larvae) to the initial counts and were considered acceptable.

The test met the control acceptance criterion of  $\geq 70\%$  normal in the seawater control; the control percent normality was 91.6%. Since the control acceptance criterion was met, and the positive control result was within limits, it is concluded that the test has developed fully acceptable data for use in making management decisions.

Data analysis and interpretation (Tables 2 and 3) were conducted based on guidelines from the "Sediment Sampling and Analysis Plan Appendix," February 2008 (Washington Department of Ecology). For a test sediment from the larval test to fail the Sediment Quality Standards under these guidelines, the test sediment mean number normal must be <85% of the reference sediment response, and significantly lower ( $\alpha = 0.10$ ) than the reference sediment mean number normal. For a test sediment from the larval test to fail the Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) under the one-test criteria in these guidelines, the test sediment mean number normal must be <70% of the reference sediment response, and significantly lower ( $\alpha = 0.10$ ) than the reference sediment mean number normal.

The number normal larvae in test sediments BBP-SS-01 and BBP-SS-02 was not significantly lower than that in the reference sediment "Samish Bay Ref" (Table 2), so these sediments passed both Sediment Quality Standards and one-test criteria for SIZML/CSL/MCL as defined by the SMS guidelines. The number normal larvae in test sediment RGH-SS-01 and in RGH-SS-03 was significantly lower than that in the reference sediment (Table 2), and less than 85% of the reference sediment value (68.9% and 77.6%, respectively; Table 3); therefore both of these test sediments failed the Sediment Quality Standards. Additionally, the number normal larvae in test sediment RGH-SS-01 was <70% of the reference sediment value (68.9%; Table 3), and therefore this sediment failed the one-test criteria for SIZML/CSL/MCL as defined by the SMS guidelines. The mean number normal in all test sediments and in the reference sediment was significantly lower than that in the seawater control.

#### STUDY APPROVAL

Michelle S. Redmond 10-30-08  
Project Manager Date

Arnold Lusman 10-30-08  
Study Director Date

Linda K. Nemeth 10/27/08  
Assistant Laboratory Director Date

Julie R. Jew 10-30-08  
Quality Assurance Unit Date

Table 1. Summary of water quality conditions during the tests of mussel, *Mytilus galloprovincialis*, larvae exposed to marine sediments.

Parameter	Mean $\pm$ SD	Minimum	Maximum	N
Temperature ( $^{\circ}$ C)	15.5 $\pm$ 0.3	15.0	15.8	18
pH	8.0 $\pm$ 0.0	7.9	8.1	18
Salinity (‰)	27.6 $\pm$ 0.3	27.0	28.0	18
Dissolved Oxygen (mg/L)	7.5 $\pm$ 0.3	7.0	8.0	18
Total soluble sulfide (mg/L)	---	<0.02	<0.02	12
Total Ammonia-N (mg/L)	---	0.1	0.5	12

Table 2. Means and standard deviations (n=5) of number normal larvae and percent NCMA (combined mortality and abnormality, normalized to the seawater control) of mussel, *Mytilus galloprovincialis*, larvae exposed to marine sediments.

Sample Description	Number normal		Normalized combined percent mortality & abnormality (NCMA)
Seawater control	231 $\pm$ 12		0.0 $\pm$ 5.1
Samish Bay Ref (NAS #2041G)	196 $\pm$ 32	b	15.3 $\pm$ 13.7
BBP-SS-01 (NAS #2042G)	185 $\pm$ 25	b	20.2 $\pm$ 10.7
BBP-SS-02 (NAS #2043G)	173 $\pm$ 20	b	25.3 $\pm$ 8.8
RGH-SS-01 (NAS #2044G)	135 $\pm$ 42	ab	41.6 $\pm$ 18.0
RGH-SS-03 (NAS #2045G)	152 $\pm$ 39	ab	34.4 $\pm$ 16.9

a Significantly lower than in reference sediment "Samish Bay Ref" (p<0.10)  
b Significantly lower than in the seawater control (p<0.10)

Table 3. Interpretation of *Mytilus galloprovincialis* test data from exposure to marine sediments, based on SMS (WDOE 2008) guidelines.

Sample description	Number normal (mean $\pm$ SD)	Significantly less than reference sediment at $\alpha = 0.10$ ?	Percent of reference sediment value	Failure under SQS? <sup>1</sup>	Failure under SIZML, CSL, or MCL? <sup>2</sup>
Seawater control	231 $\pm$ 12	---	---	---	---
Samish Bay Ref (NAS #2041G)	196 $\pm$ 32	---	---	---	---
BBP-SS-01 (NAS #2042G)	185 $\pm$ 25	NO	94.4	NO	NO
BBP-SS-02 (NAS #2043G)	173 $\pm$ 20	NO	88.3	NO	NO
RGH-SS-01 (NAS #2044G)	135 $\pm$ 42	YES	68.9	<b>YES</b>	<b>YES</b>
RGH-SS-03 (NAS #2045G)	152 $\pm$ 39	YES	77.6	<b>YES</b>	NO

<sup>1</sup> Sediment Quality Standards (SQS) failure if the mean number of normal survivors in the test sediment is significantly less (1-tailed t-test at  $P \leq 0.10$ ) than the mean number of normal survivors in the reference sediment, and  $< 85\%$  of the mean number of normal survivors in the reference sediment.

<sup>2</sup> Sediment Impact Zone Maximum Levels (SIZML), Cleanup Screening Levels (CSL), or Minimum Cleanup Levels (MCL) failure (one-test criteria) if the mean number of normal survivors in the test sediment is significantly less (1-tailed t-test at  $P \leq 0.10$ ) than the mean number of normal survivors in the reference sediment and  $< 70\%$  of the mean number of normal survivors in the reference sediment.

**APPENDIX D  
CORNWALL AVENUE LANDFILL  
SEDIMENT PROFILE IMAGE (SPI) REPORT**

# **Sediment Profile Imaging and Plan View Photography Survey Cornwall Avenue Landfill Bellingham, WA**

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## **Data Report**

Prepared for

Hart Crowser, Inc.  
1700 Westlake Avenue N, Suite 200  
Seattle, WA 98109-3056

Prepared by



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October 2008

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## List of Acronyms

DGPS	Differential Global Positioning System
R/V	research vessel
SAIC	Science Applications International Corporation
SPI	sediment profile imaging

## **1.0 Introduction**

Science Applications International Corporation (SAIC), under contract to Hart Crowser, Inc., and in consultation with Herrenkohl Consulting LLC, conducted a sediment profile imaging (SPI) and plan view photography survey at the Cornwall Avenue Landfill site, Bellingham, Washington. The survey was conducted to evaluate the presence of municipal refuse and wood debris in the intertidal and subtidal sediments surrounding the site.

The Cornwall Avenue Landfill site is approximately 8 acres in size and is located at the south end of Cornwall Avenue, along the eastern shoreline of Bellingham Bay (Figure 1). The site is currently owned by Georgia Pacific West and the State of Washington. Most of the site was originally tide flats and subtidal areas of Bellingham Bay. From 1888 to 1946, the site was used for sawmill operations, including log storage and wood waste disposal. The site was used for municipal waste disposal from 1953 to 1965 (Ecology 2004). Over time, shoreline erosion has occurred resulting in the exposure of landfill materials. The beach area is now largely composed of exposed and reworked landfill material, and the toe of the municipal waste fill slope extends out into Bellingham Bay some distance beyond the shoreline (Ecology 2004).

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## **2.0 Survey Methods**

This section describes the methodology for vessel positioning and collection of photographic images of sediments using SPI and plan view photography. The results of the survey are summarized in Section 3.0.

### **2.1 Vessel and Navigation**

The SPI and plan view camera survey were conducted aboard the research vessel (R/V) *Kittiwake* owned and operated by BioMarine Enterprises, Seattle, Washington. The Cornwall Landfill survey was conducted September 16 through 18, 2008. Vessel positioning and navigation was accomplished using a Trimble NT300D differential global positioning system (DGPS) with a minimum positional accuracy of  $\pm 2$  meters. Geographic coordinates for sampling locations are provided in Appendix A. A total of 138 locations were occupied during the 3-day survey (Figure 2).

### **2.2 Sediment Profile Imaging**

SPI provides a cross-sectional photograph of the sediment/water interface and near-surface sediment (15 by 20 cm area). Images were collected using a Benthos model 3731 SPI camera equipped with an Ocean Imaging System digital system. The SPI camera consists of a wedge-shaped prism with a Plexiglas faceplate and a back mirror mounted at a 45° angle. Light is provided by an internal strobe. The mirror reflected the image of the profile of the sediment/water interface to a digital camera mounted horizontally on top of the prism (Figure 3). Three replicate images were collected from each SPI sampling location. One representative image was selected from each location and evaluated for the presence of wood debris and municipal waste. In addition, a second image from 10 percent of the locations was evaluated to characterize small-scale (i.e., within-station) spatial variability in the measured parameters.

### **2.3 Plan View Photography**

Plan view underwater still photography was conducted simultaneously with the SPI photography. Plan view images were taken using a downward looking PhotoSea underwater 35 millimeter camera and strobe that were mounted on the SPI camera frame. The plan view camera provided a photograph of the sediment surface (20 by 30 cm area) near the front of the SPI camera faceplate. The 35 millimeter slide film was digitized following completion of the survey and one representative image from each location was evaluated for the presence of wood debris and municipal waste. In addition, a second image from 10 percent of the stations was evaluated to characterize within-station spatial variability.

During the survey, deployment and retrieval of the SPI camera on the seafloor resulted in sediment resuspension and turbidity in the water column at some locations where fine-grained surface sediments were present. At 49 of 138 stations (36 percent), only cloudy plan view images were collected and the presence or absence of woody debris and municipal waste could not be determined. At four of 138 stations (3 percent), plan view images were not collected due to a camera malfunction. However, high-quality SPI images were obtained at all locations where turbid plan view images were collected, or where plan view images were not collected due to the camera malfunction.

## **2.4 Image Analysis Methods**

Image analysis of the SPI and plan view images consisted solely of the determination of wood debris and municipal waste in surface sediments. A proportional estimate of wood debris and municipal waste (percent by area) was visually determined from the representative digital SPI image (profile to a maximum depth of 20 cm) and plan view image (20 by 30 cm surface area) at each location (Munsell 2000). Wood debris observed during the survey consisted of bark pieces, weathered log and branch pieces, and small particles. Municipal waste observed consisted of plastic, metal, glass bottle pieces, and brick (construction debris).

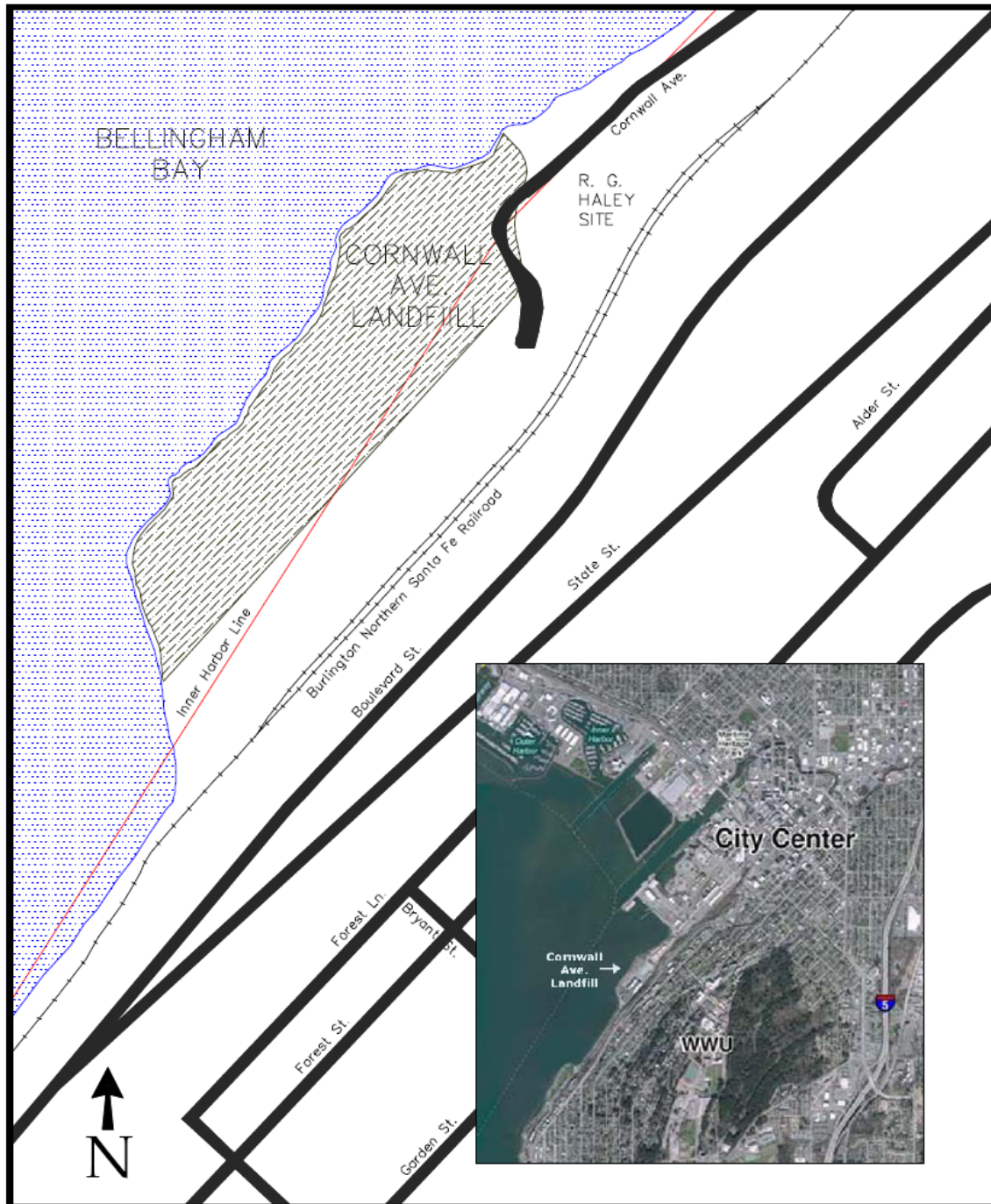
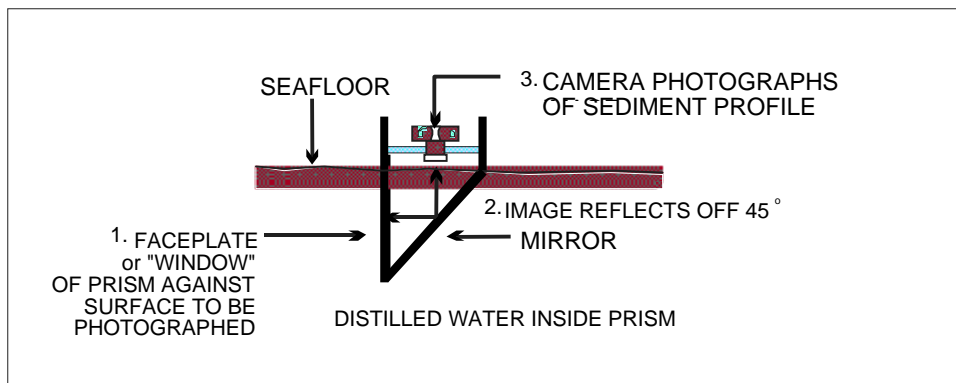
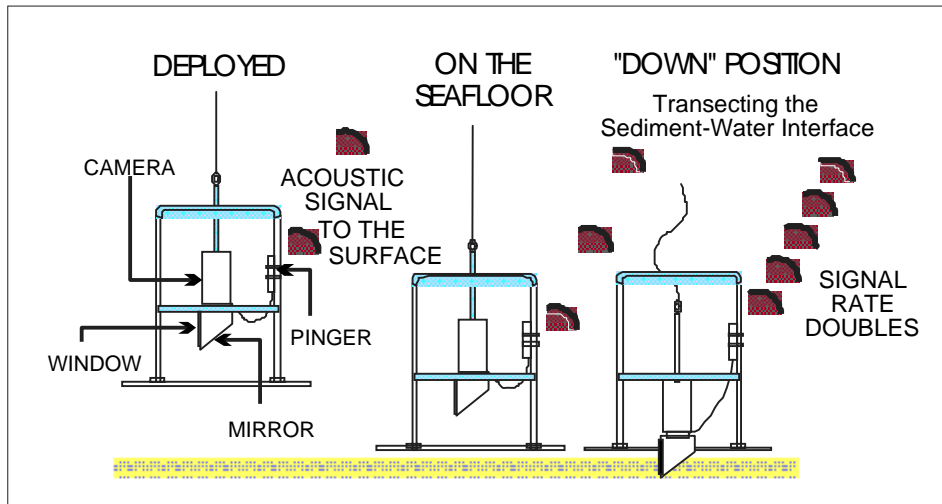
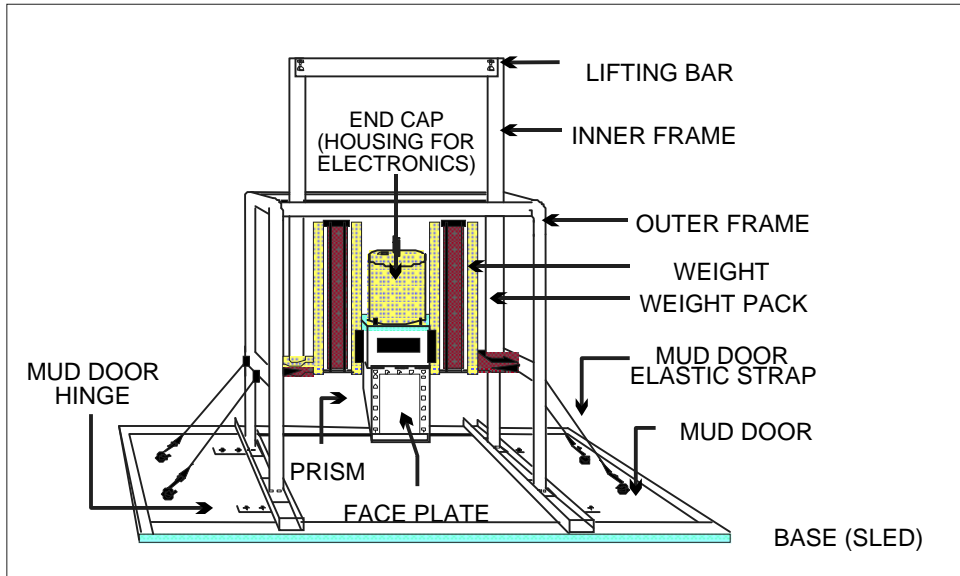


Figure 1. Location Map of Cornwall Avenue Landfill Site (from Ecology 2004)





Figure 2. SPI and Plan View Sampling Locations



**Figure 3. Schematic Diagram of Sediment-Profile Camera and Sequence of Operation on Deployment**



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## **3.0 Results**

A total of 138 locations were photographed using SPI and plan view photography to determine the distribution of wood debris and municipal waste in intertidal and subtidal surface sediments near the Cornwall Avenue Landfill site (Figure 2). SPI and plan view image analysis results for wood debris and municipal waste are summarized in Appendix B. The SPI and plan view images selected for analysis are provided on a DVD in Appendix C.

### **3.1 Sediment Profile Imaging**

#### **3.1.1 Wood Debris Distribution**

The SPI survey identified a total of 43 of 138 locations (31 percent) showing the presence of woody debris in the profile of surface sediments (Figure 4). Woody debris was observed in all parts of the survey area and a particular trend in wood debris distribution was not observed. Of those locations showing woody debris, the majority (74 percent) showed very low accumulation (5 percent or less by area) in surface sediments. The wood debris consisted mostly of small wood chips/pieces or fine particles, and was confined to the upper portions of the sediment column (8 cm or less) (Figures 5 and 6). One exception to this trend was station CW-5, where wood debris was observed to a depth of 13 cm. Fine wood particles were observed at 25 percent by area in the upper 4 cm, and 5 percent by area from 4 to 13 cm in the sediment column (Figure 6). Higher accumulations of woody debris (10 to 25 percent by area) were only observed at 11 of 138 locations (8 percent). In most cases, the wood debris at these locations consisted of larger wood pieces (weathered log or branch pieces) observed on the sediment surface (Figure 7).

#### **3.1.2 Municipal Waste Distribution**

Municipal waste, consisting of broken glass pieces and brick, was sparse in the survey area and identified at only six of 138 locations (4 percent) during the SPI survey (Figure 8). A trend in the distribution of municipal waste was not observed, similar to the wood debris. The highest accumulation of municipal waste (15 percent by area) was observed at stations CW-86 and CW-110, consisting of broken glass and brick, respectively (Figure 9). Additional locations showing glass debris in SPI images included stations CW-69 and CW-84 (Figure 10).

#### **3.1.3 Duplicate Analysis Summary**

Duplicate images were analyzed at 10 percent of the locations to characterize small-scale spatial variability in the presence of wood debris and municipal waste. For this survey, the selection of duplicate images was targeted at locations where wood debris and/or municipal waste were observed in multiple images, to assess variability in the amount of wood debris and municipal waste at each location. A comparison of duplicate SPI images is summarized in Table 1.

Five of 14 comparisons (36 percent) between primary and duplicate SPI images showed the same amount of wood debris. Presence of wood debris in primary and duplicate images, but at differing amounts occurred for five comparisons (36 percent). Four of 14 comparisons (28 percent) showed the presence of wood debris in one image, but the absence of wood debris in the other. Municipal waste was observed in two primary SPI images, but was absent in the duplicate images.

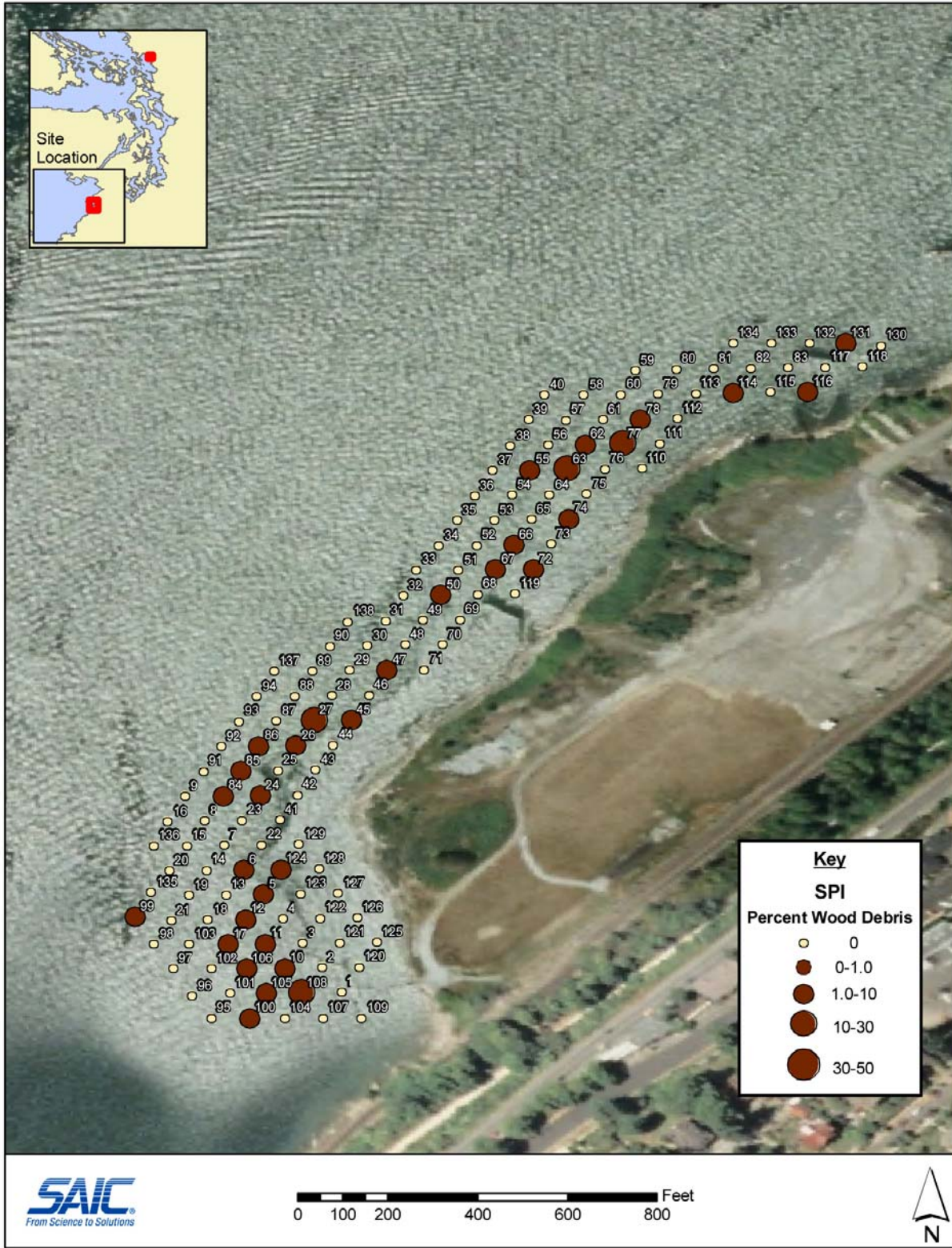


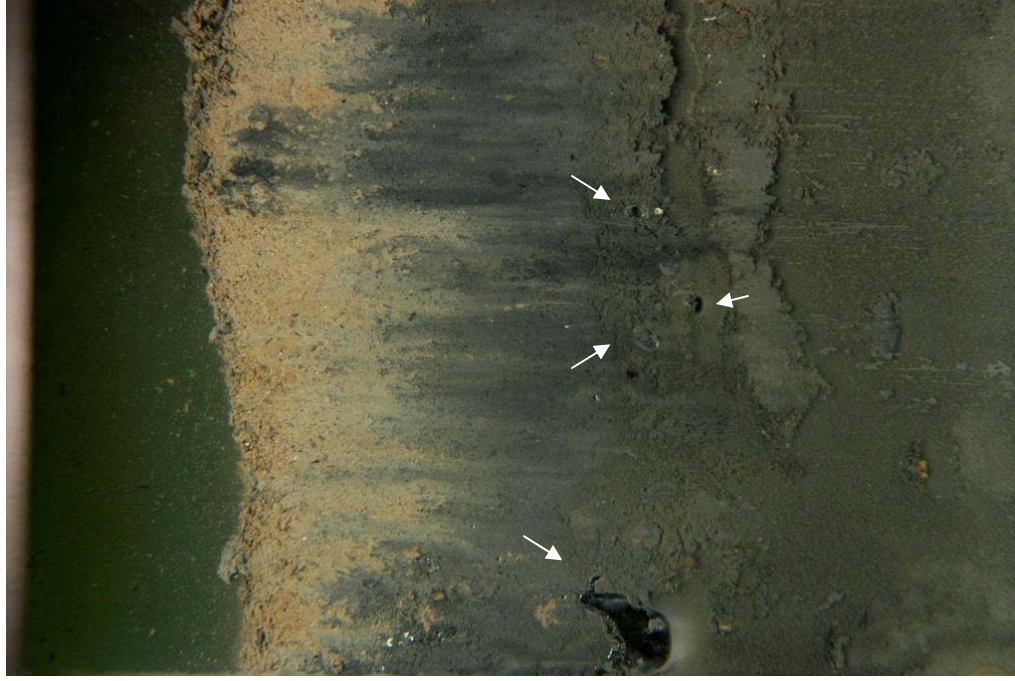
Figure 4. Distribution of Wood Debris Based on SPI Analysis



CW-84A



CW-100A



These images show the presence of fine wood debris on the sediment surface. Station CW-84A shows an accumulation of small wood particles that represent approximately 7 percent by area. Station CW-100A shows a small accumulation of fine wood particles (approximately 5 percent by area) on the sediment surface. Methane bubbles (arrows) are visible in the sediment column.

**Figure 5. SPI Images from Stations CW-84 (Replicate A) and CW-100 (Replicate A)**

CW-6B



CW-5C



Images showing the presence of fine wood debris within surface sediments. Station CW-6B shows fine wood debris in the upper 6 cm of the sediment column (approximately 5 percent by area). Station CW-5C shows a higher accumulation of fine wood debris (25 percent by area) in the upper 4 cm of the sediment column. Fine wood debris from 4 to 13 cm in the sediment column is approximately 5 percent by area.

**Figure 6. SPI Images from Stations CW-6B and CW-5C**



CW-55A



CW-77C



Both images show the presence of large wood debris on the sediment surface. Station CW-55A shows a piece of wood on the upper left (approximately 10 percent by area) draped with silt and fine organic particles. Station CW-77C shows a large piece of wood (approximately 20 percent by area) encrusted with barnacles and fine organic particles.

**Figure 7. SPI Images from Stations CW-55A and CW-77C**

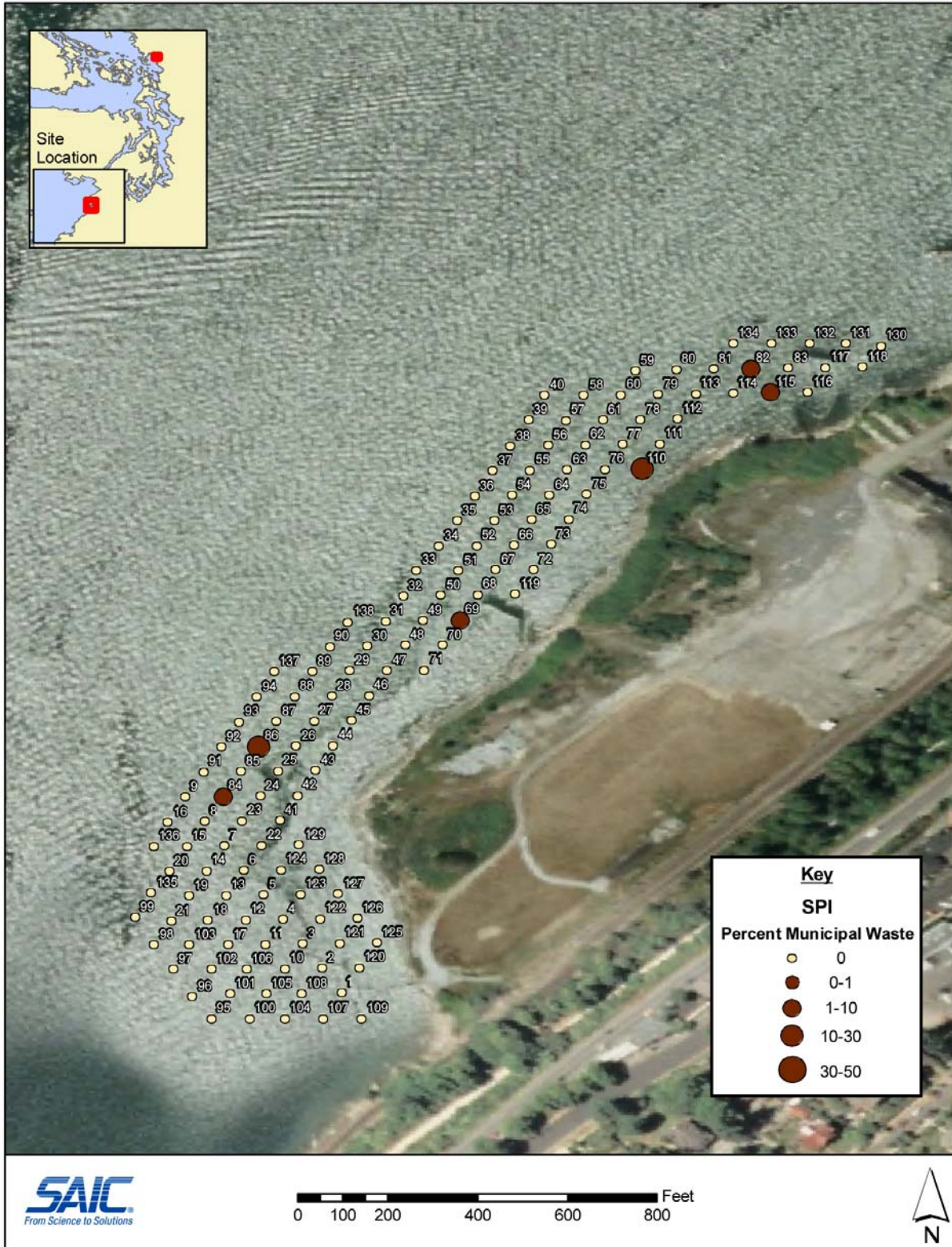


Figure 8. Distribution of Municipal Waste Based on SPI Analysis



CW-86A



CW-110C



SPI images showing the presence of municipal waste. Station CW-86A shows a piece of brown glass (approximately 15 percent by area) near the sediment surface (arrow). The glass is obscured by sediment and shell debris. Station CW-110C shows a piece of brick (approximately 15 percent by area) that has been classified as municipal waste (construction debris).

**Figure 9. SPI Images from Stations CW-86A and CW-110C**



CW-69A



CW-84B



SPI images showing the presence of municipal waste (glass pieces). Station CW-69A shows a piece of brown glass (arrow) on the sediment surface (approximately 7 percent by area). Station CW-84B shows the neck of a glass bottle draped by a sea star (arrow) on the sediment surface (approximately 15 percent by area).

**Figure 10. SPI Images from Stations CW-69A and CW-84B**

**Table 1. Comparison of Wood Debris and Municipal Waste for Duplicate SPI Images**

Station	Wood Debris (%)		Municipal Waste (%)	
	Primary	Duplicate	Primary	Duplicate
CW-5	10	10	0	0
CW-6	3	5	0	0
CW-10	3	3	0	0
CW-45	2	0	0	0
CW-62	3	3	0	0
CW-72	5	5	0	0
CW-77	20	3	0	0
CW-78	2	0	0	0
CW-84	0	7	10	0
CW-85	10	10	0	0
CW-86	3	5	15	0
CW-100	5	3	0	0
CW-105	5	0	0	0
CW-131	3	2	0	0

## 3.2 Plan View Photography

### 3.2.1 Wood Debris Distribution

Due to turbidity in the water column during the plan view photography survey (see Section 2.3), useable plan view images were collected at 85 of 138 locations (62 percent). Forty-six percent of those locations (39 of 85 locations) showed the presence of wood debris (Figure 11). The plan view photography showed a greater number of locations with higher accumulations of wood debris, compared to the SPI survey. Wood debris accumulation of 7 to 40 percent by area was identified at 44 percent of the locations (17 of 39 locations with wood debris). The majority of these locations showed the presence of small to large wood pieces/logs on the sediment surface (Figure 12). The highest coverage of wood debris was measured at station CW-68, due to the presence of a log piece on the sediment surface (Figure 13). Station CW-5 showed relatively high accumulations of wood debris (25 percent by area) due to the presence of small wood particles on the sediment surface (Figure 13). For the 22 of 39 stations (56 percent) showing lower amounts of wood debris (5 percent or less by area), the wood debris consisted of small wood pieces or particles visible on the sediment surface (Figure 14).

### 3.2.2 Municipal Waste Distribution

Municipal waste, consisting of broken glass pieces, plastic, and brick, was identified at eight locations off the southwest point of the Cornwall Avenue Landfill (Figure 15). The highest accumulation of municipal waste (20 percent by area) was observed at station CW-126 due to the presence of a metal or plastic sign piece on the seafloor (Figure 16). An intact glass bottle and a broken bottle top were visible at stations CW-84 and CW-41, respectively (Figure 17). A brick piece was visible on a rocky bottom at station CW-42 (Figure 16).

### **3.2.3 Duplicate Analysis Summary**

Duplicate images were analyzed at 10 percent of the locations to characterize small-scale spatial variability in the presence of wood debris and municipal waste. For this survey, the selection of duplicate images was targeted at locations where wood debris and/or municipal waste were observed in multiple images, to assess variability in the amount of wood debris and municipal waste at each location. A comparison of duplicate plan view images is summarized in Table 2.

Seven of 14 comparisons (50 percent) between primary and duplicate plan view images showed the same amount of wood debris. Presence of wood debris in primary and duplicate images, but at differing amounts, occurred for two comparisons (14 percent). Five of 14 comparisons (36 percent) showed the presence of wood debris in one image, but the absence of wood debris in the other. Only one of 14 comparisons (7 percent) showed the same amount of municipal waste between primary and duplicate plan view images. Nine of 14 comparisons (64 percent) did not show municipal waste in either the primary or duplicate plan view images. Presence of municipal waste in primary and duplicate images, but at differing amounts, occurred for one comparison (7 percent). Three of 14 comparisons (22 percent) showed the presence of wood debris in one image, but the absence of wood debris in the other.



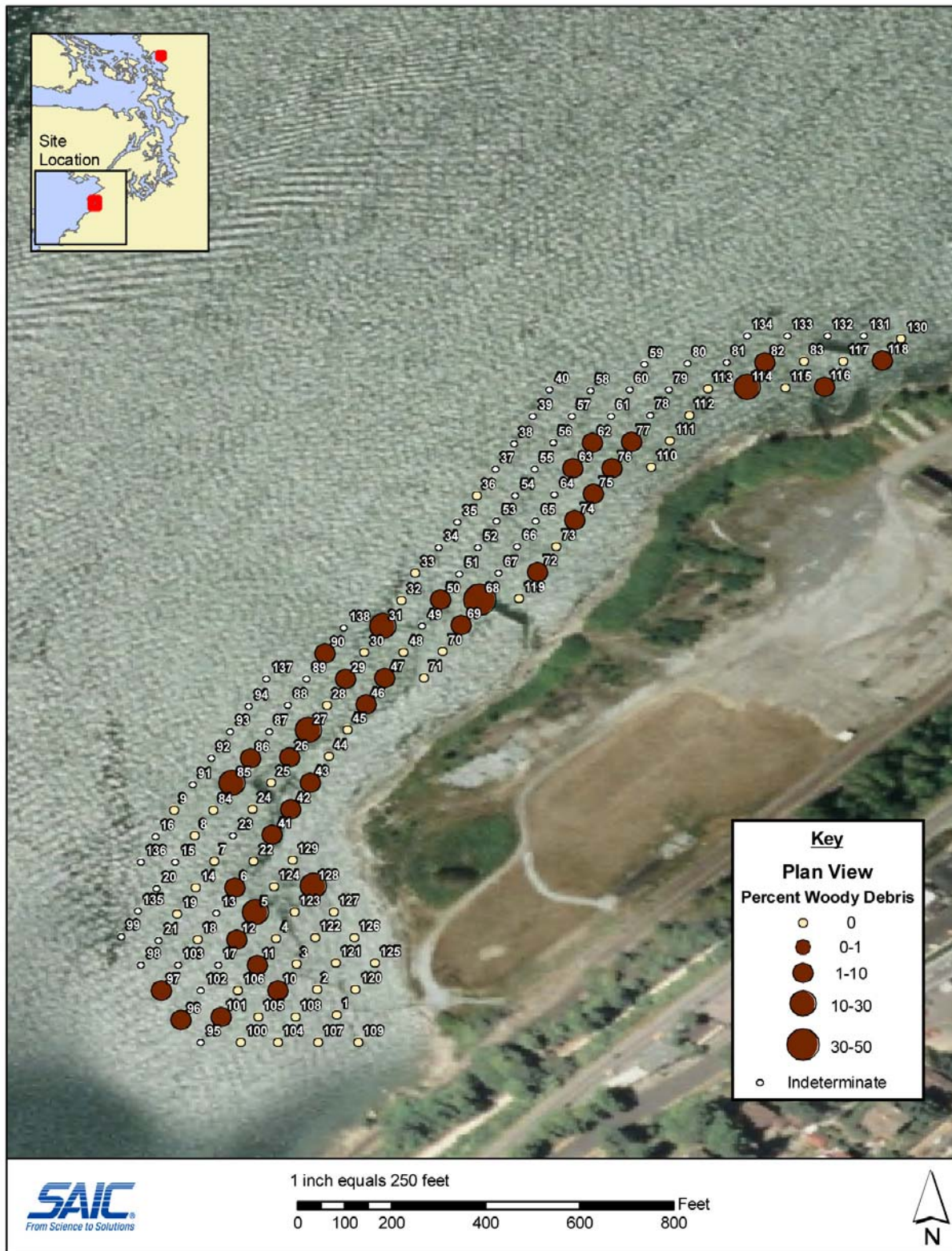


Figure 11. Distribution of Wood Debris Based on Plan View Image Analysis

CW-26A



CW-31A

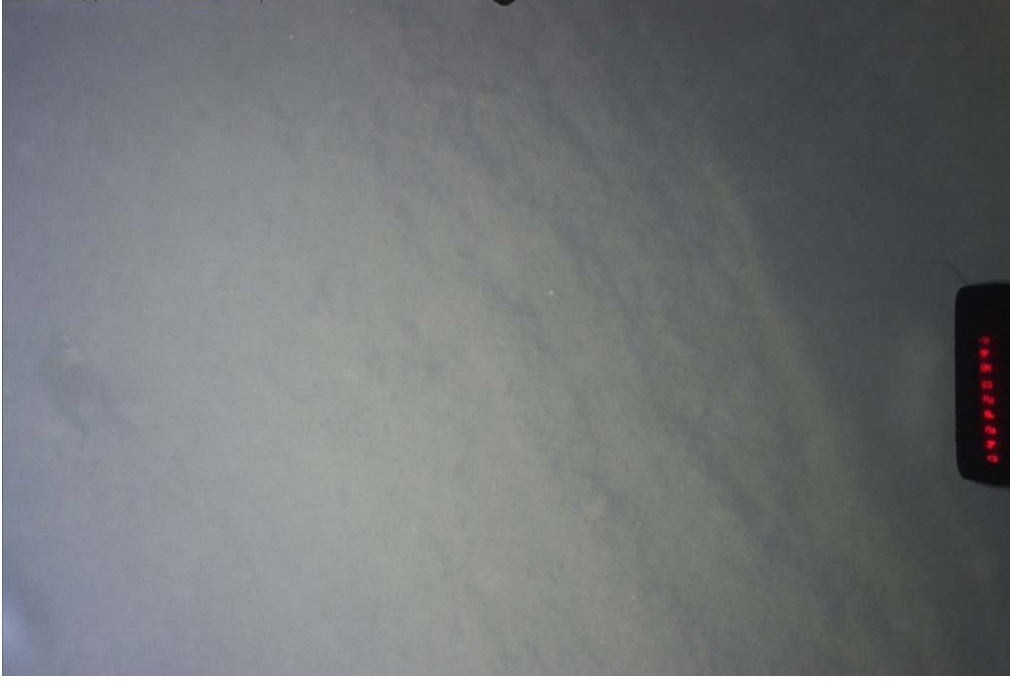


Plan view images showing the presence of large wood debris. Station CW-26A shows pieces of wood debris and shells on the sediment surface (approximately 10 percent by area). The wood debris and shells are draped by a layer of silt. Station CW-31A shows a large piece of wood encrusted with algae and bryozoans (approximately 25 percent by area). A sea cucumber is visible at the lower left of the image.

**Figure 12. Plan View Images from Stations CW-26A and CW-31A**



CW-68C



CW-5A



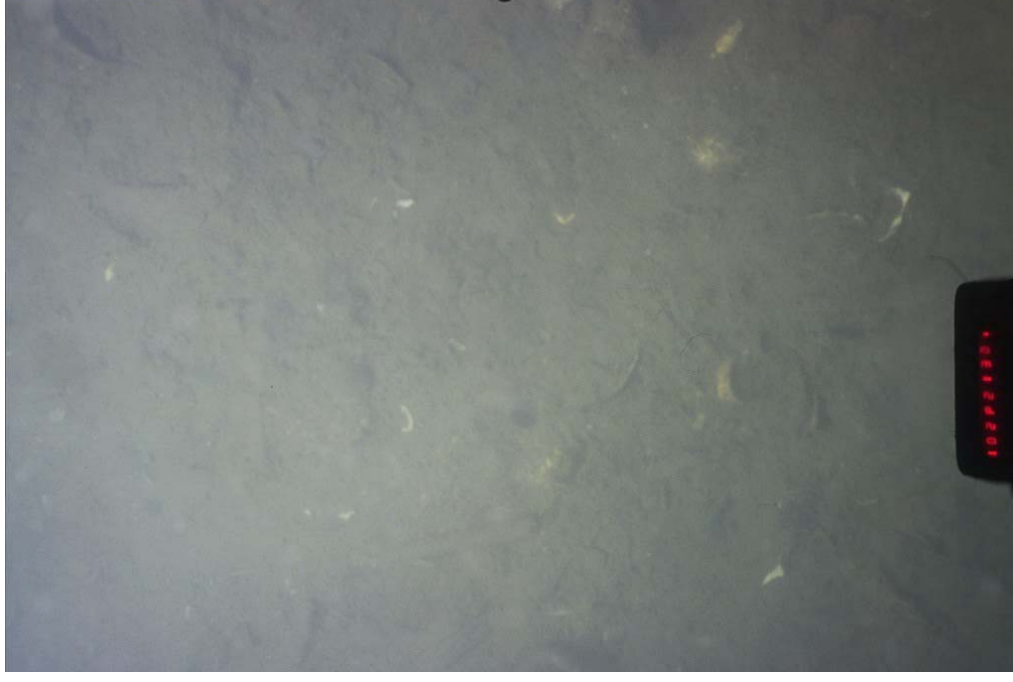
Plan view images showing the presence of wood debris on the sediment surface. Station CW-68C shows a large piece of wood/log on the sediment surface (approximately 40 percent by area). Station CW-5A shows accumulations of fine wood particles on the sediment surface (approximately 25 percent by area).

**Figure 13. Plan View Images from Stations CW-68C and CW-5A**

CW-11A



CW-86A



Plan images showing the presence of fine wood debris on the sediment surface. Station CW-11A shows small wood particles (arrows) lying on fine grained surface sediments (approximately 3 percent by area). Station CW-86A shows small wood pieces and particles with shells on the sediment surface (approximately 5 percent by area).

**Figure 14. Plan View Images from Stations CW-11A and CW-86A**



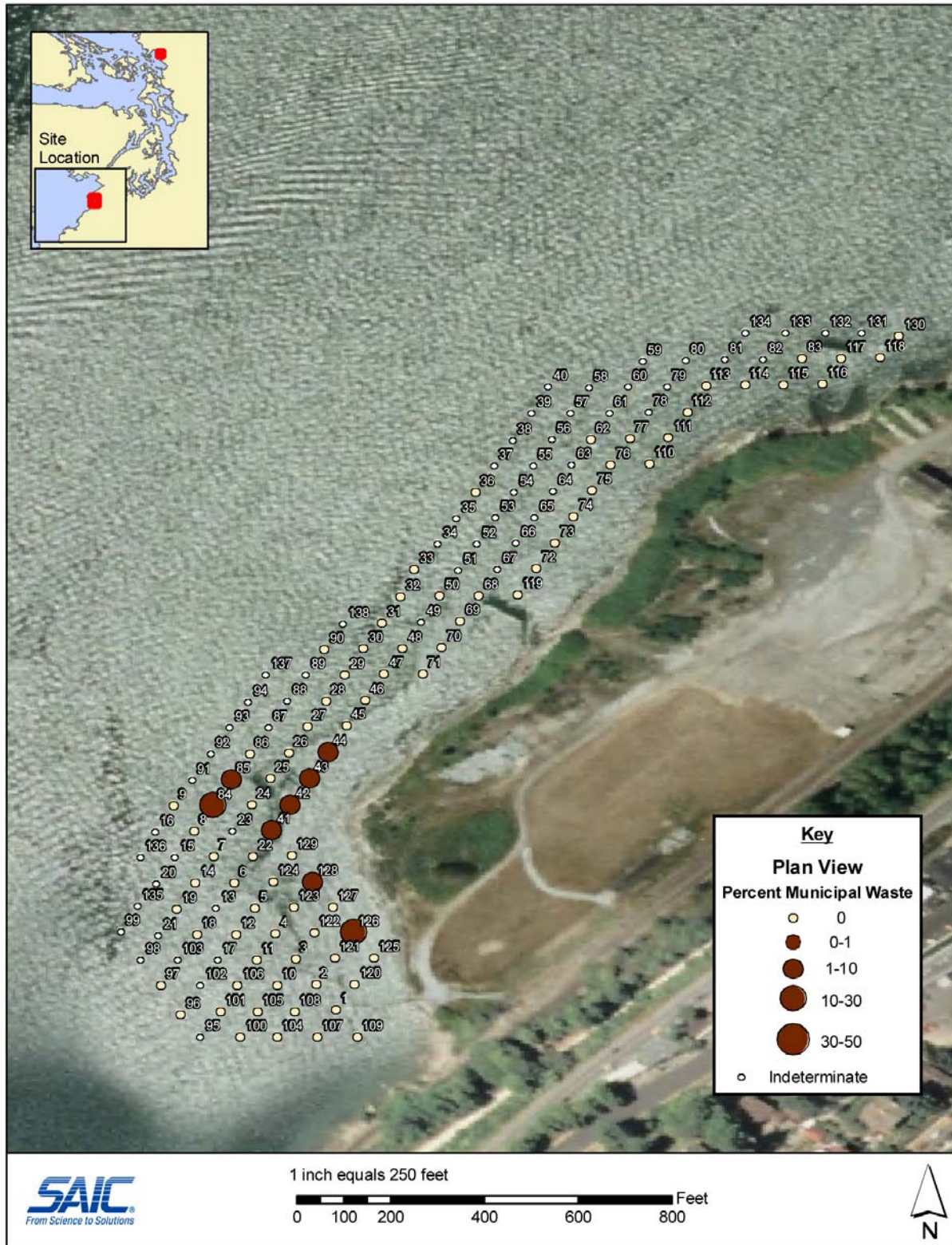


Figure 15. Distribution of Municipal Waste Based on Plan View Image Analysis



CW-126C



CW-42A



Plan view images showing municipal waste on the sediment surface. Station CW-126C shows a metal or plastic sign piece on the sediment surface (approximately 20 percent by area). Station CW-42A shows a piece of brick (approximately 10 percent by area) along the right side of the image (arrow) and wood pieces on the sediment surface.

**Figure 16. Plan View Images from Stations CW-126C and CW-42A**

CW-84A



CW-41B



Plan view images showing the presence of municipal waste (glass) on the sediment surface. Station CW-84A shows a glass bottle (arrow) resting on the sediment surface (approximately 15 percent by area). Station CW-41B shows the presence of a broken glass bottle neck (arrow) on a rocky and sandy bottom (approximately 3 percent by area).

**Figure 17. Plan View Images from Stations CW-84A and CW-41B**

**Table 2. Comparison of Wood Debris and Municipal Waste for Duplicate Plan View Images**

Station	Wood Debris (%)		Municipal Waste (%)	
	Primary	Duplicate	Primary	Duplicate
CW-24	0	0	0	0
CW-27	15	0	0	0
CW-30	0	0	0	0
CW-31	20	0	0	0
CW-41	0	3	3	0
CW-42	10	10	10	5
CW-43	5	0	3	0
CW-44	0	0	0	5
CW-46	5	5	0	0
CW-68	40	3	0	0
CW-75	7	5	0	0
CW-111	0	0	0	0
CW-119	0	0	0	0
CW-128	20	0	7	7

## **4.0 Summary**

- The SPI survey identified wood debris at 43 of 138 locations (31 percent) and the majority of locations showed very low accumulations of wood debris (5 percent or less by area). The wood debris consisted mostly of small wood chips/pieces or fine particles, and was generally confined to the upper portions of the sediment column (8 cm or less).
- The plan view photography identified wood debris at 39 of 85 locations (46 percent) on the sediment surface. Of those locations with wood debris, 44 percent were identified with wood debris accumulations of 7 to 40 percent by area. The wood debris in these higher accumulation locations consisted of small to large wood pieces or logs. Fifty-six percent of the stations had wood debris accumulations of 5 percent or less by area.
- Small amounts of wood debris were observed in all parts of the survey area, and a general trend in wood debris distribution was not observed.
- Municipal waste consisted of broken glass pieces, plastic, and brick, and was not observed in great abundance in SPI and plan view images. The greatest accumulation of municipal waste was observed at eight locations off the southwest point of the Cornwall Avenue Landfill (Figure 15).
- Although turbidity in the water column reduced the number of useable plan view images collected during the survey, plan view photography appeared to be effective in the identification of woody debris and municipal waste on surface sediments, particularly larger particles (e.g., logs, bricks, bottles, etc.). SPI photography was effective in the identification of small wood pieces and fine particles in surface sediments.

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## **5.0 References**

Ecology. 2004. Cornwall Avenue Landfill Site. Fact Sheet. September 2004. Washington State Department of Ecology. Publication Number 04-09-112.

<http://www.ecy.wa.gov/biblio/0409112.html>

Munsell. 2000. Charts for estimating proportions of mottles and coarse fragments. Munsell soil color charts. Year 2000. GretagMacBeth, New Windsor, NY.

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# **Appendix A**

## **Geographic Coordinates**



**Hart Crowser**

**Cornwall Avenue Landfill, Bellingham  
September 2008**

**SPI Mapping Survey**

SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Min. Latitude	DGPS Trimble NT300D NAD 1983, Decimal Min. Longitude			
CW-01	1	16-Sep	0940	2.2	7.2	4.2	-3.0	48 44.2445	122 29.7724	1239156.8	638113.0	48 44.2441	122 29.7723	0.8		
	2		0941	2.2	7.2	4.2	-3.0			1239155.0	638120.9	48 44.2454	122 29.7728	1.7	1.2	
	3		0942	2.2	7.2	4.2	-3.0			1239153.3	638119.1	48 44.2451	122 29.7732	1.5		
CW-02	1	16-Sep	0952	2.7	8.9	3.9	-5.0	48 44.2534	122 29.7795	1239127.5	638169.6	48 44.2533	122 29.7799	0.5		
	2		0953	2.7	8.9	3.9	-5.0			1239123.5	638171.5	48 44.2536	122 29.7809	1.7	1.2	
	3		0955	2.7	8.9	3.9	-5.0			1239118.6	638171.0	48 44.2535	122 29.7821	3.1		
CW-03	1	16-Sep	0959	3.0	9.8	3.8	-6.0	48 44.2624	122 29.7867	1239100.4	638221.3	48 44.2617	122 29.7869	1.3		
	2		1000	3.0	9.8	3.8	-6.0			1239099.2	638221.3	48 44.2617	122 29.7872	1.4	1.3	
	3		1001	3.0	9.8	3.7	-6.1			1239098.8	638221.3	48 44.2617	122 29.7873	1.5		
CW-04	1	16-Sep	1005	3.5	11.5	3.7	-7.8	48 44.2713	122 29.7938	1239069.4	638277.3	48 44.2708	122 29.7949	1.7		
	2		1005	3.6	11.8	3.6	-8.2			1239067.0	638277.3	48 44.2708	122 29.7955	2.3	1.2	
	3		1006	3.6	11.8	3.6	-8.2			1239069.5	638278.5	48 44.2710	122 29.7949	1.5		
CW-05	1	16-Sep	1010	4.2	13.8	3.5	-10.3	48 44.2803	122 29.8009	1239047.2	638344.7	48 44.2818	122 29.8008	2.8		
	2		1011	4.2	13.8	3.5	-10.3			1239052.8	638343.9	48 44.2817	122 29.7994	3.2	1.2	
	3		1012	4.2	13.8	3.5	-10.3			1239049.0	638337.3	48 44.2806	122 29.8003	1.0		
CW-06	1	16-Sep	1016	5.9	19.4	3.4	-16.0	48 44.2892	122 29.8081	1239015.3	638394.6	48 44.2899	122 29.8090	1.7		
	2		1016	5.9	19.4	3.4	-16.0			1239019.6	638390.9	48 44.2893	122 29.8079	0.3	1.2	
	3		1017	5.9	19.4	3.4	-16.0			1239015.6	638392.2	48 44.2895	122 29.8089	1.1		
CW-07	1	16-Sep	1021	6.8	22.3	3.3	-19.0	48 44.2982	122 29.8152	1238999.4	638443.0	48 44.2978	122 29.8132	2.5		
	2		1021	6.8	22.3	3.3	-19.0			1238999.0	638444.2	48 44.2980	122 29.8133	2.4	1.3	
	3		1022	6.9	22.6	3.3	-19.3			1238992.6	638446.2	48 44.2983	122 29.8149	0.4		
CW-08	1	16-Sep	1026	7.3	24.0	3.2	-20.8	48 44.3071	122 29.8223	1238959.2	638499.8	48 44.3070	122 29.8235	1.4		First three
	2		1027	7.3	24.0	3.2	-20.8			1238959.2	638500.4	48 44.3071	122 29.8235	1.4	1.3	samples, OP
	3		1028	7.3	24.0	3.2	-20.8			1238959.5	638496.8	48 44.3065	122 29.8234	1.7		
	4		1133	7.0	23.0	2.2	-20.8			1238966.7	638495.4	48 44.3063	122 29.8216	1.8		
	5		1134	7.0	23.0	2.2	-20.8			1238967.5	638494.2	48 44.3061	122 29.8214	2.2	1.1	
	6		1134	7.0	23.0	2.2	-20.8			1238967.5	638494.2	48 44.3061	122 29.8214	2.2		
CW-09	1	16-Sep	1033	7.7	25.3	3.1	-22.2	48 44.3161	122 29.8295	1238935.8	638554.5	48 44.3159	122 29.8296	0.3		
	2		1033	7.7	25.3	3.1	-22.2			1238936.3	638555.7	48 44.3161	122 29.8295	0.1	1.3	
	3		1034	7.7	25.3	3.1	-22.2			1238935.9	638555.7	48 44.3161	122 29.8296	0.2		
CW-10	1	16-Sep	1059	3.0	9.8	2.6	-7.2	48 44.2532	122 29.7932	1239076.4	638171.3	48 44.2534	122 29.7926	0.8		
	2		1059	3.0	9.8	2.6	-7.2			1239073.6	638172.6	48 44.2536	122 29.7933	0.7	1.1	
	3		1100	3.0	9.8	2.6	-7.2			1239073.6	638171.3	48 44.2534	122 29.7933	0.3		
CW-11	1	16-Sep	1103	3.4	11.2	2.6	-8.6	48 44.2622	122 29.8003	1239043.0	638228.0	48 44.2626	122 29.8012	1.3		
	2		1104	3.4	11.2	2.6	-8.6			1239043.8	638224.3	48 44.2620	122 29.8010	0.9	1.1	
	3		1104	3.4	11.2	2.6	-8.6			1239048.7	638230.3	48 44.2630	122 29.7998	1.6		
CW-12	1	16-Sep	1107	4.9	16.1	2.5	-13.6	48 44.2711	122 29.8075	1239014.7	638276.6	48 44.2705	122 29.8085	1.7		
	2		1108	4.9	16.1	2.5	-13.6			1239013.2	638279.7	48 44.2710	122 29.8089	1.8	1.1	
	3		1109	4.9	16.1	2.5	-13.6			1239015.1	638277.2	48 44.2706	122 29.8084	1.5		
CW-13	1	16-Sep	1111	5.8	19.0	2.4	-16.6	48 44.2801	122 29.8146	1238985.4	638336.3	48 44.2802	122 29.8161	1.8		
	2		1112	5.7	18.7	2.4	-16.3			1238986.2	638333.2	48 44.2797	122 29.8159	1.7	1.1	

**Hart Crowser**

**Cornwall Avenue Landfill, Bellingham  
September 2008**

**SPI Mapping Survey**

SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Latitude	NAD 1983, Decimal Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Latitude	DGPS Trimble NT300D NAD 1983, Decimal Longitude			
	3		1113	5.9	19.4	2.4	-17.0			1238986.2	638333.8	48 44.2798	122 29.8159	1.7		
CW-14	1	16-Sep	1117	6.4	21.0	2.4	-18.6	48 44.2890	122 29.8217	1238969.6	638383.4	48 44.2879	122 29.8203	2.7		
	2		1117	6.4	21.0	2.4	-18.6			1238968.5	638388.9	48 44.2888	122 29.8206	1.5	1.1	
	3		1118	6.4	21.0	2.4	-18.6			1238963.4	638395.1	48 44.2898	122 29.8219	1.4		
CW-15	1	16-Sep	1122	7.0	23.0	2.3	-20.7	48 44.2980	122 29.8289	1238932.3	638447.5	48 44.2983	122 29.8299	1.4		
	2		1122	7.0	23.0	2.3	-20.7			1238931.1	638446.9	48 44.2982	122 29.8302	1.7	1.1	
	3		1123	7.0	23.0	2.3	-20.7			1238930.7	638445.7	48 44.2980	122 29.8303	1.8		
CW-16	1	16-Sep	1129	7.4	24.3	2.3	-22.0	48 44.3069	122 29.8360	1238912.9	638497.8	48 44.3065	122 29.8350	1.5		
	2		1129	7.4	24.3	2.3	-22.0			1238913.7	638497.2	48 44.3064	122 29.8348	1.8	1.0	
	3		1130	7.4	24.3	2.3	-22.0			1238913.3	638500.2	48 44.3069	122 29.8349	1.4		
CW-17	1	16-Sep	1141	5.2	17.1	2.2	-14.9	48 44.2620	122 29.8140	1238993.0	638223.6	48 44.2617	122 29.8136	0.8		
	2		1142	5.2	17.1	2.2	-14.9			1238995.4	638221.7	48 44.2614	122 29.8130	1.7	1.0	
	3		1143	5.2	17.1	2.2	-14.9			1238991.9	638224.2	48 44.2618	122 29.8139	0.4		
CW-18	1	16-Sep	1146	6.0	19.7	2.1	-17.6	48 44.2709	122 29.8212	1238961.9	638273.5	48 44.2698	122 29.8216	2.2		
	2		1146	6.0	19.7	2.1	-17.6			1238970.5	638277.0	48 44.2704	122 29.8195	2.3	1.0	
	3		1147	6.0	19.7	2.1	-17.6			1238964.4	638274.1	48 44.2699	122 29.8210	1.9		
CW-19	1	16-Sep	1151	7.0	23.0	2.1	-20.9	48 44.2799	122 29.8283	1238938.4	638336.1	48 44.2800	122 29.8278	0.6		
	2		1152	6.9	22.6	2.1	-20.5			1238938.7	638331.8	48 44.2793	122 29.8277	1.3	1.0	
	3		1152	6.9	22.6	2.1	-20.5			1238938.7	638332.4	48 44.2794	122 29.8277	1.2		
CW-20	1	16-Sep	1155	7.1	23.3	2.1	-21.2	48 44.2888	122 29.8354	1238910.6	638391.4	48 44.2890	122 29.8350	0.6		
	2		1156	7.1	23.3	2.1	-21.2			1238908.6	638390.8	48 44.2889	122 29.8355	0.2	1.0	
	3		1157	7.1	23.3	2.1	-21.2			1238905.0	638395.8	48 44.2897	122 29.8364	2.0		
CW-21	1	16-Sep	1201	7.0	23.0	2.1	-20.9	48 44.2707	122 29.8348	1238909.9	638283.2	48 44.2712	122 29.8346	0.9		
	2		1201	7.0	23.0	2.1	-20.9			1238915.1	638282.4	48 44.2711	122 29.8333	2.0	1.1	
	3		1203	7.0	23.0	2.1	-20.9			1238913.2	638287.3	48 44.2719	122 29.8338	2.5		
CW-22	1	16-Sep	1314	5.6	18.4	2.5	-15.9	48 44.2984	122 29.8015	1239039.4	638449.4	48 44.2990	122 29.8033	2.5		
	2		1314	5.6	18.4	2.5	-15.9			1239036.6	638450.7	48 44.2992	122 29.8040	3.4	1.0	
	3		1315	5.6	18.4	2.5	-15.9			1239037.4	638451.3	48 44.2993	122 29.8038	3.3		
CW-23	1	16-Sep	1320	6.3	20.7	2.6	-18.1	48 44.3073	122 29.8087	1239011.0	638496.3	48 44.3066	122 29.8106	2.7		
	2		1320	6.2	20.3	2.6	-17.7			1239014.1	638490.7	48 44.3057	122 29.8098	3.3	1.4	
	3		1321	6.3	20.7	2.6	-18.1			1239010.6	638495.1	48 44.3064	122 29.8107	3.0		
CW-24	1	16-Sep	1324	4.0	13.1	2.6	-10.5	48 44.3164	122 29.8021	1239043.1	638546.7	48 44.3150	122 29.8029	2.9		
	2		1325	4.0	13.1	2.6	-10.5			1239042.4	638550.9	48 44.3157	122 29.8031	1.8	1.3	
	3		1326	4.0	13.1	2.7	-10.4			1239041.3	638557.0	48 44.3167	122 29.8034	1.6		
CW-25	1	16-Sep	1329	3.0	9.8	2.7	-7.1	48 44.3256	122 29.7956	1239071.1	638616.0	48 44.3265	122 29.7963	1.9		
	2		1330	3.0	9.8	2.7	-7.1			1239073.1	638613.5	48 44.3261	122 29.7958	1.0	1.3	
	3		1331	3.0	9.8	2.8	-7.0			1239074.0	638620.2	48 44.3272	122 29.7956	3.0		
CW-26	1	16-Sep	1337	1.5	4.9	2.8	-2.1	48 44.3347	122 29.7890	1239098.0	638670.2	48 44.3355	122 29.7899	1.8		
	2		1338	1.5	4.9	2.9	-2.0			1239099.2	638667.1	48 44.3350	122 29.7896	0.8	1.3	
	3		1338	1.5	4.9	2.9	-2.0			1239094.4	638669.0	48 44.3353	122 29.7908	2.4		
CW-27	1	16-Sep	1344	5.6	18.4	3.0	-15.4	48 44.3439	122 29.7825	1239125.8	638723.7	48 44.3444	122 29.7833	1.4		

**Hart Crowser**

**Cornwall Avenue Landfill, Bellingham  
September 2008**

**SPI Mapping Survey**

SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Latitude	NAD 1983, Decimal Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Latitude	DGPS Trimble NT300D NAD 1983, Decimal Longitude			
	2		1345	5.6	18.4	3.0	-15.4			1239127.0	638727.3	48 44.3450	122 29.7830	2.2	1.3	
	3		1345	5.6	18.4	3.0	-15.4			1239128.6	638725.5	48 44.3447	122 29.7826	1.5		
CW-28	1	16-Sep	1348	6.1	20.0	3.1	-16.9	48 44.3530	122 29.7760	1239150.7	638781.5	48 44.3540	122 29.7774	2.5		
	2		1349	6.0	19.7	3.1	-16.6			1239150.8	638783.4	48 44.3543	122 29.7774	3.0	1.3	
	3		1349	6.1	20.0	3.1	-16.9			1239149.9	638781.6	48 44.3540	122 29.7776	2.7		
CW-29	1	16-Sep	1352	5.9	19.4	3.1	-16.3	48 44.3622	122 29.7694	1239184.2	638821.6	48 44.3607	122 29.7693	2.7		
	2		1353	5.9	19.4	3.1	-16.3			1239188.3	638825.1	48 44.3613	122 29.7683	2.1	1.3	
	3		1353	5.9	19.4	3.2	-16.2			1239193.7	638831.7	48 44.3624	122 29.7670	3.0		
CW-30	1	16-Sep	1356	6.1	20.0	3.2	-16.8	48 44.3713	122 29.7629	1239209.6	638882.5	48 44.3708	122 29.7633	1.1		
	2		1356	6.1	20.0	3.2	-16.8			1239212.0	638879.4	48 44.3703	122 29.7627	1.9	1.3	
	3		1357	6.2	20.3	3.2	-17.1			1239212.9	638886.0	48 44.3714	122 29.7625	0.5		
CW-31	1	16-Sep	1401	6.6	21.7	3.3	-18.4	48 44.3804	122 29.7563	1239235.8	638940.3	48 44.3804	122 29.7571	0.9		
	2		1401	6.6	21.7	3.3	-18.4			1239232.3	638946.4	48 44.3814	122 29.7580	2.7	1.2	
	3		1402	6.7	22.0	3.3	-18.7			1239237.5	638942.7	48 44.3808	122 29.7567	0.8		
CW-32	1	16-Sep	1406	6.4	21.0	3.4	-17.6	48 44.3896	122 29.7498	1239269.7	638997.9	48 44.3900	122 29.7490	1.3		
	2		1406	6.3	20.7	3.4	-17.3			1239273.4	639002.1	48 44.3907	122 29.7481	2.9	1.2	
	3		1407	6.3	20.7	3.4	-17.3			1239266.4	638997.4	48 44.3899	122 29.7498	0.6		
CW-33	1	16-Sep	1434	6.1	20.0	4.0	-16.0	48 44.3990	122 29.7450	1239286.6	639054.1	48 44.3993	122 29.7451	0.6		
	2		1435	6.0	19.7	4.1	-15.6			1239287.4	639054.1	48 44.3993	122 29.7449	0.6	1.0	
	3		1436	6.1	20.0	4.1	-15.9			1239289.0	639052.9	48 44.3991	122 29.7445	0.6		
CW-34	1	16-Sep	1439	6.0	19.7	4.1	-15.6	48 44.4079	122 29.7367	1239322.2	639101.4	48 44.4072	122 29.7365	1.2		
	2		1439	6.0	19.7	4.1	-15.6			1239316.1	639099.7	48 44.4069	122 29.7380	2.4	1.0	
	3		1440	6.0	19.7	4.2	-15.5			1239321.0	639100.2	48 44.4070	122 29.7368	1.6		
CW-35	1	16-Sep	1443	5.9	19.4	4.2	-15.2	48 44.4170	122 29.7302	1239347.5	639154.4	48 44.4160	122 29.7305	1.9		
	2		1444	6.0	19.7	4.2	-15.5			1239350.3	639154.9	48 44.4161	122 29.7298	1.7	1.0	
	3		1445	5.9	19.4	4.3	-15.1			1239353.1	639154.3	48 44.4160	122 29.7291	2.3		
CW-36	1	16-Sep	1448	6.3	20.7	4.4	-16.3	48 44.4261	122 29.7236	1239377.4	639217.6	48 44.4265	122 29.7234	0.7		
	2		1449	6.4	21.0	4.4	-16.6			1239373.4	639220.1	48 44.4269	122 29.7244	1.7	0.9	
	3		1449	6.4	21.0	4.4	-16.6			1239374.6	639219.5	48 44.4268	122 29.7241	1.4		
CW-37	1	16-Sep	1454	7.0	23.0	4.5	-18.5	48 44.4353	122 29.7171	1239407.4	639267.4	48 44.4348	122 29.7162	1.4		
	2		1455	7.0	23.0	4.5	-18.5			1239409.9	639269.2	48 44.4351	122 29.7156	1.9	0.9	
	3		1456	6.9	22.6	4.5	-18.1			1239404.2	639266.3	48 44.4346	122 29.7170	1.3		
CW-38	1	16-Sep	1459	8.0	26.2	4.6	-21.6	48 44.4444	122 29.7106	1239431.4	639313.8	48 44.4425	122 29.7105	3.6		
	2		1459	7.9	25.9	4.6	-21.3			1239435.0	639312.5	48 44.4423	122 29.7096	4.1	1.0	
	3		1500	7.9	25.9	4.6	-21.3			1239442.0	639321.4	48 44.4438	122 29.7079	3.4		
CW-39	1	16-Sep	1506	8.1	26.6	4.8	-21.8	48 44.4540	122 29.7040	1239456.8	639393.5	48 44.4557	122 29.7046	3.2		
	2		1506	8.1	26.6	4.8	-21.8			1239453.9	639387.5	48 44.4547	122 29.7053	2.1	0.9	
	3		1507	8.1	26.6	4.8	-21.8			1239452.6	639385.1	48 44.4543	122 29.7056	2.0		
CW-40	1	16-Sep	1511	8.0	26.2	4.9	-21.3	48 44.4630	122 29.6980	1239485.9	639437.9	48 44.4631	122 29.6976	0.5		
	2		1512	8.0	26.2	4.9	-21.3			1239482.8	639443.4	48 44.4640	122 29.6984	1.9	1.0	
	3		1513	8.0	26.2	4.9	-21.3			1239484.1	639445.2	48 44.4643	122 29.6981	2.4		

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September 2008**

**SPI Mapping Survey**

SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Latitude	NAD 1983, Decimal Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Latitude	DGPS Trimble NT300D NAD 1983, Decimal Longitude			
CW-41	1	16-Sep	1525	4.0	13.1	5.2	-7.9	48 44.3075	122 29.7950	1239073.2	638505.9	48 44.3084	122 29.7952	1.7		
	2		1526	4.0	13.1	5.2	-7.9			1239068.8	638508.4	48 44.3088	122 29.7963	2.9	1.0	
	3		1527	4.0	13.1	5.3	-7.8			1239072.4	638506.5	48 44.3085	122 29.7954	1.9		
CW-42	1	16-Sep	1531	3.0	9.8	5.4	-4.4	48 44.3166	122 29.7885	1239103.3	638558.7	48 44.3172	122 29.7880	1.2		
	2		1531	3.0	9.8	5.4	-4.4			1239104.2	638561.8	48 44.3177	122 29.7878	2.1	1.1	
	3		1532	3.0	9.8	5.4	-4.4			1239103.3	638557.5	48 44.3170	122 29.7880	0.9		
CW-43	1	16-Sep	1537	3.0	9.8	5.5	-4.3	48 44.3258	122 29.7819	1239122.5	638608.8	48 44.3255	122 29.7835	2.0		
	2		1537	3.1	10.2	5.5	-4.7			1239124.6	638614.9	48 44.3265	122 29.7830	1.9	1.2	
	3		1538	3.0	9.8	5.5	-4.3			1239127.8	638613.0	48 44.3262	122 29.7822	0.8		
CW-44	1	16-Sep	1542	3.2	10.5	5.6	-4.9	48 44.3349	122 29.7754	1239159.4	638662.8	48 44.3345	122 29.7746	1.2		
	2		1542	3.2	10.5	5.6	-4.9			1239161.5	638665.8	48 44.3350	122 29.7741	1.6	1.2	
	3		1543	3.3	10.8	5.6	-5.2			1239161.5	638667.0	48 44.3352	122 29.7741	1.6		
CW-45	1	16-Sep	1546	4.8	15.7	5.7	-10.0	48 44.3441	122 29.7688	1239181.6	638721.3	48 44.3442	122 29.7694	0.7		
	2		1547	4.8	15.7	5.7	-10.0			1239183.7	638726.1	48 44.3450	122 29.7689	1.7	1.2	
	3		1547	4.9	16.1	5.7	-10.4			1239181.8	638729.2	48 44.3455	122 29.7694	2.7		
CW-46	1	16-Sep	1549	5.0	16.4	5.8	-10.6	48 44.3532	122 29.7623	1239207.6	638767.5	48 44.3519	122 29.7632	2.7		
	2		1550	5.0	16.4	5.8	-10.6			1239215.0	638775.9	48 44.3533	122 29.7614	1.1	1.2	
	3		1550	5.0	16.4	5.8	-10.6			1239208.1	638772.4	48 44.3527	122 29.7631	1.4		
CW-47	1	16-Sep	1557	6.1	20.0	6.0	-14.0	48 44.3623	122 29.7557	1239237.0	638827.7	48 44.3619	122 29.7562	1.0		
	2		1558	6.2	20.3	6.0	-14.3			1239233.9	638830.8	48 44.3624	122 29.7570	1.5	1.2	
	3		1558	6.2	20.3	6.0	-14.3			1239234.7	638829.6	48 44.3622	122 29.7568	1.3		
CW-48	1	16-Sep	1601	6.8	22.3	6.1	-16.2	48 44.3715	122 29.7492	1239262.2	638877.1	48 44.3701	122 29.7502	2.8		
	2		1602	6.8	22.3	6.1	-16.2			1239274.3	638878.0	48 44.3703	122 29.7472	3.3	1.2	
	3		1602	6.8	22.3	6.1	-16.2			1239271.9	638879.9	48 44.3706	122 29.7478	2.4		
CW-49	1	16-Sep	1608	7.3	24.0	6.2	-17.8	48 44.3806	122 29.7427	1239293.9	638945.7	48 44.3815	122 29.7427	1.6		
	2		1608	7.3	24.0	6.2	-17.8			1239293.0	638943.3	48 44.3811	122 29.7429	0.9	1.2	
	3		1609	7.4	24.3	6.3	-18.0			1239291.5	638945.2	48 44.3814	122 29.7433	1.6		
CW-50	1	16-Sep	1613	6.9	22.6	6.3	-16.3	48 44.3898	122 29.7361	1239321.1	638997.4	48 44.3901	122 29.7362	0.6		
	2		1613	6.9	22.6	6.3	-16.3			1239321.9	638996.8	48 44.3900	122 29.7360	0.5	1.2	
	3		1614	6.9	22.6	6.4	-16.2			1239326.0	638999.8	48 44.3905	122 29.7350	1.9		
CW-51	1	16-Sep	1617	6.5	21.3	6.4	-14.9	48 44.3989	122 29.7296	1239350.5	639053.4	48 44.3994	122 29.7292	1.0		
	2		1618	6.5	21.3	6.5	-14.8			1239352.4	639046.0	48 44.3982	122 29.7287	1.7	1.2	
	3		1619	6.6	21.7	6.5	-15.2			1239350.1	639054.0	48 44.3995	122 29.7293	1.1		
CW-52	1	16-Sep	1622	6.7	22.0	6.6	-15.4	48 44.4080	122 29.7230	1239375.8	639104.5	48 44.4079	122 29.7232	0.3		
	2		1622	6.7	22.0	6.6	-15.4			1239380.2	639107.5	48 44.4084	122 29.7221	1.3	1.2	
	3		1623	6.7	22.0	6.6	-15.4			1239379.9	639108.7	48 44.4086	122 29.7222	1.5		
CW-53	1	16-Sep	1636	6.8	22.3	6.9	-15.4	48 44.4172	122 29.7165	1239397.1	639160.6	48 44.4172	122 29.7182	2.1		
	2		1637	6.7	22.0	6.9	-15.1			1239395.8	639158.8	48 44.4169	122 29.7185	2.5	1.1	
	3		1638	6.7	22.0	6.9	-15.1			1239396.2	639157.6	48 44.4167	122 29.7184	2.5		
CW-54	1	16-Sep	1640	6.7	22.0	7.0	-15.0	48 44.4263	122 29.7100	1239424.5	639219.6	48 44.4270	122 29.7117	2.5		
	2		1641	6.7	22.0	7.0	-15.0			1239425.8	639223.3	48 44.4276	122 29.7114	2.9	1.2	

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**SPI Mapping Survey**

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Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	<u>Sample Target</u>		<u>Sample Location</u>		<u>Sample Location</u>		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N.		DGPS Trimble NT300D NAD 1983, Decimal Min.				
	3		1642	6.6	21.7	7.0	-14.7			1239438.5	639213.9	48 44.4261	122 29.7082	2.2		

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Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N.		DGPS Trimble NT300D NAD 1983, Decimal Min.				
								Easting (x)	Northing (y)	Latitude	Longitude					
CW-55	1	16-Sep	1646	6.6	21.7	7.1	-14.6	48 44.4355	122 29.7034	1239460.9	639264.5	48 44.4345	122 29.7029	1.9		
	2		1647	6.3	20.7	7.1	-13.6			1239468.1	639264.3	48 44.4345	122 29.7011	3.4	1..2	
	3		1647	6.3	20.7	7.1	-13.6			1239468.6	639267.9	48 44.4351	122 29.7010	3.0		
CW-56	1	17-Sep	0828	7.1	23.3	7.1	-16.2	48 44.4446	122 29.6969	1239493.6	639328.8	48 44.4452	122 29.6951	2.4		
	2		0830	7.0	23.0	7.0	-16.0			1239483.9	639323.0	48 44.4442	122 29.6975	1.1	1.0	
	3		0831	7.0	23.0	7.0	-16.0			1239485.1	639322.9	48 44.4442	122 29.6972	0.9		
CW-57	1	17-Sep	0837	7.8	25.6	7.8	-17.8	48 44.4538	122 29.6903	1239518.5	639383.0	48 44.4542	122 29.6892	1.6		
	2		0837	7.8	25.6	7.8	-17.8			1239514.6	639387.4	48 44.4549	122 29.6902	2.1	1.0	
	3		0838	7.8	25.6	7.8	-17.8			1239513.7	639384.4	48 44.4544	122 29.6904	1.2		
CW-58	1	17-Sep	0843	7.8	25.6	7.8	-17.8	48 44.4629	122 29.6838	1239538.2	639438.0	48 44.4633	122 29.6846	1.2		
	2		0844	7.7	25.3	7.7	-17.6			1239542.3	639441.5	48 44.4639	122 29.6836	1.9	1.2	
	3		0844	7.7	25.3	7.7	-17.6			1239541.5	639442.1	48 44.4640	122 29.6838	2.0		
CW-59	1	17-Sep	0848	7.2	23.6	7.2	-16.4	48 44.4720	122 29.6650	1239622.4	639495.7	48 44.4731	122 29.6640	2.4		
	2		0848	7.2	23.6	7.2	-16.4			1239619.5	639496.4	48 44.4732	122 29.6647	2.3	1.2	
	3		0849	7.2	23.6	7.2	-16.4			1239619.9	639495.8	48 44.4731	122 29.6646	2.1		
CW-60	1	17-Sep	0854	7.2	23.6	7.2	-16.4	48 44.4631	122 29.6701	1239593.8	639439.8	48 44.4638	122 29.6708	1.6		
	2		0854	7.2	23.6	7.2	-16.4			1239589.7	639437.5	48 44.4634	122 29.6718	2.1	1.2	
	3		0855	7.2	23.6	7.2	-16.4			1239598.2	639440.9	48 44.4640	122 29.6697	1.8		
CW-61	1	17-Sep	0901	6.9	22.6	6.9	-15.7	48 44.4539	122 29.6767	1239566.3	639379.6	48 44.4538	122 29.6773	0.8		
	2		0901	6.9	22.6	6.9	-15.7			1239564.7	639377.8	48 44.4535	122 29.6777	1.5	1.5	
	3		0902	6.9	22.6	6.9	-15.7			1239564.3	639377.8	48 44.4535	122 29.6778	1.6		
CW-62	1	17-Sep	0905	5.9	19.4	5.9	-13.5	48 44.4448	122 29.6832	1239542.4	639333.3	48 44.4461	122 29.6830	2.4		
	2		0906	5.9	19.4	5.9	-13.5			1239544.4	639330.2	48 44.4456	122 29.6825	1.7	1.5	
	3		0906	5.6	18.4	5.6	-12.8			1239545.8	639323.4	48 44.4445	122 29.6821	1.5		
CW-63	1	17-Sep	0911	5.6	18.4	6.3	-12.1	48 44.4357	122 29.6898	1239506.5	639274.4	48 44.4363	122 29.6916	2.6		
	2		0911	5.5	18.0	6.3	-11.7			1239511.7	639271.9	48 44.4359	122 29.6903	0.8	1.5	
	3		0912	5.5	18.0	6.3	-11.7			1239511.0	639274.3	48 44.4363	122 29.6905	1.5		
CW-64	1	17-Sep	0916	5.2	17.1	6.2	-10.9	48 44.4265	122 29.6963	1239488.9	639218.8	48 44.4271	122 29.6957	1.3		
	2		0917	5.2	17.1	6.2	-10.9			1239487.2	639217.1	48 44.4268	122 29.6961	0.6	1.5	
	3		0917	5.2	17.1	6.2	-10.9			1239485.1	639213.5	48 44.4262	122 29.6966	0.7		
CW-65	1	17-Sep	0923	5.1	16.7	6.1	-10.6	48 44.4174	122 29.7028	1239451.3	639157.6	48 44.4169	122 29.7047	2.5		
	2		0924	5.2	17.1	6.1	-11.0			1239450.9	639154.6	48 44.4164	122 29.7048	3.0	1.4	
	3		0925	5.2	17.1	6.1	-11.0			1239451.4	639158.8	48 44.4171	122 29.7047	2.4		
CW-66	1	17-Sep	0929	5.7	18.7	6.0	-12.7	48 44.4082	122 29.7094	1239435.2	639102.0	48 44.4077	122 29.7084	1.6		
	2		0929	5.6	18.4	6.0	-12.4			1239435.1	639097.8	48 44.4070	122 29.7084	2.6	1.4	
	3		0930	5.6	18.4	6.0	-12.4			1239431.9	639097.8	48 44.4070	122 29.7092	2.3		

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SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Min. Latitude	DGPS Trimble NT300D NAD 1983, Decimal Min. Longitude			
CW-67	1	17-Sep	0935	5.8	19.0	5.9	-13.1	48 44.3991	122 29.7159	1239397.5	639050.5	48 44.3991	122 29.7175	1.9		
	2		0936	5.8	19.0	5.8	-13.2			1239398.2	639043.2	48 44.3979	122 29.7173	2.8	1.4	
	3		0937	5.8	19.0	5.8	-13.2			1239397.8	639046.3	48 44.3984	122 29.7174	2.2		
CW-68	1	17-Sep	0940	4.9	16.1	5.8	-10.3	48 44.3900	122 29.7225	1239380.1	638987.0	48 44.3886	122 29.7215	2.8	1.3	
	2		0941	5.3	17.4	5.7	-11.7			1239377.3	638990.7	48 44.3892	122 29.7222	1.5		
CW-69	1	17-Sep	0948	5.1	16.7	5.6	-11.1	48 44.3808	122 29.7290	1239350.9	638940.8	48 44.3809	122 29.7285	0.6	1.3	
	2		0949	5.0	16.4	5.6	-10.8			1239347.6	638937.3	48 44.3803	122 29.7293	1.0		
	3		0949	5.0	16.4	5.6	-10.8			1239344.0	638937.9	48 44.3804	122 29.7302	1.7		
CW-70	1	17-Sep	0953	4.6	15.1	5.5	-9.6	48 44.3717	122 29.7355	1239319.7	638891.6	48 44.3727	122 29.7360	2.0		
	2		0954	4.5	14.8	5.5	-9.3			1239320.9	638891.6	48 44.3727	122 29.7357	1.9	1.3	
	3		0955	4.8	15.7	5.5	-10.2			1239316.1	638894.1	48 44.3731	122 29.7369	3.1		
CW-71	1	17-Sep	1000	3.0	9.8	5.4	-4.4	48 44.3625	122 29.7421	1239297.1	638835.6	48 44.3634	122 29.7413	1.8		
	2		1001	3.0	9.8	5.3	-4.5			1239291.9	638833.2	48 44.3630	122 29.7426	1.1	1.2	
	3		1002	3.0	9.8	5.3	-4.5			1239290.3	638836.9	48 44.3636	122 29.7430	2.3		
CW-72	1	17-Sep	1037	3.9	12.8	4.6	-8.2	48 44.3993	122 29.7022	1239459.4	639046.1	48 44.3986	122 29.7021	1.3		
	2		1037	4.0	13.1	4.6	-8.5			1239461.1	639052.8	48 44.3997	122 29.7017	1.0	1.3	
	3		1038	4.0	13.1	4.6	-8.5			1239460.8	639056.5	48 44.4003	122 29.7018	1.9		
CW-73	1	17-Sep	1042	4.1	13.5	4.5	-9.0	48 44.4084	122 29.6957	1239487.6	639104.5	48 44.4083	122 29.6954	0.5		
	2		1042	4.1	13.5	4.5	-9.0			1239486.8	639105.8	48 44.4085	122 29.6956	0.2	1.4	
	3		1043	4.1	13.5	4.5	-9.0			1239485.9	639099.1	48 44.4074	122 29.6958	1.9		
CW-74	1	17-Sep	1047	4.1	13.5	4.4	-9.1	48 44.4176	122 29.6892	1239513.9	639168.4	48 44.4189	122 29.6892	2.4	1.1	
	2		1047	4.1	13.5	4.4	-9.1			1239512.7	639166.0	48 44.4185	122 29.6895	1.8		
CW-75	1	17-Sep	1053	3.9	12.8	4.3	-8.5	48 44.4267	122 29.6826	1239543.9	639215.8	48 44.4268	122 29.6820	0.8	1.1	
	2		1053	3.9	12.8	4.3	-8.5			1239541.5	639216.5	48 44.4269	122 29.6826	0.3		
	3		1054	3.9	12.8	4.3	-8.5			1239539.2	639222.6	48 44.4279	122 29.6832	2.3		
CW-76	1	17-Sep	1058	3.8	12.5	4.2	-8.3	48 44.4359	122 29.6761	1239568.1	639273.7	48 44.4364	122 29.6763	1.0	1.1	
	2		1059	3.8	12.5	4.2	-8.3			1239566.5	639275.0	48 44.4366	122 29.6767	1.6		
	3		1059	3.8	12.5	4.2	-8.3			1239571.7	639276.1	48 44.4368	122 29.6754	1.9		
CW-77	1	17-Sep	1103	4.0	13.1	4.1	-9.0	48 44.4450	122 29.6695	1239593.7	639322.4	48 44.4445	122 29.6702	1.2		
	2		1104	4.1	13.5	4.1	-9.4			1239590.5	639324.3	48 44.4448	122 29.6710	1.8	1.1	
	3		1104	4.1	13.5	4.1	-9.4			1239597.3	639322.9	48 44.4446	122 29.6693	0.8		
CW-78	1	17-Sep	1110	5.1	16.7	4.0	-12.7	48 44.4541	122 29.6630	1239622.8	639387.5	48 44.4553	122 29.6633	2.2		
	2		1110	5.1	16.7	4.0	-12.7			1239618.4	639385.1	48 44.4549	122 29.6644	2.2	1.1	
	3		1111	5.0	16.4	4.0	-12.4			1239622.0	639386.9	48 44.4552	122 29.6635	2.1		
CW-79	1	17-Sep	1117	5.9	19.4	3.9	-15.5	48 44.4633	122 29.6565	1239654.0	639431.8	48 44.4627	122 29.6558	1.3		
	2		1118	5.9	19.4	3.9	-15.5			1239653.3	639437.3	48 44.4636	122 29.6560	0.8	1.1	
	3		1118	5.9	19.4	3.9	-15.5			1239654.4	639434.8	48 44.4632	122 29.6557	0.9		
CW-80	1	17-Sep	1121	6.0	19.7	3.8	-15.9	48 44.4724	122 29.6499	1239680.2	639493.3	48 44.4729	122 29.6496	1.0		
	2		1122	6.0	19.7	3.8	-15.9			1239679.8	639493.3	48 44.4729	122 29.6497	0.9	1.0	
	3		1123	6.0	19.7	3.8	-15.9			1239678.3	639495.1	48 44.4732	122 29.6501	1.5		

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**SPI Mapping Survey**

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Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Latitude	Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Latitude	Longitude			
CW-81	1	17-Sep	1126	5.9	19.4	3.7	-15.7	48 44.4726	122 29.6362	1239739.0	639495.7	48 44.4735	122 29.6350	2.2		
	2		1127	5.9	19.4	3.7	-15.7			1239737.1	639498.1	48 44.4739	122 29.6355	2.5	1.0	
	3		1127	5.9	19.4	3.7	-15.7			1239743.9	639498.0	48 44.4739	122 29.6338	3.8		
CW-82	1	17-Sep	1130	4.9	16.1	3.7	-12.4	48 44.4728	122 29.6226	1239784.8	639493.5	48 44.4733	122 29.6236	1.6		
	2		1130	5.0	16.4	3.6	-12.8			1239787.3	639497.0	48 44.4739	122 29.6230	2.1	1.0	
	3		1131	5.0	16.4	3.6	-12.8			1239787.3	639496.4	48 44.4738	122 29.6230	1.9		
CW-83	1	17-Sep	1134	2.5	8.2	3.6	-4.6	48 44.4730	122 29.6089	1239839.3	639485.0	48 44.4721	122 29.6100	2.2		
	2		1135	2.4	7.9	3.6	-4.3			1239842.6	639487.9	48 44.4726	122 29.6092	0.8	1.0	
	3		1135	2.3	7.5	3.6	-3.9			1239842.7	639490.4	48 44.4730	122 29.6092	0.4		
CW-84	1	17-Sep	1249	6.0	19.7	3.0	-16.7	48 44.3163	122 29.8158	1238993.3	638549.6	48 44.3153	122 29.8153	1.9		
	2		1250	6.3	20.7	3.0	-17.7			1238987.4	638557.0	48 44.3165	122 29.8168	1.3	1.0	
	3		1250	6.2	20.3	3.0	-17.3			1238993.7	638552.0	48 44.3157	122 29.8152	1.3		
CW-85	1	17-Sep	1254	4.9	16.1	3.0	-13.1	48 44.3254	122 29.8093	1239021.4	638604.9	48 44.3245	122 29.8086	1.8		
	2		1254	4.9	16.1	3.0	-13.1			1239024.6	638601.8	48 44.3240	122 29.8078	3.1	1.0	
	3		1255	5.0	16.4	3.0	-13.4			1239023.4	638605.5	48 44.3246	122 29.8081	2.0		
CW-86	1	17-Sep	1300	5.4	17.7	3.0	-14.7	48 44.3345	122 29.8027	1239044.5	638667.7	48 44.3349	122 29.8032	0.9		
	2		1301	5.4	17.7	3.0	-14.7			1239045.4	638671.3	48 44.3355	122 29.8030	1.8	1.0	
	3		1301	5.3	17.4	3.0	-14.4			1239052.2	638671.8	48 44.3356	122 29.8013	2.6		
CW-87	1	17-Sep	1304	6.0	19.7	3.0	-16.7	48 44.3437	122 29.7962	1239078.2	638718.0	48 44.3433	122 29.7951	1.5		
	2		1305	6.0	19.7	3.0	-16.7			1239070.9	638717.6	48 44.3432	122 29.7969	1.3	1.0	
	3		1306	6.1	20.0	3.0	-17.0			1239070.5	638717.6	48 44.3432	122 29.7970	1.3		
CW-88	1	17-Sep	1308	6.2	20.3	3.0	-17.3	48 44.3528	122 29.7896	1239110.1	638780.0	48 44.3536	122 29.7875	3.0		
	2		1309	6.4	21.0	3.0	-18.0			1239102.0	638778.3	48 44.3533	122 29.7895	0.9	1.0	
	3		1310	6.3	20.7	3.0	-17.7			1239103.5	638772.8	48 44.3524	122 29.7891	1.0		
CW-89	1	17-Sep	1314	6.3	20.7	3.1	-17.6	48 44.3620	122 29.7831	1239129.6	638828.8	48 44.3617	122 29.7829	0.5		
	2		1314	6.3	20.7	3.1	-17.6			1239129.3	638831.9	48 44.3622	122 29.7830	0.5	1.4	
	3		1315	6.3	20.7	3.1	-17.6			1239130.2	638836.1	48 44.3629	122 29.7828	1.8		
CW-90	1	17-Sep	1320	6.0	19.7	3.1	-16.6	48 44.3711	122 29.7766	1239149.8	638888.6	48 44.3716	122 29.7782	2.2		
	2		1321	6.3	20.7	3.1	-17.6			1239157.8	638886.6	48 44.3713	122 29.7762	0.6	1.3	
	3		1322	6.3	20.7	3.1	-17.6			1239155.4	638884.2	48 44.3709	122 29.7768	0.5		
CW-91	1	17-Sep	1330	7.1	23.3	3.2	-20.1	48 44.3252	122 29.8229	1238965.5	638606.1	48 44.3245	122 29.8225	1.4		
	2		1331	7.1	23.3	3.2	-20.1			1238961.3	638613.5	48 44.3257	122 29.8236	1.2	1.4	
	3		1331	7.1	23.3	3.2	-20.1			1238961.2	638611.7	48 44.3254	122 29.8236	0.9		
CW-92	1	17-Sep	1335	7.0	23.0	3.2	-19.8	48 44.3343	122 29.8164	1238987.3	638664.7	48 44.3342	122 29.8174	1.3		
	2		1336	7.0	23.0	3.2	-19.8			1238987.9	638673.2	48 44.3356	122 29.8173	2.6	1.3	
	3		1337	7.0	23.0	3.2	-19.8			1238990.3	638673.1	48 44.3356	122 29.8167	2.4		
CW-93	1	17-Sep	1340	6.6	21.7	3.3	-18.4	48 44.3435	122 29.8098	1239024.2	638715.6	48 44.3427	122 29.8085	2.2		
	2		1340	6.6	21.7	3.3	-18.4			1239018.1	638710.8	48 44.3419	122 29.8100	2.9	1.3	
	3		1341	6.6	21.7	3.3	-18.4			1239023.8	638715.6	48 44.3427	122 29.8086	2.1		



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								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	NAD 1983, SPCS, Wa. N. Easting (x)	NAD 1983, SPCS, Wa. N. Northing (y)	NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude			
CW-94	1	17-Sep	1344	6.9	22.6	3.3	-19.3	48 44.3526	122 29.8033	1239048.5	638778.9	48 44.3532	122 29.8028	1.2		
	2		1344	6.8	22.3	3.3	-19.0			1239047.4	638782.0	48 44.3537	122 29.8031	2.0	1.3	
	3		1345	6.8	22.3	3.4	-18.9			1239048.8	638774.0	48 44.3524	122 29.8027	0.8		
CW-95	1	17-Sep	1419	6.0	19.7	3.9	-15.8	48 44.2350	122 29.8200	1238968.4	638052.6	48 44.2335	122 29.8188	3.1		
	2		1420	6.0	19.7	3.9	-15.8			1238961.7	638058.2	48 44.2344	122 29.8205	1.3	1.1	
	3		1421	6.0	19.7	3.9	-15.8			1238963.3	638058.2	48 44.2344	122 29.8201	1.1		
CW-96	1	17-Sep	1423	6.7	22.0	3.9	-18.1	48 44.2430	122 29.8270	1238931.5	638113.6	48 44.2434	122 29.8283	1.8		
	2		1424	6.7	22.0	3.9	-18.1			1238931.9	638113.6	48 44.2434	122 29.8282	1.6	1.0	
	3		1425	6.7	22.0	3.9	-18.1			1238932.7	638112.4	48 44.2432	122 29.8280	1.3		
CW-97	1	17-Sep	1429	7.1	23.3	4.0	-19.3	48 44.2530	122 29.8340	1238904.3	638173.2	48 44.2531	122 29.8354	1.7		
	2		1429	7.1	23.3	4.0	-19.3			1238905.3	638167.7	48 44.2522	122 29.8351	2.0	1.0	
	3		1430	7.1	23.3	4.0	-19.3			1238907.9	638171.9	48 44.2529	122 29.8345	0.6		
CW-98	1	17-Sep	1435	7.7	25.3	4.1	-21.2	48 44.2620	122 29.8410	1238884.0	638224.1	48 44.2614	122 29.8407	1.2		
	2		1435	7.7	25.3	4.1	-21.2			1238887.1	638217.3	48 44.2603	122 29.8399	3.4	1.0	
	3		1436	7.7	25.3	4.2	-21.1			1238884.5	638227.7	48 44.2620	122 29.8406	0.5		
CW-99	1	17-Sep	1439	7.8	25.6	4.2	-21.4	48 44.2720	122 29.8480	1238857.3	638287.9	48 44.2718	122 29.8477	0.5		
	2		1439	7.8	25.6	4.2	-21.4			1238858.4	638284.9	48 44.2713	122 29.8474	1.5	1.0	
	3		1441	7.8	25.6	4.2	-21.4			1238864.0	638285.4	48 44.2714	122 29.8460	2.7		
CW-100	1	17-Sep	1446	4.8	15.7	4.4	-11.3	48 44.2350	122 29.8060	1239018.9	638058.8	48 44.2347	122 29.8063	0.7		
	2		1447	4.8	15.7	4.4	-11.3			1239021.6	638056.9	48 44.2344	122 29.8056	1.2	1.0	
	3		1447	4.8	15.7	4.4	-11.3			1239018.5	638059.4	48 44.2348	122 29.8064	0.6		
CW-101	1	17-Sep	1450	5.5	18.0	4.4	-13.6	48 44.2440	122 29.8130	1238989.9	638116.0	48 44.2440	122 29.8138	1.0		
	2		1451	5.5	18.0	4.4	-13.6			1238993.1	638114.7	48 44.2438	122 29.8130	0.4	1.0	
	3		1452	5.5	18.0	4.5	-13.5			1238991.6	638120.2	48 44.2447	122 29.8134	1.4		
CW-102	1	17-Sep	1500	6.1	20.0	4.6	-15.4	48 44.2530	122 29.8200	1238967.9	638174.9	48 44.2536	122 29.8196	1.2		
	2		1500	6.1	20.0	4.6	-15.4			1238967.0	638173.0	48 44.2533	122 29.8198	0.6	1.0	
	3		1501	6.1	20.0	4.6	-15.4			1238970.2	638173.6	48 44.2534	122 29.8190	1.4		
CW-103	1	17-Sep	1504	7.0	23.0	4.7	-18.3	48 44.2620	122 29.8280	1238935.2	638227.9	48 44.2622	122 29.8280	0.4		
	2		1505	7.0	23.0	4.7	-18.3			1238940.7	638222.9	48 44.2614	122 29.8266	2.0	1.0	
	3		1506	7.0	23.0	4.7	-18.3			1238938.4	638227.2	48 44.2621	122 29.8272	1.0		
CW-104	1	17-Sep	1510	3.5	11.5	4.9	-6.6	48 44.2350	122 29.7930	1239074.9	638065.5	48 44.2360	122 29.7924	2.0		
	2		1511	3.5	11.5	4.9	-6.6			1239069.4	638068.7	48 44.2365	122 29.7938	2.9	1.0	
	3		1512	3.5	11.5	4.9	-6.6			1239067.6	638062.6	48 44.2355	122 29.7942	1.7		

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Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Latitude	Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Latitude	Longitude			
CW-105	1	17-Sep	1517	3.9	12.8	5.0	-7.8	48 44.2440	122 29.8000	1239049.8	638115.3	48 44.2441	122 29.7989	1.4		
	2		1517	3.9	12.8	5.0	-7.8			1239047.1	638119.0	48 44.2447	122 29.7996	1.4	1.0	
	3		1518	3.9	12.8	5.0	-7.8			1239050.7	638115.9	48 44.2442	122 29.7987	1.6		
CW-106	1	17-Sep	1523	4.3	14.1	5.1	-9.0	48 44.2530	122 29.8070	1239020.0	638167.0	48 44.2525	122 29.8066	1.0		
	2		1524	4.3	14.1	5.1	-9.0			1239021.5	638164.0	48 44.2520	122 29.8062	2.1	1.0	
	3		1525	4.3	14.1	5.1	-9.0			1239020.8	638165.2	48 44.2522	122 29.8064	1.7		
CW-107	1	17-Sep	1530	3.1	10.2	5.2	-5.0	48 44.2350	122 29.7790	1239127.5	638061.9	48 44.2356	122 29.7793	1.2		
	2		1530	3.1	10.2	5.2	-5.0			1239128.6	638057.0	48 44.2348	122 29.7790	0.4	1.4	
	3		1531	3.1	10.2	5.3	-4.9			1239127.5	638058.3	48 44.2350	122 29.7793	0.4		
CW-108	1	17-Sep	1535	3.7	12.1	5.4	-6.7	48 44.2440	122 29.7870	1239100.8	638110.5	48 44.2435	122 29.7862	1.3		
	2		1536	3.7	12.1	5.4	-6.7			1239097.6	638110.0	48 44.2434	122 29.7870	1.1	1.4	
	3		1536	3.7	12.1	5.4	-6.7			1239099.6	638106.9	48 44.2429	122 29.7865	2.1		
CW-109	1	17-Sep	1540	2.2	7.2	5.5	-1.7	48 44.2350	122 29.7650	1239185.7	638054.0	48 44.2345	122 29.7648	1.0		
	2		1540	2.2	7.2	5.5	-1.7			1239187.7	638053.3	48 44.2344	122 29.7643	1.4	1.2	
	3		1541	2.2	7.2	5.5	-1.7			1239186.0	638050.3	48 44.2339	122 29.7647	2.1		
CW-110	1	18-Sep	0730	2.7	8.9	7.3	-1.6	48 44.4361	122 29.6624	1239626.0	639273.7	48 44.4366	122 29.6619	1.2		
	2		0731	2.7	8.9	7.3	-1.6			1239624.4	639274.9	48 44.4368	122 29.6623	1.4	0.9	
	3		0732	2.7	8.9	7.3	-1.6			1239626.8	639274.9	48 44.4368	122 29.6617	1.6		
CW-111	1	18-Sep	0736	3.1	10.2	7.4	-2.8	48 44.4452	122 29.6559	1239648.5	639328.5	48 44.4457	122 29.6566	1.3		
	2		0737	3.1	10.2	7.4	-2.8			1239650.8	639322.4	48 44.4447	122 29.6560	0.9	0.9	
	3		0737	3.1	10.2	7.4	-2.8			1239647.7	639327.9	48 44.4456	122 29.6568	1.4		
CW-112	1	18-Sep	0740	3.8	12.5	7.4	-5.1	48 44.4543	122 29.6493	1239679.7	639374.7	48 44.4534	122 29.6491	1.8		
	2		0741	3.8	12.5	7.4	-5.1			1239678.0	639373.5	48 44.4532	122 29.6495	2.1	0.9	
	3		0742	3.8	12.5	7.4	-5.1			1239679.7	639375.3	48 44.4535	122 29.6491	1.6		
CW-113	1	18-Sep	0744	5.9	19.4	7.4	-12.0	48 44.4635	122 29.6428	1239706.4	639438.0	48 44.4639	122 29.6428	0.8		
	2		0745	5.9	19.4	7.4	-12.0			1239702.2	639431.4	48 44.4628	122 29.6438	1.8	1.1	
	3		0746	5.9	19.4	7.4	-12.0			1239701.0	639432.0	48 44.4629	122 29.6441	1.9		
CW-114	1	18-Sep	0752	4.0	13.1	7.5	-5.6	48 44.4637	122 29.6291	1239760.3	639438.0	48 44.4641	122 29.6294	0.9		
	2		0752	4.0	13.1	7.5	-5.6			1239757.9	639438.7	48 44.4642	122 29.6300	1.5	1.1	
	3		0753	4.0	13.1	7.5	-5.6			1239758.6	639434.4	48 44.4635	122 29.6298	0.9		
CW-115	1	18-Sep	0756	2.8	9.2	7.5	-1.7	48 44.4639	122 29.6154	1239823.1	639439.7	48 44.4646	122 29.6138	2.4		
	2		0757	2.8	9.2	7.5	-1.7			1239822.6	639435.5	48 44.4639	122 29.6139	1.9	1.1	
	3		0757	2.8	9.2	7.5	-1.7			1239821.4	639436.1	48 44.4640	122 29.6142	1.5		
CW-116	1	18-Sep	0805	2.8	9.2	7.5	-1.7	48 44.4641	122 29.6018	1239867.8	639441.8	48 44.4651	122 29.6027	2.2		
	2		0805	2.8	9.2	7.5	-1.7			1239868.2	639440.6	48 44.4649	122 29.6026	1.9	1.1	
	3		0806	2.8	9.2	7.5	-1.7			1239867.8	639443.0	48 44.4653	122 29.6027	2.6		
CW-117	1	18-Sep	0811	2.8	9.2	7.6	-1.6	48 44.4732	122 29.5952	1239899.3	639484.9	48 44.4723	122 29.5951	1.7		
	2		0812	2.8	9.2	7.6	-1.6			1239901.8	639489.7	48 44.4731	122 29.5945	0.9	1.1	
	3		0813	2.8	9.2	7.6	-1.6			1239899.8	639488.5	48 44.4729	122 29.5950	0.6		

**Hart Crowser**

**Cornwall Avenue Landfill, Bellingham  
September 2008**

**SPI Mapping Survey**

SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Min. Latitude	DGPS Trimble NT300D NAD 1983, Decimal Min. Longitude			
CW-118	1	18-Sep	0816	2.4	7.9	7.6	-0.3	48 44.4734	122 29.5816	1239947.9	639483.2	48 44.4722	122 29.5830	2.8		
	2		0816	2.4	7.9	7.6	-0.3			1239946.4	639487.5	48 44.4729	122 29.5834	2.4	1.0	
	3		0817	2.4	7.9	7.6	-0.3			1239943.6	639490.0	48 44.4733	122 29.5841	3.1		
CW-119	1	18-Sep	0830	3.7	12.1	7.5	-4.6	48 44.3902	122 29.7088	1239426.1	638995.8	48 44.3902	122 29.7101	1.6		
	2		0831	3.7	12.1	7.5	-4.6			1239429.4	639000.0	48 44.3909	122 29.7093	1.5	1.0	
	3		0831	3.7	12.1	7.5	-4.6			1239424.5	638995.2	48 44.3901	122 29.7105	2.1		
CW-120	1	18-Sep	0843	3.0	9.8	7.5	-2.3	48 44.2536	122 29.7659	1239189.5	638173.7	48 44.2542	122 29.7645	2.0		
	2		0844	3.0	9.8	7.5	-2.3			1239186.7	638173.8	48 44.2542	122 29.7652	1.3	1.3	
	3		0845	3.0	9.8	7.5	-2.3			1239185.4	638168.3	48 44.2533	122 29.7655	0.8		
CW-121	1	18-Sep	0849	3.0	9.8	7.5	-2.3	48 44.2626	122 29.7730	1239153.7	638228.6	48 44.2631	122 29.7737	1.3		
	2		0850	3.0	9.8	7.4	-2.4			1239151.9	638223.2	48 44.2622	122 29.7741	1.5	1.2	
	3		0850	3.0	9.8	7.4	-2.4			1239148.5	638229.3	48 44.2632	122 29.7750	2.7		
CW-122	1	18-Sep	0853	3.0	9.8	7.4	-2.4	48 44.2715	122 29.7801	1239128.3	638281.5	48 44.2717	122 29.7803	0.4		
	2		0854	3.0	9.8	7.4	-2.4			1239126.0	638286.4	48 44.2725	122 29.7809	2.0	1.5	
	3		0855	3.0	9.8	7.4	-2.4			1239124.7	638283.4	48 44.2720	122 29.7812	1.6		
CW-123	1	18-Sep	0857	3.8	12.5	7.4	-5.1	48 44.2805	122 29.7873	1239096.9	638336.3	48 44.2806	122 29.7884	1.4		
	2		0858	3.8	12.5	7.4	-5.1			1239095.2	638333.9	48 44.2802	122 29.7888	1.9	1.5	
	3		0858	3.8	12.5	7.4	-5.1			1239101.7	638335.0	48 44.2804	122 29.7872	0.2		
CW-124	1	18-Sep	0903	4.2	13.8	7.4	-6.4	48 44.2894	122 29.7944	1239076.7	638388.4	48 44.2891	122 29.7937	1.0		
	2		0903	4.2	13.8	7.3	-6.5			1239079.1	638390.8	48 44.2895	122 29.7931	1.6	1.5	
	3		0904	4.2	13.8	7.3	-6.5			1239077.1	638390.2	48 44.2894	122 29.7936	1.0		
CW-125	1	18-Sep	0911	2.1	6.9	7.3	0.4	48 44.2628	122 29.7593	1239205.4	638221.4	48 44.2621	122 29.7608	2.2		
	2		0911	2.1	6.9	7.3	0.4			1239206.6	638221.4	48 44.2621	122 29.7605	1.9	1.5	
	3		0912	2.1	6.9	7.3	0.4			1239207.5	638226.2	48 44.2629	122 29.7603	1.2		
CW-126	1	18-Sep	0917	2.5	8.2	7.2	-1.0	48 44.2717	122 29.7665	1239186.3	638285.7	48 44.2726	122 29.7659	1.8		
	2		0917	2.5	8.2	7.2	-1.0			1239183.2	638271.8	48 44.2703	122 29.7666	2.6	1.5	
	3		0918	2.5	8.2	7.2	-1.0			1239183.3	638278.5	48 44.2714	122 29.7666	0.6		
CW-127	1	18-Sep	0924	2.9	9.5	7.1	-2.4	48 44.2807	122 29.7736	1239150.4	638337.6	48 44.2810	122 29.7751	1.9		
	2		0925	2.9	9.5	7.1	-2.4			1239144.3	638334.0	48 44.2804	122 29.7766	3.7	1.4	
	3		0926	2.9	9.5	7.1	-2.4			1239149.2	638340.0	48 44.2814	122 29.7754	2.6		
CW-128	1	18-Sep	0929	2.9	9.5	7.1	-2.4	48 44.2896	122 29.7807	1239129.0	638389.1	48 44.2894	122 29.7807	0.4		
	2		0930	2.9	9.5	7.1	-2.4			1239132.1	638386.0	48 44.2889	122 29.7799	1.7	1.4	
	3		0930	2.9	9.5	7.1	-2.4			1239127.8	638390.4	48 44.2896	122 29.7810	0.3		
CW-129	1	18-Sep	0937	3.9	12.8	7.0	-5.8	48 44.2986	122 29.7879	1239085.6	638446.0	48 44.2986	122 29.7918	4.8		Boom sticks
	2		0937	3.9	12.8	7.0	-5.8			1239087.6	638449.6	48 44.2992	122 29.7913	4.4	1.3	on target
	3		0938	3.9	12.8	7.0	-5.8			1239090.9	638449.5	48 44.2992	122 29.7905	3.4		

**Hart Crowser**

**Cornwall Avenue Landfill, Bellingham  
September 2008**

**SPI Mapping Survey**

SOFTWARE: Corpscon 5.11.08

Station No.	Sample Rep.	Date	GPS Time	Meter Wheel Depth m.	Meter Wheel Depth ft.	Predicted Nearest Tide ft.	Predicted Mudline Depth, ft. (MLLW)	Sample Target		Sample Location		Sample Location		Distance to Target (m.)	GPS Status HDOP good < 2	Comments
								NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Easting (x)	DGPS Trimble NT300D NAD 1983, SPCS, Wa. N. Northing (y)	DGPS Trimble NT300D NAD 1983, Decimal Min. Latitude	DGPS Trimble NT300D NAD 1983, Decimal Min. Longitude			
CW-130	1	18-Sep	0956	3.2	10.5	6.8	-3.7	48 44.4810	122 29.5750	1239978.1	639537.3	48 44.4812	122 29.5758	1.0		
	2		0957	3.2	10.5	6.7	-3.8			1239978.8	639533.1	48 44.4805	122 29.5756	1.2	1.2	
	3		0957	3.2	10.5	6.7	-3.8			1239979.2	639533.7	48 44.4806	122 29.5755	1.0		
CW-131	1	18-Sep	1008	4.1	13.5	6.6	-6.9	48 44.4820	122 29.5880	1239925.3	639536.6	48 44.4809	122 29.5889	2.3		
	2		1009	4.1	13.5	6.6	-6.9			1239926.6	639538.4	48 44.4812	122 29.5886	1.7	1.2	
	3		1009	4.1	13.5	6.5	-7.0			1239935.1	639543.7	48 44.4821	122 29.5865	1.8		
CW-132	1	18-Sep	1013	5.8	19.0	6.5	-12.5	48 44.4820	122 29.6010	1239873.6	639543.2	48 44.4818	122 29.6018	1.0		
	2		1013	5.8	19.0	6.5	-12.5			1239876.1	639548.7	48 44.4827	122 29.6012	1.3	1.3	
	3		1014	5.9	19.4	6.5	-12.9			1239874.9	639548.1	48 44.4826	122 29.6015	1.3		
CW-133	1	18-Sep	1017	7.0	23.0	6.4	-16.6	48 44.4820	122 29.6150	1239816.9	639545.7	48 44.4820	122 29.6159	1.1		
	2		1018	7.0	23.0	6.4	-16.6			1239824.2	639545.5	48 44.4820	122 29.6141	1.1	1.3	
	3		1019	7.0	23.0	6.4	-16.6			1239829.5	639551.5	48 44.4830	122 29.6128	3.3		
CW-134	1	18-Sep	1022	7.0	23.0	6.4	-16.6	48 44.4820	122 29.6290	1239762.0	639554.8	48 44.4833	122 29.6296	2.5		
	2		1022	7.0	23.0	6.4	-16.6			1239766.0	639551.6	48 44.4828	122 29.6286	1.6	1.3	
	3		1023	7.0	23.0	6.3	-16.7			1239762.0	639554.8	48 44.4833	122 29.6296	2.5		
CW-135	1	18-Sep	1033	8.8	28.9	6.2	-22.7	48 44.2810	122 29.8420	1238877.2	638336.8	48 44.2799	122 29.8430	2.4		
	2		1033	8.8	28.9	6.2	-22.7			1238878.5	638338.6	48 44.2802	122 29.8427	1.7	1.3	
	3		1034	8.8	28.9	6.2	-22.7			1238877.8	638342.8	48 44.2809	122 29.8429	1.1		
CW-136	1	18-Sep	1037	8.8	28.9	6.1	-22.8	48 44.2980	122 29.8410	1238879.2	638446.2	48 44.2979	122 29.8431	2.6		
	2		1038	8.8	28.9	6.1	-22.8			1238880.8	638447.4	48 44.2981	122 29.8427	2.1	1.2	
	3		1039	8.8	28.9	6.1	-22.8			1238881.2	638448.0	48 44.2982	122 29.8426	2.0		
CW-137	1	18-Sep	1044	7.8	25.6	6.0	-19.6	48 44.3620	122 29.7970	1239070.4	638825.2	48 44.3609	122 29.7976	2.2		
	2		1045	7.8	25.6	6.0	-19.6			1239074.9	638828.8	48 44.3615	122 29.7965	1.1	1.2	
	3		1045	7.8	25.6	6.0	-19.6			1239077.8	638829.3	48 44.3616	122 29.7958	1.6		
CW-138	1	18-Sep	1049	7.6	24.9	5.9	-19.0	48 44.3800	122 29.7700	1239186.3	638937.1	48 44.3797	122 29.7694	0.9		
	2		1050	7.6	24.9	5.9	-19.0			1239185.9	638937.7	48 44.3798	122 29.7695	0.7	1.2	
	3		1050	7.6	24.9	5.9	-19.0			1239186.7	638938.9	48 44.3800	122 29.7693	0.9		

**Appendix B**  
**SPI and Plan View Analysis Results**

**Cornwall Landfill SPI Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Muni Waste	Wood Debris	Comments
1B	9/16/2008	9:42	No	No	Eelgrass, no obvious debris
2C	9/16/2008	9:55	No	No	Eelgrass, no obvious debris
3A	9/16/2008	10:00	No	No	Eelgrass, no obvious debris
4A	9/16/2008	10:05	No	No	Sparse eelgrass, no obvious debris
5A	9/16/2008	10:11	No	10%	Small wood particles and fibers in upper 2 cm, scattered below
5C	9/16/2008	10:12	No	10%	25% wood particles in upper 4 cm, 5 % wood particles below
6A	9/16/2008	10:16	No	3%	fine organic/wood particles in upper 5 cm
6B	9/16/2008	10:17	No	5%	fine wood/organic particles in upper 6 cm
7A	9/16/2008	10:21	No	No	fine organics, no obvious debris
8A	9/16/2008	10:27	No	No	partial overpenetration, no obvious debris
9A	9/16/2008	10:33	No	No	no obvious debris, fine organic particles in upper 3 cm
10A	9/16/2008	10:59	No	3%	small wood pieces on surface
10B	9/16/2008	11:00	No	3%	small woody debris on surface
11A	9/16/2008	11:04	No	2%	small wood chips on surface
12B	9/16/2008	11:08	No	3%	wood pieces upper 2 cm
13A	9/16/2008	11:12	No	No	no obvious debris, possible small wood particles on surface
14A	9/16/2008	11:17	No	No	no obvious debris
15B	9/16/2008	11:23	No	No	no obvious debris, polychaetes at depth
16A	9/16/2008	11:29	No	No	no obvious debris
17B	9/16/2008	11:42	No	2%	fine wood particles in upper 6 cm, brittle star
18B	9/16/2008	11:47	No	No	no obvious debris
19C	9/16/2008	11:53	No	No	no obvious debris, void
20C	9/16/2008	11:57	No	No	no obvious debris, spionid polychaetes
21A	9/16/2008	12:01	No	No	no obvious debris
22B	9/16/2008	13:15	No	No	no obvious debris
23A	9/16/2008	13:20	No	No	no obvious debris
24A	9/16/2008	13:25	No	5%	wood piece on surface
25A	9/16/2008	13:30	No	No	sculpin, rocky/shell bottom, no obvious debris
26C	9/16/2008	13:39	No	3%	wood piece in rocks, shells silt
27B	9/16/2008	13:45	No	25%	large wood piece on surface
28B	9/16/2008	13:49	No	No	no obvious debris
29B	9/16/2008	13:53	No	No	no obvious debris
30A	9/16/2008	13:56	No	No	possible buried wood piece on surface, indeterminate
31B	9/16/2008	14:02	No	No	no obvious debris
32A	9/16/2008	14:06	No	No	no obvious debris

**Cornwall Landfill SPI Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Muni Waste	Wood Debris	Comments
33A	9/16/2008	14:34	No	No	no obvious debris, void
34A	9/16/2008	14:39	No	No	no obvious debris
35A	9/16/2008	14:44	No	No	no obvious debris, sed layering
36C	9/16/2008	14:50	No	No	no obvious debris
37A	9/16/2008	14:55	No	No	no obvious debris
38C	9/16/2008	15:01	No	No	no obvious debris, methane bubbles
39C	9/16/2008	15:07	No	No	no obvious debris
40C	9/16/2008	15:13	No	No	no obvious debris, polychaete
41A	9/16/2008	15:26	No	No	rocky, no obvious debris
42B	9/16/2008	15:32	No	No	rocky, no obvious debris, sea star
43B	9/16/2008	15:38	No	No	rocky, no obvious debris
44A	9/16/2008	15:42	No	No	rocky, no obvious debris
45A	9/16/2008	15:46	No	No	shells and rock on silt, methane bubbles
45C	9/16/2008	15:47	No	2%	possible small wood piece in upper sed column
46A	9/16/2008	15:49	No	No	shells, rock, and silt, no obvious debris
47B	9/16/2008	15:58	No	2%	wood piece on surface
48C	9/16/2008	16:03	No	No	no obvious debris
49B	9/16/2008	16:09	No	No	no obvious debris, methane bubble
50A	9/16/2008	16:13	No	5%	wood piece on surface
51B	9/16/2008	16:18	No	No	no obvious debris
52B	9/16/2008	16:23	No	No	no obvious debris, polychaetes at depth
53A	9/16/2008	16:36	No	No	no obvious debris
54C	9/16/2008	16:42	No	No	no obvious debris
55A	9/16/2008	16:46	No	10%	wood piece on surface
56C	9/17/2008	8:31	No	No	no obvious debris
57B	9/17/2008	8:38	No	No	no obvious debris, void
58C	9/17/2008	8:45	No	No	no obvious debris
59C	9/17/2008	8:49	No	No	no obvious debris
60A	9/17/2008	8:54	No	No	no obvious debris
61A	9/17/2008	9:01	No	No	no obvious debris
62A	9/17/2008	9:05	No	3%	wood particles on surface
62C	9/17/2008	9:07	No	3%	wood particles on surface
63A	9/17/2008	9:11	No	15%	wood pieces in surface sediment
64B	9/17/2008	9:17	No	No	no obvious debris
65C	9/17/2008	9:25	No	No	no obvious debris

**Cornwall Landfill SPI Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Muni Waste	Wood Debris	Comments
66C	9/17/2008	9:31	No	5%	wood piece on surface
67C	9/17/2008	9:37	No	3%	wood piece on surface
68A	9/17/2008	9:41	No	No	no obvious debris, compact bottom & no pen
69A	9/17/2008	9:48	7%	No	piece of glass
70A	9/17/2008	9:54	No	No	rocks and shells in sand/silt, no obvious debris
71C	9/17/2008	10:02	No	No	rocks and shell hash, low pen, no obvious debris
72A	9/17/2008	10:37	No	5%	fine wood particles upper 5 cm
72B	9/17/2008	10:38	No	5%	fine wood particles upper 5 cm
73A	9/17/2008	10:42	No	No	no obvious debris
74C	9/17/2008	10:48	No	3%	fine wood particles upper 3 cm
75A	9/17/2008	10:53	No	No	rocks and shells on silt, no obvious debris
76A	9/17/2008	10:59	No	No	rocks and shells on silt, no obvious debris
77A	9/17/2008	11:03	No	3%	small wood pieces on surface
77C	9/17/2008	11:05	No	20%	wood pieces on surface
78A	9/17/2008	11:10	No	2%	small wood pieces on surface
78C	9/17/2008	11:11	No	No	no obvious debris, brittle star
79B	9/17/2008	11:18	No	No	no obvious debris
80C	9/17/2008	11:23	No	No	no obvious debris, polychaete
81C	9/17/2008	11:28	No	No	no obvious debris
82A	9/17/2008	11:30	5%	No	neck of glass bottle
83B	9/17/2008	11:35	No	No	Eelgrass, no obvious debris
84A	9/17/2008	12:49	No	7%	wood pieces on surface
84B	9/17/2008	12:50	10%	No	seastar on neck of bottle
85A	9/17/2008	12:54	No	10%	very low pen, wood pieces on surface
85B	9/17/2008	12:55	No	10%	wood pieces, also in farfield?, low pen
86A	9/17/2008	13:00	15%	3%	bottle glass piece, small wood pieces on surface
86C	9/17/2008	13:02	No	5%	stick
87A	9/17/2008	13:05	No	No	no obvious debris
88A	9/17/2008	13:09	No	No	no obvious debris
89A	9/17/2008	13:14	No	No	no obvious debris
90B	9/17/2008	13:21	No	No	low pen
91B	9/17/2008	13:31	No	No	no obvious debris
92A	9/17/2008	13:36	No	No	possible wood in farfield, no obvious debris
93B	9/17/2008	13:41	No	No	hard bottom, no pen
94A	9/17/2008	13:44	No	No	no obvious debris, polychaete



**Cornwall Landfill SPI Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Muni Waste	Wood Debris	Comments
95A	9/17/2008	14:20	No	No	no obvious debris
96A	9/17/2008	14:24	No	No	no obvious debris
97A	9/17/2008	14:29	No	No	no obvious debris
98C	9/17/2008	14:36	No	No	no obvious debris, polychaete
99C	9/17/2008	14:41	No	2%	wood piece on surface
100A	9/17/2008	14:46	No	5%	small wood pieces on surface, methane bubble
100B	9/17/2008	14:47	No	3%	small wood pieces on surface, methane bubble
101B	9/17/2008	14:52	No	No	no obvious debris, methane bubbles
102A	9/17/2008	15:00	No	No	no obvious debris
103B	9/17/2008	15:06	No	No	no obvious debris, void, polychaete
104B	9/17/2008	15:12	No	No	eelgrass strands on surface
105A	9/17/2008	15:17	No	No	organic aggregates on surface, no obvious wood debris
105B	9/17/2008	15:18	No	5%	wood piece and organic aggregates in upper 3 cm
106A	9/17/2008	15:23	No	5%	fine wood particles in upper 8 cm
107A	9/17/2008	15:30	No	No	Eelgrass, no obvious debris
108C	9/17/2008	15:37	No	15%	fine wood particles in upper 8 cm, eelgrass
109A	9/17/2008	15:40	No	No	Eelgrass, no obvious debris
110C	9/18/2008	7:32	15%	No	low pen, brick piece, rocks
111C	9/18/2008	7:38	No	No	no pen, rocks
112C	9/18/2008	7:42	No	No	shell hash in sand, no obvious debris
113C	9/18/2008	7:46	No	No	no obvious debris
114B	9/18/2008	7:53	No	10%	wood debris upper right surface
115B	9/18/2008	7:57	2%	No	hard sand bottom, small shell particles, algae, brick piece
116A	9/18/2008	8:05	No	5%	stick in farfield
117C	9/18/2008	8:13	No	No	sandy hard bottom, low pen
118C	9/18/2008	8:18	No	No	sandy hard bottom, eelgrass fronds in farfield?
119B	9/18/2008	8:31	No	No	rocky & sandy bottom, no pen
120A	9/18/2008	8:44	No	No	sparse eelgrass on sandy bottom, no obvious debris
121C	9/18/2008	8:51	No	No	eelgrass on sandy bottom, crab
122C	9/18/2008	8:55	No	No	Eelgrass, no obvious debris
123B	9/18/2008	8:58	No	No	Eelgrass, no obvious debris
124C	9/18/2008	9:04	No	3%	fine wood particles in upper 2 cm
125A	9/18/2008	9:11	No	No	rocky bottom, no pen
126B	9/18/2008	9:18	No	No	rocky bottom, no pen
127B	9/18/2008	9:25	No	No	eelgrass, low pen, deceased shiner perch?

**Cornwall Landfill SPI Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Muni Waste	Wood Debris	Comments
128C	9/18/2008	9:31	No	No	sandy/rocky bottom with fine shell
129C	9/18/2008	9:38	No	No	rocks on sandy bottom
130B	9/18/2008	9:57	No	No	Eelgrass, no obvious debris
131A	9/18/2008	10:09	No	3%	fine wood particles in surface
131B	9/18/2008	10:09	No	2%	fine wood particles in surface
132A	9/18/2008	10:13	No	No	no obvious debris
133B	9/18/2008	10:18	No	No	no obvious debris, polychaete
134A	9/18/2008	10:22	No	No	no obvious debris
135C	9/18/2008	10:34	No	No	no obvious debris, spionid polychaete?
136A	9/18/2008	10:38	No	No	no obvious debris
137A	9/18/2008	10:44	No	No	no obvious debris, methane bubbles
138A	9/18/2008	10:49	No	No	no obvious debris

Duplicate image for final analysis  
 Image for final analysis

**Cornwall Landfill Plan View Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Time Stamp	Strip #	Image #	Slide #	Muni Waste	Wood Debris	Comments
1A	9/16/2008	9:41	10:41	1	9	mounted	No	No	dense eelgrass
2C	9/16/2008	9:55	10:56	1	16	mounted	No	No	dense eelgrass
3A	9/16/2008	10:00	11:00	1	17	mounted	No	No	dense eelgrass
4A	9/16/2008	10:05	11:06	1	21	mounted	No	No	mod to sparse eelgrass
5A	9/16/2008	10:11	11:11	2	25	5	No	25%	very fine woody debris on surface
6A	9/16/2008	10:16	11:17	2	29	9	No	3%	fine wood debris on silty surface
7A	9/16/2008	10:21	11:21	2	32	12	No	No	slightly cloudy, no obvious debris
8A	9/16/2008	10:27	11:27	2	35	15	No	No	cloudy image, no obvious debris
9A	9/16/2008	10:33	11:34	2	39	19	No	No	cloudy image, no obvious debris
10A	9/16/2008	10:59	11:59	2	42	22	No	3%	one wood chunk, eelgrass and silty surface
11A	9/16/2008	11:04	12:04	2	46	26	No	3%	trace woody debris, clear image
12A	9/16/2008	11:08	12:08	2	49	29	No	3%	slight cloudy, trace woody debris
13A	9/16/2008	11:12	12:12	2	52	32	--	--	cloudy
14B	9/16/2008	11:18	12:18	2	57	37	No	No	cloudy, image overexposed
15B	9/16/2008	11:23	12:24	3	60	mounted	--	--	black slide (slide was mounted)
16A	9/16/2008	11:29	12:30	3	62	mounted	--	--	cloudy (slide was mounted)
17C	9/16/2008	11:43	12:43	3	70	6	--	--	cloudy
18A	9/16/2008	11:46	12:47	3	71	7	No	No	mostly cloudy, possible wood debris
19A	9/16/2008	11:51	12:52	3	74	10	No	No	cloudy, possible wood debris
20A	9/16/2008	11:56	12:56	3	77	13	--	--	cloudy
21A	9/16/2008	12:01	13:02	3	80	16	--	--	cloudy
22A	9/16/2008	13:14	14:15	3	88	22	No	No	No obvious debris
23A	9/16/2008	13:20	14:21	3	91	25	--	--	cloudy
24A	9/16/2008	13:25	14:25	3	95	29	No	No	shells and rock, algae growth or sands?
24B	9/16/2008	13:25	14:26	3	96	30	No	No	shells and rocks
25A	9/16/2008	13:30	14:31	3	99	33	No	No	sandy and shells, algae, seastar
26A	9/16/2008	13:37	14:39	4	102	36A	No	10%	Wood chunks and shells
27A	9/16/2008	13:45	14:45	4	106	40A	No	No	No obvious debris
27C	9/16/2008	13:46	14:46	4	108	42A	No	15%	large wood debris pieces
28A	9/16/2008	13:48	14:49	4	110	44A	No	No	Kelp piece on surface
29A	9/16/2008	13:52	14:53	4	113	3A	No	3%	piece of wood on side
30A	9/16/2008	13:56	14:57	4	116	6A	No	No	crab on surface, no obvious debris
30B	9/16/2008	13:57	14:57	4	117	7A	No	No	No obvious debris
31A	9/16/2008	14:01	15:02	4	119	9A	No	20%	sea cucumber, wood piece encrusted w/ algae, bryozoa
31B	9/16/2008	14:02	15:03	4	120	10A	No	No	No obvious debris
32A	9/16/2008	14:06	15:07	4	123	13A	No	No	No obvious debris
33A	9/16/2008	14:34	15:35	4	128	16A	No	No	No obvious debris
34A	9/16/2008	14:39	15:40	4	131	19A	--	--	cloudy
35C	9/16/2008	14:45	15:46	5	137	25A	--	--	cloudy
36A	9/16/2008	14:48	15:49	5	138	26A	No	No	No obvious debris
37A	9/16/2008	14:55	15:56	5	142	30A	--	--	cloudy

**Cornwall Landfill Plan View Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Time Stamp	Strip #	Image #	Slide #	Muni Waste	Wood Debris	Comments
38A	9/16/2008	14:59	16:00	5	145	33A	--	--	cloudy, possible shell particles
39A	9/16/2008	15:06	16:07	5	148	36A	--	--	cloudy, possible shell particles
40A	9/16/2008	15:12	16:12	5	151	39A	--	--	cloudy
41B	9/16/2008	15:26	16:27	5	157	1A	3%	No	seastar, bottle neck
41C	9/16/2008	15:27	16:28	5	158	2A	No	3%	sandy bottom, piece of wood
42A	9/16/2008	15:31	16:32	5	159	3A	10%	10%	wood pieces, brick piece, sea star, rocky
42C	9/16/2008	15:32	16:33	5	161	5A	5%	10%	plastic bag, wood pieces
43A	9/16/2008	15:37	16:38	5	162	6A	No	No	eelgrass, no obvious debris
43C	9/16/2008	15:38	16:39	5	164	8A	3%	5%	plastic pieces (likely), buried wood debris, rocky/sandy
44A	9/16/2008	15:42	16:43	5	165	9A	No	No	rocky/sandy, no obvious debris, seastar
44B	9/16/2008	15:43	16:43	5	166	10A	5%	No	rocky/sandy, plastic/brick? pieces, seastar
45A	9/16/2008	15:46	16:47	6	168	12A	No	No	No obvious debris
46A	9/16/2008	15:49	16:50	6	171	15A	No	5%	kelp piece (likely), shell with wood pieces
46B	9/16/2008	15:50	16:51	6	172	16A	No	5%	shell and wood pieces
47A	9/16/2008	15:57	16:58	6	174	18A	No	7%	cloudy, likely wood debris
48A	9/16/2008	16:01	17:02	6	177	21A	No	No	cloudy, possible wood debris
49A	9/16/2008	16:08	17:09	6	180	24A	--	--	cloudy
50A	9/16/2008	16:13	17:14	6	183	27A	No	5%	wood pieces, cloudy image
51A	9/16/2008	16:18	17:18	6	186	30A	--	--	cloudy
52A	9/16/2008	16:22	17:23	6	190	34A	--	--	cloudy, dark
53A	9/16/2008	16:36	17:37	6	194	38A	--	--	cloudy, dark
54A	9/16/2008	16:41	17:41	6	197	41A	--	--	very dark/black image
55A	9/16/2008	16:46	--						No plan view obtained at this station
56B	9/17/2008	8:30	8:30	7	7	6	--	--	cloudy
57A	9/17/2008	8:37	--						No plan view obtained at this station
58A	9/17/2008	8:43	8:43	7	10	9	--	--	cloudy
59A	9/17/2008	8:48	8:48	7	13	12	--	--	cloudy
60A	9/17/2008	8:54	8:54	7	16	15	--	--	cloudy
61A	9/17/2008	9:01	9:01	7	19	18	--	--	cloudy
62A	9/17/2008	9:05	9:05	7	22	21	no	10%	wood debris, cloudy image
63B	9/17/2008	9:12	9:12	7	26	25	--	3%	cloudy, wood piece
64B	9/17/2008	9:17	9:17	7	29	28	--	--	cloudy
65A	9/17/2008	9:23	9:23	7	31	30	--	--	cloudy
66B	9/17/2008	9:30	9:30	8	35	34	--	--	cloudy
67A	9/17/2008	9:36	9:36	8	37	36	--	--	cloudy
68A	9/17/2008	9:41	9:41	8	40	39	No	3%	small woody pieces, circular shell?
68C	9/17/2008	9:42	9:42	8	42	41	No	40%	large wood piece
69C	9/17/2008	9:50	9:49	8	45	44	No	5%	crabs, scattered wood debris
70A	9/17/2008	9:54	9:54	8	48	3	No	No	rocks/shells on silty surface
71A	9/17/2008	10:01	10:01	8	51	6	No	No	rocks/sandy, algae, shell pieces
72A	9/17/2008	10:37	10:37	8	55	9	No	5%	small wood particles

**Cornwall Landfill Plan View Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Time Stamp	Strip #	Image #	Slide #	Muni Waste	Wood Debris	Comments
73A	9/17/2008	10:42	10:42	8	58	12	No	No	No obvious debris
74A	9/17/2008	10:47	10:47	8	61	15	No	10%	wood pieces on surface
75A	9/17/2008	10:53	10:53	9	65	19	No	7%	scattered wood debris on rocky bottom
75B	9/17/2008	10:54	10:54	9	66	20	No	5%	wood debris on rocky bottom
76A	9/17/2008	10:59	10:59	9	68	22	No	5%	silt drape on wood pieces, rocky bottom
77A	9/17/2008	11:03	11:03	9	71	25	No	10%	wood debris, shell debris
78A	9/17/2008	11:10	11:10	9	74	28	--	--	cloudy
79A	9/17/2008	11:17	11:18	9	78	32	--	--	cloudy
80A	9/17/2008	11:22	11:22	9	81	35	--	--	cloudy
81B	9/17/2008	11:27	11:27	9	85	39	--	--	cloudy
82A	9/17/2008	11:30	11:30	9	87	41	--	3%	wood piece, cloudy
83A	9/17/2008	11:34	11:34	9	90	44	No	No	eelgrass, no obvious debris
84A	9/17/2008	12:49	12:48	9	94	4	15%	No	bottle present
85A	9/17/2008	12:54	12:54	10	99	9	3%	15%	partial image, wood debris, circular object (bottle?)
86A	9/17/2008	13:00	13:01	10	102	12	No	5%	small wood pieces and particles w/ shells
87A	9/17/2008	13:05	13:05	10	107	17	--	--	cloudy
88A	9/17/2008	13:09	13:09	10	111	21	--	--	cloudy
89C	9/17/2008	13:15	13:16	10	117	27	--	--	cloudy
90C	9/17/2008	13:22	13:23	10	121	31	No	10%	likely wood debris
91A	9/17/2008	13:30	13:30	10	122	32	--	--	cloudy
92A	9/17/2008	13:36	13:36	10	125	35	--	--	cloudy
93A	9/17/2008	13:40	13:40	10	128	38	--	--	cloudy
94A	9/17/2008	13:44	13:44	11	131	41	--	--	cloudy
95A	9/17/2008	14:20	14:20	11	136	2	--	--	cloudy
96A	9/17/2008	14:24	14:24	11	139	5	No	7%	possible wood debris, seastar
97A	9/17/2008	14:29	14:29	11	143	9	No	5%	wood piece
98A	9/17/2008	14:35	14:35	11	146	12	--	--	cloudy
99A	9/17/2008	14:39	14:39	11	149	15	--	--	cloudy
100A	9/17/2008	14:46	14:47	11	153	19	No	No	hazy, no obvious debris
101A	9/17/2008	14:51	14:51	11	156	22	No	2%	stick
102A	9/17/2008	15:00	15:00	11	159	25	--	--	cloudy
103A	9/17/2008	15:05	15:05	12	162	28	--	--	cloudy
104A	9/17/2008	15:11	15:11	12	165	31	No	No	eelgrass, no obvious debris
105A	9/17/2008	15:17	15:17	12	168	34	No	No	No obvious debris
106A	9/17/2008	15:23	15:24	12	173	39	No	No	No obvious debris
107A	9/17/2008	15:30	15:30	12	176	42	No	No	eelgrass, no obvious debris
108A	9/17/2008	15:35	15:35	12	179	1	No	No	eelgrass, no obvious debris
109A	9/17/2008	15:40	15:40	12	182	4	No	No	eelgrass, no obvious debris
110A	9/18/2008	7:31	7:31	13	5	40	No	No	rocky, no obvious debris
111A	9/18/2008	7:36	7:36	13	8	43	No	No	rocky, fine shell, no obvious debris
111B	9/18/2008	7:37	7:37	13	9	44	No	No	rocky, fine shell, no obvious debris

**Cornwall Landfill Plan View Image Analysis - Final Results (10/21/08)**

Station (CW)	Date	Time	Time Stamp	Strip #	Image #	Slide #	Muni Waste	Wood Debris	Comments
112A	9/18/2008	7:41	7:41	13	12	3	No	No	sandy, fine shells, no obvious debris
113A	9/18/2008	7:45	7:45	13	15	6	No	No	sandy, fine shells, no obvious debris
114B	9/18/2008	7:53	7:53	13	20	11	No	25%	decayed log/branch
115A	9/18/2008	7:56	7:56	13	23	14	No	No	sandy, shells, no obvious debris
116A	9/18/2008	8:05	8:05	13	26	17	No	5%	small woody pieces, branch
117A	9/18/2008	8:12	8:12	13	30	21	No	No	cut slide, no obvious debris
118B	9/18/2008	8:17	8:17	13	34	25	No	5%	weathered wood piece
119A	9/18/2008	8:31	8:31	13	36	27	No	No	rocky, fine shell, no obvious debris
119B	9/18/2008	8:31	8:31	13	37	28	No	No	rocky, fine shell, no obvious debris
120A	9/18/2008	8:44	8:44	13	39	30	No	No	eelgrass, no obvious debris
121A	9/18/2008	8:49	8:49	13	43	34	No	No	eelgrass, no obvious debris
122A	9/18/2008	8:54	8:54	13	46	37	No	No	eelgrass, no obvious debris
123A	9/18/2008	8:58	8:58	13	49	40	No	No	eelgrass, no obvious debris
124A	9/18/2008	9:03	9:03	13	52	43	No	No	eelgrass, no obvious debris
125A	9/18/2008	9:11	9:11	13	56	3	No	No	rocky, no obvious debris
126C	9/18/2008	9:19	9:19	13	61	8	20%	No	metal or plastic sign piece
127A	9/18/2008	9:25	9:25	14	64	11	No	No	eelgrass, no obvious debris
128B	9/18/2008	9:31	9:31	14	68	15	7%	No	clear glass and possible plastic
128C	9/18/2008	9:31	9:31	14	69	16	7%	20%	decomposing wood piece, glass and poss plastic
129A	9/18/2008	9:37	9:37	14	71	18	No	No	rocks and shell debris, sea stars
130A	9/18/2008	9:56	9:56	14	74	21	No	No	eelgrass, no obvious debris
131A	9/18/2008	10:09	10:09	14	77	24	--	--	cloudy
132A	9/18/2008	10:13	10:13	14	80	27	--	--	cloudy
133A	9/18/2008	10:18	10:18	14	83	30	--	--	cloudy
134A	9/18/2008	10:22	10:22	14	86	33	--	--	cloudy
135A	9/18/2008	10:33	10:33	14	89	36	--	--	cloudy
136A	9/18/2008	10:38	10:38	14	92	39	--	--	cloudy

**Appendix C**  
**SPI and Plan View Images (DVD Insert)**

**APPENDIX E**  
**CORNWALL AVENUE LANDFILL**  
**SEDIMENT VIBRACORE LOCATIONS, DESCRIPTIONS, AND LOGS**



**Table E-1 - Cornwall Avenue Landfill Vibracore Location Data**

Location No.	Sample Rep.	Date	GPS Time	Measured Depth in Feet	Predicted Nearest Tide in Feet	Predicted Mudline Elevation in Feet (MLLW)	Sample Target		Sample Location		Distance to Target in Feet	GPS Status HDOP good < 2	Comments p=penetration r=recovery
							NAD 1983, Decimal Min.		DGPS Trimble NT300D NAD 1983, Decimal Min.				
							Latitude	Longitude	Latitude	Longitude			
CW-12	1	25-Sep	1031	13.8	1.1	-12.7	48 44.2711	122 29.8075	48 44.2696	122 29.8057	11.8	1.1	8.5' p, 5.5' r
CW-14	1	25-Sep	1116	21.0	2.1	-18.9	48 44.2890	122 29.8217	48 44.2884	122 29.8214	4.1	1.1	7.5' p, 7.5' r
CW-08	1	25-Sep	1150	23.0	3.1	-19.9	48 44.3071	122 29.8223	48 44.3054	122 29.8207	12.3	1.0	7.0' p, 6.3' r
CW-91	1	25-Sep	1313	25.9	5.5	-20.4	48 44.3252	122 29.8229	48 44.3242	122 29.8215	8.4	1.3	7.5' p, 5.9' r
CW-87	1	25-Sep	1343	23.6	6.2	-17.4	48 44.3437	122 29.7962	48 44.3433	122 29.7963	2.3	1.1	4.5' p, 2.3' r
CW-29	1	25-Sep	1409	22.5	6.8	-15.7	48 44.3622	122 29.7694	48 44.3623	122 29.7693	1.0	1.0	7.0' p, 6.0' r
CW-49	1	25-Sep	1552	25.6	8.3	-17.3	48 44.3806	122 29.7427	48 44.3813	122 29.7429	4.2	1.1	7.5' p, 4.8' r
CW-02	1	25-Sep	1615	13.5	8.3	-5.2	48 44.2534	122 29.7795	48 44.2524	122 29.7803	7.0	1.2	5.7' p, 2.2' r
CW-67	1	25-Sep	1634	21.0	8.2	-12.8	48 44.3991	122 29.7159	48 44.3982	122 29.7165	6.0	1.2	7.9' p, 4.8' r
CW-53	1	25-Sep	1708	21.7	7.9	-13.8	48 44.4172	122 29.7165	48 44.4162	122 29.7172	6.6	1.2	6.3' p, na' r
CW-63	1	25-Sep	1729	20.3	7.7	-12.6	48 44.4357	122 29.6898	48 44.4362	122 29.6904	4.2	1.3	6.5' p, na' r
CW-61	1	25-Sep	1800	23.6	7.2	-16.4	48 44.4539	122 29.6767	48 44.4540	122 29.6771	1.8	1.1	7.7' p, 5.7' r
CW-80	1	26-Sep	0851	17.0	0.6	-16.4	48 44.4724	122 29.6499	48 44.4713	122 29.6494	7.1	1.4	8.5' p, 7.2' r
CW-82	1	26-Sep	1037	13.5	0.9	-12.6	48 44.4728	122 29.6226	48 44.4725	122 29.6218	3.6	1.1	5.9' p, 2.9' r
CW-07	1	26-Sep	1109	20.3	1.3	-19.0	48 44.2982	122 29.8152	48 44.2980	122 29.8152	1.0	1.0	7.0' p, 3.3' r
CW-84	1	26-Sep	1128	18.7	1.7	-17.0	48 44.3163	122 29.8158	48 44.3151	122 29.8162	7.2	1.1	7.0' p, 4.2' r
CW-26	1	26-Sep	1206	14.8	2.3	-12.5	48 44.3347	122 29.7890	48 44.3357	122 29.7888	6.0	1.0	6.0' p, 1.7' r
CW-28	1	26-Sep	1303	20.5	4.0	-16.5	48 44.3530	122 29.7760	48 44.3529	122 29.7754	2.4	1.3	7.0' p, 3.7' r
CW-48	1	26-Sep	1319	22.3	6.3	-16.1	48 44.3715	122 29.7492	48 44.3706	122 29.7481	7.0	1.3	6.0' p, 3.9' r
CW-68	1	26-Sep	1339	16.1	5.6	-10.5	48 44.3900	122 29.7225	48 44.3896	122 29.7216	4.1	1.1	8.2' p, 2.6' r
CW-66	1	26-Sep	1354	18.4	5.5	-12.9	48 44.4082	122 29.7094	48 44.4080	122 29.7083	4.6	1.0	7.1' p, 2.0' r
CW-64	1	26-Sep	1414	18.4	6.1	-12.3	48 44.4265	122 29.6963	48 44.4269	122 29.6957	3.3	0.9	7.6' p, 5.0' r
CW-77	1	26-Sep	1430	16.7	6.5	-10.2	48 44.4450	122 29.6695	48 44.4447	122 29.6697	2.0	0.9	7.2' p, 3.0' r
CW-113	1	26-Sep	1501	19.4	7.3	-12.1	48 44.4635	122 29.6428	48 44.4631	122 29.6418	4.6	1.2	6.0' p, 3.6' r
CW-75	1	26-Sep	1521	16.1	7.6	-8.5	48 44.4267	122 29.6826	48 44.4270	122 29.6836	4.3	1.2	4.8' p, 2.3' r
CW-120	1	26-Sep	1539	10.2	7.9	-2.3	48 44.2536	122 29.7659	48 44.2550	122 29.7631	13.9	1.2	na' p, 1.3' r
CW-03	1	26-Sep	1551	14.1	8.1	-6.0	48 44.2624	122 29.7867	48 44.2623	122 29.7873	2.6	1.1	6.0' p, 2.7' r
CW-17	1	29-Sep	1010	17.7	3.3	-14.4	48 44.2620	122 29.8140	48 44.2619	122 29.8134	2.6	1.1	8.0' p, 3.5' r
CW-19	1	29-Sep	1030	21.0	3.0	-18.0	48 44.2799	122 29.8283	48 44.2809	122 29.8274	7.1	1.1	8.0' p, 4.0' r
CW-136	1	29-Sep	1046	23.6	2.8	-20.8	48 44.2980	122 29.8410	48 44.2979	122 29.8401	3.7	1.0	7.5' p, 5.7' r
CW-139	1	29-Sep	1107	23.6	2.7	-20.9	48 44.3230	122 29.8360	48 44.3235	122 29.8371	5.4	1.1	7.5' p, 5.6' r
CW-93	1	29-Sep	1125	21.7	2.6	-19.1	48 44.3435	122 29.8098	48 44.3423	122 29.8099	7.2	1.1	7.5' p, 5.4' r
CW-89	1	29-Sep	1146	20.0	2.6	-17.4	48 44.3620	122 29.7831	48 44.3620	122 29.7830	0.4	1.1	6.1' p, 2.5' r
CW-31	1	29-Sep	1236	20.7	3.0	-17.7	48 44.3804	122 29.7563	48 44.3800	122 29.7554	4.6	1.3	6.7' p, 3.5' r
CW-51	1	29-Sep	1251	17.2	3.2	-14.0	48 44.3989	122 29.7296	48 44.3994	122 29.7308	5.7	1.3	8.0' p, 6.8' r

**Table E-1 - Cornwall Avenue Landfill Vibracore Location Data**

Location No.	Sample Rep.	Date	GPS Time	Measured Depth in Feet	Predicted Nearest Tide in Feet	Predicted Mudline Elevation in Feet (MLLW)	Sample Target		Sample Location		Distance to Target in Feet	GPS Status HDOP good < 2	Comments p=penetration r=recovery
							NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude	NAD 1983, Decimal Min. Latitude	NAD 1983, Decimal Min. Longitude			
CW-36	1	29-Sep	1307	19.0	3.4	-15.6	48 44.4261	122 29.7236	48 44.4262	122 29.7242	2.3	1.1	7.7' p, 5.5' r
CW-57	1	29-Sep	1324	22.5	3.7	-18.8	48 44.4538	122 29.6903	48 44.4539	122 29.6900	1.6	1.1	6.5' p, 3.7' r
CW-134	1	29-Sep	1339	20.0	4.0	-16.0	48 44.4820	122 29.6290	48 44.4812	122 29.6288	4.9	1.0	8.0' p, 6.5' r
CW-132	1	29-Sep	1354	16.4	4.3	-12.1	48 44.4820	122 29.6010	48 44.4813	122 29.6008	4.3	1.0	8.0' p, 2.5' r
	2	29-Sep	1404	17.1	4.5	-12.6	48 44.4820	122 29.6010	48 44.4810	122 29.6010	6.1	1.3	7.5' p, 2.5' r
CW-108	1	29-Sep	1434	11.2	5.2	-6.0	48 44.2440	122 29.7870	48 44.2437	122 29.7868	2.0	1.1	6.8' p, 2.0' r
CW-05	1	29-Sep	1448	15.4	5.4	-10.0	48 44.2803	122 29.8009	48 44.2796	122 29.8011	4.2	1.2	7.1' p, 1.8' r
CW-124	1	29-Sep	1503	13.8	5.8	-8.0	48 44.2894	122 29.7944	48 44.2893	122 29.7944	0.7	1.7	6.2' p, 3.8' r
CW-25	1	29-Sep	1519	12.5	6.1	-6.4	48 44.3256	122 29.7956	48 44.3261	122 29.7961	3.7	1.2	no recovery
CW-117	1	29-Sep	1538	9.5	6.6	-2.9	48 44.4732	122 29.5952	48 44.4725	122 29.5949	4.5	1.1	4.0 p, na' r

**Note:**

\*Data provided by Bio-Marine Enterprises

NA: Not Available

Table E-2 - Cornwall Avenue Landfill Sediment Coring Observations<sup>a</sup>

Core Number	Date	Time	Total Penetration in Feet	Total Recovery in Feet	Refuse? Refuse?	Refuse Thickness in Feet	Description	Percent by Volume <sup>b</sup>	Wood Debris?	Wood Thickness in Feet	Percent by Volume <sup>c</sup>	Relative Percent <sup>c</sup> (Bark vs. Chips/Sawdust)		Recent Overlying Sediment Layer in Feet <sup>d</sup>
												Bore Log Notes		
BLVD-SC-01	9/23/2008	1530	6.0 (refusal)	6.0	No	--	refusal likely due to wood debris	--	Yes	5	25 to 50			1.0
BLVD-SC-02	9/23/2008	1438	9.1 (refusal)	5.4	No	--	refusal due to wood debris, also caused compaction	--	Yes	5.4	25 to 50			0.4
BLVD-SC-03	9/23/2008	1126	11.3	6.6	No	--	compaction likely due to wood debris	--	Yes	6.6	>50			0.0
BLVD-SC-04	9/23/2008	1014	11.5	10.2	No	--	no native sediment observed	--	Yes	9.7	>50			0.5
BLVD-SC-05	9/22/2008	1630	14.0	14.0	No	--	"native" sediments encountered at ~9.5 ft.	--	Yes	9.5	>50			0.0
BLVD-SC-06	9/22/2008	1530	15.0	7.8	No	--	"native" sediments encountered at ~6 ft.	--	Yes	4.5	25 to 50			1.5
BLVD-SC-07	9/24/2008	902	4.0 (refusal)	3.3	No	--	refusal due to wood debris	--	Yes	3.3	25 to 50			0.0
BLVD-SC-08	9/23/2008	1656	16.0	15.0	No	--	"native" sediments encountered at ~7 ft.	--	Yes	4.5	25 to 50			2.5
BLVD-SC-09	9/23/2008	1818	9.7 (refusal)	8.1	Yes	0*	milk container fragment observed from 1.7-2.5 ft	<5	Yes	3.5	25 to 50	Both	bark, wood chips, sawdust	0.5
CW-002	9/25/2008	1615	5.7 (refusal)	2.2	No	--	refusal caused by wood debris	--	Yes	2.2	>50	>Chips/Dust	bark and wood chips/sawdust	~ 0.5 + eelgrass
CW-003	9/26/2008	1551	6.0 (refusal)	2.7	No	--	refusal and pile driving due to wood debris	--	Yes	2.7	>50	>Chips/Dust	sawdust	~ 0.5 + eelgrass
CW-005	9/29/2008	1455	7.1	1.8	Yes	0*	single piece of plastic at 1 ft, pile drive due to wood debris	<5	Yes	1.8	25 to 50	>Chips/Dust	wood chips, fibers	~ 1
CW-007	9/26/2008	1109	7.0	3.3	Yes	0.4	plastic fragments, rubber band, blue rubber, aluminum foil	<5	Yes	2.3	25 to 50	>Bark	piece of wood and bark	2.9
CW-008	9/25/2008	1150	7.0	6.3	Yes	1	plastic, tongue depressor, tin foil, sock	<5	Yes	4.3	25 to 50	>Chips/Dust	wood chips/sawdust and bark (3 inch)	2.0
CW-012	9/25/2008	1031	8.5	6.5	Yes	0*	single piece of aluminum foil in upper 0.5 ft	<5	Yes	6	>50	Both	wood chips and bark	0.5
CW-014	9/25/2008	1116	7.5	7.5	Yes	3.5	plastic pieces, bags	<5	Yes	4.5	25 to 50	Both	bark and wood chips	1.5
CW-017	9/29/2008	1010	8.0	3.5	Yes	0*	one shoe lace at 2.5 ft, pile drive due to wood debris	<5	Yes	2	25 to 50	Both	bark, wood chips/sawdust	1.5
CW-019	9/29/2008	1030	8.0	4.0	No	--	pile drive due to wood debris	--	Yes	1.5	25 to 50	Both	bark, wood chips, sawdust	2.5
CW-025	9/29/2008	1519	refusal	refusal	--	--	glass and fine gravel at bottom may have caused refusal	--	--	--	--	--	--	0.0
CW-026	9/26/2008	1206	6.0 (refusal)	1.7	Yes	1.7	glass and plastic fragments, refusal due to gravel and refuse	<5	Yes	1.7	25 to 50	>Bark	bark	0.0
CW-028	9/26/2008	1303	7.0	3.7	Yes	0*	one piece of plastic at 1.5 ft	<5	Yes	2.2	25 to 50	>Bark	large (3-4 inch) piece of bark	1.5
CW-029	9/25/2008	1409	7.0	6.0	Yes	0.5	plastic fragments	<5	Yes	5	25 to 50	>Chips/Dust	moderate to abundant wood chips/sawdust	3.0
CW-031	9/29/2008	1236	6.7	3.5	No	--	--	--	Yes	2	25 to 50	>Bark	bark, wood sticks	1.0
CW-036	9/29/2008	1307	7.7	5.5	Yes	0*	single piece of plastic (candy wrapper) at 1.8 ft	<5	No	--	--	--	--	1.8
CW-048	9/26/2008	1319	6.0 (refusal)	3.9	Yes	0.4	plastic bag/fragments, christmas tinsel, detergent bottle cap, refusal due to refuse?	10	Yes	3.5	25 to 50	>Bark	bark	3.5

Table E-2 - Cornwall Avenue Landfill Sediment Coring Observations<sup>a</sup>

Core Number	Date	Time	Total Penetration in Feet	Total Recovery in Feet	Refuse? Refuse?	Refuse Thickness in Feet	Description	Percent by Volume <sup>b</sup>	Wood Debris?	Wood Thickness in Feet	Percent by Volume <sup>c</sup>	Relative Percent <sup>c</sup> (Bark vs. Chips/Sawdust)		Bore Log Notes	Recent Overlying Sediment Layer in Feet <sup>d</sup>
												>Chips/Dust	>Bark		
CW-049	9/25/2008	1552	7.5	4.8	Yes	2.5	plastic bags, plastic jar bottom	5-10	Yes	2.8	25 to 50	Both	some bark, wood chips fibers, wood chips, sawdust, piece of bark	2.0	
CW-051	9/29/2008	1251	7.8	6.8	No	--	single plastic sheet at 0.8 ft, pile drive due to wood debris	--	Yes	1.4	25 to 50	>Chips/Dust	wood chips, bark, one large wood chip	1.5	
CW-053	9/25/2008	1708	6.3	2.8	Yes	0*	drive due to wood debris	<5	Yes	2	>50	>Chips/Dust	bark	0.8	
CW-057	9/29/2008	1324	6.5	3.7	No	--		--	Yes	2.7	25 to 50	>Bark	wood chips	1.0	
CW-061	9/25/2008	1800	7.7	5.7	Yes	2	plastic sheet, blue plastic	<5	Yes	3.7	>50	>Chips/Dust	wood chips	2.0	
CW-063	9/25/2008	1729	6.5	5.0	No	--		--	Yes	3	>50	>Chips/Dust	wood sawdust	1.5	
CW-064	9/26/2008	1414	7.6	5.0	No	--		--	Yes	5	25 to 50	>Chips/Dust	thin layer (~2 inches) of fibrous wood	3.0	
CW-066	9/26/2008	1354	7.1	2.0	Yes	1	rubber gasket, plastic fragments, wood at bottom caused pile drive	<5	Yes	1	25 to 50	>Bark	large piece of wood (3-inch)	1.0	
CW-067	9/25/2008	1634	7.9	4.8	Yes	1	plastic sheet and fragments	<5	Yes	2	>50	>Chips/Dust	bark and wood chips/sawdust	2.0	
CW-068	9/26/2008	1339	8.2	2.6	Yes	0*	piece of linoleum flooring may have cause pile driving	<5	Yes	2.6	25 to 50	>Bark	bark	2.6	
CW-075	9/26/2008	1521	4.8 (refusal)	2.3	Yes	0*	single plastic sheet at 0.7 ft	<5	Yes	2.3	25 to 50	Both	bark, wood chips, large piece of wood	2.3	
CW-077	9/26/2008	1430	7.2	3.0	Yes	1.5	brick and glass frags, plywood piece, pile drive due to debris	5-10	Yes	3	25 to 50	Both	wood debris	0.0	
CW-080	9/26/2008	851	8.5	7.2	No	--		--	Yes	4	25 to 50	>Chips/Dust	bark and wood chips/sawdust	3.0	
CW-082	9/26/2008	1037	5.9 (refusal)	2.9	Yes	1.4	plastic bags, aluminum foil, refusal caused by wood debris	<5	Yes	1.4	25 to 50	>Chips/Dust	wood chips	1.5	
CW-084	9/26/2008	1128	7.0	4.2	Yes	1.2	bread clip, newspaper, glass fragments	<5	Yes	3.7	25 to 50	>Chips/Dust	wood chips/sawdust, small bark moderate to abundant wood	0.5	
CW-087	9/25/2008	1343	4.5 (refusal)	2.3	Yes	0*	refusal caused by refuse, glass and porcelain frags, plastic	<5	Yes	2.3	<25	Both	debris	2.3	
CW-089	9/29/2008	1146	6.1	2.5	No	--	pile drive due to wood debris	--	Yes	2	25 to 50	>Chips/Dust	wood chips, fibers, sawdust	0.5	
CW-091	9/25/2008	1313	7.5	5.9	Yes	2	cigarette pack, paper, plastic	<5	Yes	2.5	25 to 50	Both	wood chips and bark	0.5	
CW-093	9/29/2008	1125	7.5	5.4	Yes	0.5	small piece of leather, glass fragment	<5	Yes	2	25 to 50	Both	wood debris	2.5	
CW-108	9/29/2008	1434	6.8	2.0	No	--	pile drive due to wood debris	--	Yes	2	>50	>Chips/Dust	sawdust/wood chips, large 3-4 inch wood piece	~ 0.5 + eelgrass	
CW-113	9/26/2008	1501	6.0	3.6	Yes	0*	one small piece of plastic at 3 ft	<5	Yes	3.6	25 to 50	>Bark	bark (3-inch)	3.0	
CW-117	9/29/2008	1538	4.0	4.0	No	--		--	Yes	2.5	>50	>Chips/Dust	wood chips and sawdust	< 0.5	
CW-120	9/26/2008	1539	2.0 (refusal)	1.3	No	--	refusal due to wood debris	--	Yes	1.3	>50	>Chips/Dust	wood chips and sawdust	~ 0.5 + eelgrass	
CW-124	9/29/2008	1503	6.2	3.8	Yes	0*	piece of fabric/textile at 3.8 ft, pile drive due to wood debris	<5	Yes	3.8	25 to 50	Both	--	2.0	
CW-132	9/29/2008	1404	6.5	2.5	Yes	0*	single piece of plastic sheet, pile drive due to wood debris	<5	Yes	2.5	25 to 50	>Chips/Dust	wood chips, sawdust, fibers	1.5	
CW-134	9/29/2008	1339	8.5	6.5	No	--		--	Yes	0.7	25 to 50	>Chips/Dust	fibers, wood chips	2.7	
CW-136	9/29/2008	1046	7.5	5.7	Yes	0*	small piece of plastic at 4 ft	<5	Yes	4	25 to 50	>Bark	primarily bark	1.7	
CW-139	9/29/2008	1107	7.5	5.6	Yes	2	plastic frags, aluminum foil	<5	Yes	3.6	25 to 50	>Chips/Dust	fibers, wood chips, sawdust, large piece of bark (3-inches)	2.0	
RGH-SC-01	8/26/2008	1654	6.0	4.5	Yes	0.5	glass fragments on surface, brick debris at 2.5 ft	<5	Yes	<1	<25	>Chips/Dust	chips, sawdust, 2-inch wood chip	<0.5	

Table E-2 - Cornwall Avenue Landfill Sediment Coring Observations<sup>a</sup>

Core Number	Date	Time	Total Penetration in Feet	Total Recovery in Feet	Refuse? Refuse? Thickness in Feet	Description	Percent by Volume <sup>b</sup>	Wood Debris? Wood Thickness in Feet	Percent by Volume <sup>c</sup>	Relative Percent <sup>c</sup> (Bark vs. Chips/Sawdust)	Bore Log Notes	Recent Overlying Sediment Layer in Feet <sup>d</sup>		
RGH-SC-02	8/26/2008	1802	6.0	5.2	Yes	3	brick, glass, wire fragments on surface, brick and glass fragments at 2.25 ft to 5.2 ft	10	Yes	2.25	25 to 50	>Chips/Dust	scattered wood fiber on surface, 3-inch wood chips from 3 to 5.25 ft	0.5
RGH-SC-03	8/27/2008	1212	6.2	5.5	No	--	brick fragments on surface	--	Yes	3	>50	>Chips/Dust	abundant wood sticks (0.5 to 4 inch long) at surface, wood chips from 2.8 ft to 5.5 ft	1.8
RGH-SC-04	8/27/2008	1149	6.0	5.7	No	--	--	--	Yes	5	>50	>Chips/Dust	wood pieces (0.5 to 2 inch) from 0.7 to 2.2 ft, wood chip layers at 2.5 ft and 5.1 ft, abundant wood pieces to 5.7 ft	0.7
RGH-SC-05	8/27/2008	1127	6.0	4.5	No	--	--	--	Yes	4	>50	>Chips/Dust	wood fragments 0.5 to 1.5 ft, abundant wood chips from 3 to 4.5 ft	0.5
RGH-SC-06	8/27/2008	1017	6.0	5.3	No	--	--	--	Yes	3.5	>50	>Chips/Dust	root/wood fragments from surface to 2.75 ft, wood chip layers (1 to 3 cm thick) at 2.75 and 3.25 ft, wood chip layers increase to 5.25 ft	0.9
RGH-SC-07	9/24/2008	1403	6.8	4.9	Yes	0*	5 inch piece black plastic at 6.8'	<5	Yes	6.5	25 to 50	>Chips/Dust	wood chips, sawdust	0.5
RGH-SC-08	9/24/2008	1639	5.5	4.8	Yes	0*	plastic syringe at 5.5 ft	<5	Yes	3.5	>50	>Chips/Dust	wood chips, sawdust, fibers	2.0
RGH-SC-09	9/24/2008	1601	5.5	4.3	No	--	--	--	Yes	3.5	25 to 50	>Chips/Dust	wood pieces (0.5 to 4 inch), increasing amounts with depth	2.0
<b>Average Thickness of Recent Sediment =</b>											<b>1.5</b>			

Notes:

0\* - single piece or fragment of refuse observed in core

<sup>a</sup> Observations are based on recovered sediment depth (not penetration depth)

<sup>b</sup> Percent by volume - visual estimate of refuse volume in sediment thickness (<5% is limit of observation)

<sup>c</sup> Percent volume is an estimate based on field observations. Highly organic sediments (PT) contain >50% wood debris.

Bold (>50%) indicates primarily wood debris, with little sediment. Organic silts and clays (OL) contain 25 to 50% wood debris.

<sup>d</sup> Recent sediments at some locations contain organic material including wood debris

but generally less than observed with increasing sediment depth.

Municipal refuse present with < 1.0 foot of recent overlying sediment

Greater than 1.0 foot accumulated wood containing > 50% sawdust/wood chips with < 1.0 foot of recent overlying sediment

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-012  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1031

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
8.5	6.5	77	N	-	-		OL	Organic clayey SILT, dark brown in color. Upper 0.5 ft observed small piece of aluminum foil, no other refuse observed.	
			Y	<5	>50	1--	PT	Highly organic material including wood chips and bark of various size in fine-grained matrix (clayey SILT with fine sand) with strong sulfide odor	
						2--			
						3--			
						4--			
						5--			
						6--			
						7--		Base of Core @ 6.5 ft	

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239025.85469 N 638270.91116
WATER DEPTH IN FEET	13.8 ft
WATER LEVEL (TIDE) IN FEET	1.1 ft
SEDIMENT ELEVATION (MLLW)	-12.7 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

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Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-014  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1116

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.5	7.5	100	Y	<5	<25			USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
								Organic clayey SILT with fine sand and glass shards on surface Dark brown to gray in color.	
						1-	OL	Refuse observed from 1.5 to 5 ft below surface including plastic pieces (bags) scattered throughout within wood debris (bark, chips) in clayey SILT matrix with strong sulfide odor	
			Y	<5	25-50	2-	OL		
						3-			
						4-			
						5-			
			N	--	<25	6-	OL/ML	Wood debris decreasing with depth.	
						7-		Base of Core @ 7.5 ft	

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238965.19468 N 638386.56723
WATER DEPTH IN FEET	21.0 ft
WATER LEVEL (TIDE) IN FEET	2.1 ft
SEDIMENT ELEVATION (MLLW)	-18.9 ft
WEATHER	Sunny, 60's F

## LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-008
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/25/08 1150

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.0	6.3	90	N	-	<25		OL/ML	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1--		Organic clayey SILT with fine sand Dark brown to gray in color.	
						2--			
			Y	<5	25-50	3--	OL	Refuse observed from 2 to 3 ft below surface including plastic fragments, popsicle stick (or tongue depressor), tin foil, and sock/rag hanging from core catcher. Refuse in wood debris and strong sulfide odor.	
			N	--	25-50 to 50	4--	OL/PT	Wood debris increasing at 3 ft including wood chips, bark (3-inch), and dust in fine-grained matrix with strong sulfide odor.	
						5--			
						6--			
						7--		Base of core @ 6.3 ft.	

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238970.244      N 638489.85477
WATER DEPTH IN FEET	23.0 ft
WATER LEVEL (TIDE) IN FEET	3.1 ft
SEDIMENT ELEVATION (MLLW)	-19.9 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale



# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-091  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1313

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.5	5.9	79	N	--	<25		OL	Organic clayey SILT with fine sand Dark brown to gray in color.	
			Y	<5	25-50	1-	OL	Refuse observed from 0.5 to 2.5 ft below surface including paper, plastic fragments, and cigarette pack in organic clayey SILT with sand matrix	
			N	--	25-50	3-	OL/ML	Organic clayey SILT with wood chips and bark grading to clayey SILT with moderate organics. Less wood debris with increasing depth.	
						4-			
						5-			
						6-		Base of Core @ 5.9 ft.	
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238969.49836 N 638604.21551
WATER DEPTH IN FEET	25.9 ft
WATER LEVEL (TIDE) IN FEET	5.5 ft
SEDIMENT ELEVATION (MLLW)	-20.4 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-087  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1343

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
4.5	2.3	51	Y	<5	<25			USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1--	ML/OL	Organic clayey SILT with fine sand and moderate to abundant wood debris and strong sulfide odor. Dark brown color.	
								Refuse at bottom of core including glass fragments, porcelain, and plastic Glass may have caused refusal of core.	
						2--			
								Base of core @ 2.3 ft (refusal)	
						3--			
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239073.33816 N 638718.13984
WATER DEPTH IN FEET	23.6 ft
WATER LEVEL (TIDE) IN FEET	6.2 ft
SEDIMENT ELEVATION (MLLW)	-17.4 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980


CORE NUMBER CW-029  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1409

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7	6	86	Y	--	25-50	1--	OL	Organic clayey SILT with moderate to abundant wood chips/dust, brown in color, strong sulfide odor, and small piece of plastic observed at 1 ft.	
			Y	<5	25-50	3--	OL	Refuse layer observed from 3 to 3.5 ft below surface including plastic fragments.	
			N	--	25-50	4--	OL		
			N	--	<25	5--	OL/ML	Lithology change to clayey SILT with moderate organics, olive to brown color.	
						6--		Base of core @ 6.0 ft.	
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239184.40132 N 638831.30043
WATER DEPTH IN FEET	22.5 ft
WATER LEVEL (TIDE) IN FEET	6.8 ft
SEDIMENT ELEVATION (MLLW)	-15.7 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report



N

Not to scale



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321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-002  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1615

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
5.7	2.2	39	N	--	>50				
							PT	Bark and wood chips from surface to 0.8 ft.	
						1--	PT	Saw dust from 0.8 to 2.2 ft. Strong sulfide odor.	
			N	--	>50				
						2--		Base of core @ 2.2 ft (refusal)	
						3--			
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239125.73058 N 638164.13916
WATER DEPTH IN FEET	13.5 ft
WATER LEVEL (TIDE) IN FEET	8.3 ft
SEDIMENT ELEVATION (MLLW)	-5.2 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-067  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1634

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.9	4.8	61	N	--	<25	1--	OL	Organic clayey SILT with sand, dark brown in color.	
			Y	<5	25-50	2--	OL	Refuse observed from 2 to 3 ft. below surface including plastic sheet and fragments within wood debris (bark, chips)	
			N	--	>50	3--	PT	Wood chips and saw dust.	
			N	--	<25	4--	ML	Clayey SILT with moderate organics, olive color. Base of core @ 4.8 ft.	
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239401.42278 N 639044.96127
WATER DEPTH IN FEET	21.0 ft
WATER LEVEL (TIDE) IN FEET	8.2 ft
SEDIMENT ELEVATION (MLLW)	-12.8 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-053  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1708

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.3	2.8	44	N	--	<25	OL	Organic clayey SILT, dark brown in color		
							Refuse observed at 0.8 ft below surface - one piece of plastic sheet		
			Y	--	>50	OL/PT	Highly organic material (wood chips, bark) in clayey SILT matrix. Large wood chip in core catcher likely blocked recovery (pile-drive).		
							Strong sulfide odor.		
							Base of core @ 2.8 ft.		
						3-			
						4-			
						5-			
						6-			
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239400.9717 N 639154.4499
WATER DEPTH IN FEET	21.7 ft
WATER LEVEL (TIDE) IN FEET	7.9 ft
SEDIMENT ELEVATION (MLLW)	-13.8 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-063  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/25/08 1729

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
6.5	5.0	77	N	--	<25		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT) Organic clayey SILT with sand and shell hash, dark brown in color.	
						1-			
			N	--	>50	2-	OL/PT	Organic clayey SILT with layers of wood saw dust.	
						3-			
			N	--	<25	4-	ML	Clayey SILT with trace shell fragments, olive in color, (native?).	
						5-		Base of core @ 5.0 ft.	
						6-			
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239511.35743 N 639273.70919
WATER DEPTH IN FEET	20.3 ft
WATER LEVEL (TIDE) IN FEET	7.7 ft
SEDIMENT ELEVATION (MLLW)	-12.6 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale



# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-061
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/25/08 1800

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)			
7.7	5.7	74	N	--	<25	1--	OL	Organic clayey SILT with mud clam on surface, dark brown in color.	
			Y	<5	>50	3--	OL/PT	Refuse observed from 2 to 4 ft below surface including plastic sheets and blue plastic fragments mixed with wood debris in a fine-grained matrix.	
			N	--	25-50	5--	OL	Organic clayey SILT with layer of wood chips at bottom of core.	
			N	--	>50	6--	PT	Base of core @ 5.7 ft.	
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239567.17148 N 639380.76652
WATER DEPTH IN FEET	23.6 ft
WATER LEVEL (TIDE) IN FEET	7.2 ft
SEDIMENT ELEVATION (MLLW)	-16.4 ft
WEATHER	Sunny, 50's F

## LOCATION SKETCH

Refer to characterization report



Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-080
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/26/08 0851

SAMPLE INFORMATION						Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris			
8.5	7.2	85	N	--	<25	OL	Organic clayey SILT with fine sand and scattered to moderate wood debris (bark), dark brown in color.	
					to			
					25-50			
						1--		
						2--		
						3--		
			N	--	>50	PT	Wood debris (chips and dust)	
						4--		
			N	--	<25	ML	Clayey SILT with fine sand and scattered shell fragments, olive in color, (native?).	
						5--		
						6--		
						7--	Base of core @ 7.2 ft.	

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239680.8193 N 639483.53452
WATER DEPTH IN FEET	17.0 ft
WATER LEVEL (TIDE) IN FEET	0.6 ft
SEDIMENT ELEVATION (MLLW)	-16.4 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-082  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, L.G, LEG  
DATE 9/26/08 1037

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
5.9	2.9	49	N	-	<25		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)  Organic clayey SILT, dark brown in color.	
							1--		
			Y	<5	25-50		2--	OL/PT Refuse observed from 1.5 to 2.9 ft. including plastic fragments, bags, and aluminum foil mixed with wood debris (chips).  Wood chips increase at bottom of core.	
							3--	Base of core @ 2.9 ft., wood chips may have blocked recovery (pile drive)	
							4--		
							5--		
							6--		
							7--		

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239791.95173 N 639488.43469
WATER DEPTH IN FEET	13.5 ft
WATER LEVEL (TIDE) IN FEET	0.9 ft
SEDIMENT ELEVATION (MLLW)	-12.6 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-007  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1109

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.0	3.3	47	N	--	<25		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT) Organic clayey SILT, dark brown in color.	
							1-		Large (3-inch) worm-hole piece of wood and bark fragments at 1 ft.
			N	--	25-50		OL	Wood debris increases with depth.	
			Y	<5	>50		OL/PT	Refuse observed from 2.9 to 3.3 ft below surface including plastic fragments, aluminum foil, rubber band, and blue rubber fragment within wood debris	
								Wood debris/refuse likely blocked recovery (pile-drive). Base of core @ 3.3 ft.	
							4-		
							5-		
							6-		
							7-		

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238991.38712 N 638444.38965
WATER DEPTH IN FEET	20.3 ft
WATER LEVEL (TIDE) IN FEET	1.3 ft
SEDIMENT ELEVATION (MLLW)	-19.0 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-084  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1128

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.0	4.2	60	N	--	<25		OL	Organic clayey SILT with fine sand, dark brown to black in color.	
			Y	<5	25-50	1--	OL	Refuse observed from 0.5 to 1.7 ft below surface including plastic bread clip, newspaper, and glass fragments within wood debris (chips/bark)	
			N	--	25-50	2--	OL/PT	Organic clayey SILT with fine sand and pockets of wood chips, saw dust, and small bark, dark brown in color.	
						3--			
						4--		Base of core @ 4.2 ft.	
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238989.61368 N 638548.43293
WATER DEPTH IN FEET	18.7 ft
WATER LEVEL (TIDE) IN FEET	1.7 ft
SEDIMENT ELEVATION (MLLW)	-17.0 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-026  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1206

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.0	1.7	28	Y	<5	25-50		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1-		Organic SILT with clay, black in color. Refuse observed from surface to 1.7 ft including glass and plastic fragments within wood debris (bark).	
						2-		Fine gravel observed at bottom of core. Base of core @ 1.7 ft. Refuse/bark may have blocked recovery (pile-drive). Refusal at 6.0 ft penetration depth.	
						3-			
						4-			
						5-			
						6-			
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239102.49699 N 638671.28514
WATER DEPTH IN FEET	14.8 ft
WATER LEVEL (TIDE) IN FEET	2.3 ft
SEDIMENT ELEVATION (MLLW)	-12.5 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-028
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/26/08 1303

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)			
7.0	3.7	53	N	--	<25	OL	Organic clayey SILT with mud clam observed near surface, dark brown in color.		
						OL/PT	A single piece of plastic observed at 1.5 ft below surface.  Large (3-4 inch) piece of bark at 2.5 ft below surface. Wood increasing with depth.		
			Y	--	25-50				
						Base of core @ 3.7 ft.			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239158.63835 N 638774.68489
WATER DEPTH IN FEET	20.5 ft
WATER LEVEL (TIDE) IN FEET	4.0 ft
SEDIMENT ELEVATION (MLLW)	-16.5 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-048
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/26/08 1319

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
6.0	3.9	65	N	--	25-50	1--	OL	Organic clayey SILT with mussel shells in surface and wood debris (bark) throughout upper 3.5 ft., gray to black in color.	
						2--			
						3--			
			Y	10	25-50	4--	OL	Refuse observed from 3.5 to 3.9 ft below surface including christmas gold tinsel, plastic bags, detergent cap, and small plastic fragments. Base of core @ 3.9 ft. Refusal may have been caused by refuse.	
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239270.73619 N 638879.91681
WATER DEPTH IN FEET	22.3 ft
WATER LEVEL (TIDE) IN FEET	6.3 ft
SEDIMENT ELEVATION (MLLW)	-16.1 ft
WEATHER	Sunny, 60's F

**LOCATION SKETCH**

Refer to characterization report

↑  
**N**

Not to scale



**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-068  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1339

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
8.2	2.6	32	N	--	25-50		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1--		Organic clayey SILT with abundant wood debris (bark), dark brown in color.	
						2--			
						3--		Refuse observed at bottom of core including linoleum flooring piece, plastic fragments.	
			Y	?	25-50			Base of core @ 2.6 ft. Refuse likely blocked recovery (pile-drive).	
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239379.78673 N 638993.12202
WATER DEPTH IN FEET	16.1 ft
WATER LEVEL (TIDE) IN FEET	5.6 ft
SEDIMENT ELEVATION (MLLW)	-10.5 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-066  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1354

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.1	2.0	28	N	--	<25		OL	Organic clayey SILT with fine sand and mud clam in surface, dark brown in color.	
							OL/PT	Refuse observed from 1 to 2 ft below surface including rubber gasket, plastic fragments within wood debris. Large piece of wood (3-inch) in core catcher likely caused poor recovery (pile-drive).	
								Base of core @ 2 ft.	

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239435.68111 N 639103.82652
WATER DEPTH IN FEET	18.4 ft
WATER LEVEL (TIDE) IN FEET	5.5 ft
SEDIMENT ELEVATION (MLLW)	-12.9 ft
WEATHER	Sunny, 60's F

**LOCATION SKETCH**

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-064
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/26/08 1414

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.6	5.0	66	N	-	25-50		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1-		Organic clayey SILT with fine sand and moderate to abundant wood debris, shell fragments near bottom of core, dark brown in color.	
						2-			
						3-		Thin layer (~2 inches) of fibrous wood at 3 ft. Wood debris increases with depth.	
						4-			
						5-		Base of core @ 5 ft.	
						6-			
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239488.82586 N 639217.63164
WATER DEPTH IN FEET	18.4 ft
WATER LEVEL (TIDE) IN FEET	6.1 ft
SEDIMENT ELEVATION (MLLW)	-12.3 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-077
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/26/08 1430

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.2	3.0	42	Y	5-10	25-50		OL/PT	Organic clayey SILT with fine sand and abundant wood debris. Refuse observed from surface to 1.5 ft including brick and glass fragments, and piece of plywood.	
						1--			
			N	--	25-50	2--	OL	Organic clayey SILT with fine wood debris throughout sediment.	
						3--		Base of core @ 3 ft.	
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239595.70522 N 639323.58638
WATER DEPTH IN FEET	16.7 ft
WATER LEVEL (TIDE) IN FEET	6.5 ft
SEDIMENT ELEVATION (MLLW)	-10.2 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-113  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1501

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
6.0	3.6	60	Y	--	25-50		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1--		Organic clayey SILT with sand and fine gravels and wood debris (bark), 3-inch piece observed at 2.7 ft below surface, dark brown in color.	
						2--			
						3--		Observed one small piece of plastic at 3 ft below surface.	
						4--	OL	Shell fragments observed at bottom of core.	
						5--		Base of core @ 3.6 ft.	
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239710.30171 N 639433.02446
WATER DEPTH IN FEET	19.4 ft
WATER LEVEL (TIDE) IN FEET	7.3 ft
SEDIMENT ELEVATION (MLLW)	-12.1 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-075  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1521

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
4.8	2.3	48	Y	--	25-50		OL	Chunk of wood at surface.	
								A single piece of plastic at 0.7 ft below surface.	
						1--	OL	Organic clayey SILT with sand and fine gravel and abundant wood debris (bark, chips), dark brown in color.	
						2--		Base of core @ 2.3 ft. Refusal at penetration depth of 4.8 ft. likely caused by large piece of wood observed at bottom of core.	
						3--			
						4--			
						5--			
						6--			
						7--			

## LOCATION SKETCH

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239537.49177      N 639217.189
WATER DEPTH IN FEET	16.1 ft
WATER LEVEL (TIDE) IN FEET	7.6 ft
SEDIMENT ELEVATION (MLLW)	-8.5 ft
WEATHER	Sunny, 60's F



Refer to characterization report

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-120  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1539

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
2.0	1.3	65	N	--	>50		PT	Wood chips and saw dust.	
						1--		Base of core @ 1.3 ft. Refusal due to wood debris.	
						2--			
						3--			
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239195.2354 N 638178.45069
WATER DEPTH IN FEET	10.2 ft
WATER LEVEL (TIDE) IN FEET	7.9 ft
SEDIMENT ELEVATION (MLLW)	-2.3 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-003  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/26/08 1551

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.0	2.7	45	N	-	>50		PT	Wood debris (saw dust).	
						1--			
						2--			
						3--		Base of core @ 2.7 ft. Core may have penetrated at an angle.	
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239098.88363 N 638224.93278
WATER DEPTH IN FEET	14.1 ft
WATER LEVEL (TIDE) IN FEET	8.1 ft
SEDIMENT ELEVATION (MLLW)	-6.0 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale



# HERRENKOHL CONSULTING LLC

321 Summerland Road  
 Bellingham, WA 98229  
 (360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-017  
 PROJECT Cornwall Avenue Landfill Refuse Mapping  
 LOCATION Bellingham Bay  
 PROJECT NUMBER 1733017  
 LOGGED BY Mark Herrenkohl, LG, LEG  
 DATE 9/29/08 1010

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
8.0	3.5	44	N	--	<25	OL	Organic clayey SILT with fine sand, dark brown in color.		
							1--		
						OL/PT	Wood debris (bark, chips, dust) increasing with depth.		
			Y	--	25-50		2--	Observed one shoe lace at 2.5 ft below surface.	
						OL/PT			
			N	--	25-50		3--	Base of core @ 3.5 ft.	
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238993.88019 N 638224.76981
WATER DEPTH IN FEET	17.7 ft
WATER LEVEL (TIDE) IN FEET	3.3 ft
SEDIMENT ELEVATION (MLLW)	-14.4 ft
WEATHER	P. Sunny, 50's F

### LOCATION SKETCH

Refer to characterization report



Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-019  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1030

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
8.0	4.0	50	N	--	<25		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
							1--		
							2--		
							3--	OL/PT Wood debris increases at 2.5 ft below surface (bark, chips, dust). Strong sulfide odor.	
							4--	Base of core @ 4.0 ft.	
							5--		
							6--		
							7--		

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238940.08234 N 638341.49403
WATER DEPTH IN FEET	21.0 ft
WATER LEVEL (TIDE) IN FEET	3.0 ft
SEDIMENT ELEVATION (MLLW)	-18.0 ft
WEATHER	P. Sunny, 50's F

### LOCATION SKETCH

Refer to characterization report



Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-136  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1046

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.5	5.7	76	N	--	<25		OL	Organic clayey SILT with sand and scattered worms in upper 0.2 ft. Dark brown in color.	
							1-		
							2-	Wood debris increases at 1.7 ft (primarily bark)	
			Y	--	25-50		OL to OL/PT		
							3-		
							4-	Observed one piece of plastic at 4 ft below surface.	
							5-		
							6-	Base of core @ 5.7 ft.	
							7-		

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238891.24963 N 638445.94673
WATER DEPTH IN FEET	23.6 ft
WATER LEVEL (TIDE) IN FEET	2.8 ft
SEDIMENT ELEVATION (MLLW)	-20.8 ft
WEATHER	P. Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-139  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1107

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.5	5.6	75	N	--	<25		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT) Organic clayey SILT with mud clam and worms in upper 1 ft. Dark brown in color.	
							1--		
			Y	<5	25-50		OL	Refuse observed at 1 ft below surface including plastic and aluminum foil fragments.	
							2--		
			N	--	25-50		OL/PT	Wood debris increases at ~2 ft (fibers, chips, dust)	
							3--		
			N	--	25-50		OL to OL/PT	Organic clayey SILT with sand, olive to dark brown in color.	
							4--		
							5--	Large piece of bark (3-inches) at ~4.5 ft.	
							6--		
							7--	Base of core @ 5.6 ft.	

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1238906.67836 N 638601.31639
WATER DEPTH IN FEET	23.6 ft
WATER LEVEL (TIDE) IN FEET	2.7 ft
SEDIMENT ELEVATION (MLLW)	-20.9 ft
WEATHER	P. Sunny, 50's F

### LOCATION SKETCH

Refer to characterization report



Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-093  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1125

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.5	5.4	72	N	--	<25	1--	OL	Organic clayey SILT with sand, dark brown to olive in color.	
			N	--	25-50	3--	OL	Wood debris increases at ~2.5 ft.	
			Y	<5	25-50		OL	Refuse observed from 3 to 3.5 ft below surface including small piece of leather and glass fragment.	
			N	--	25-50	4--	OL	Moderate sulfide odor.	
			N	--	25-50	5--	OL/PT	Wood debris increases. Base of core @ 5.4 ft.	
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239018.52114 N 638713.24271
WATER DEPTH IN FEET	21.7 ft
WATER LEVEL (TIDE) IN FEET	2.6 ft
SEDIMENT ELEVATION (MLLW)	-19.1 ft
WEATHER	Sunny, 50's F

LOCATION SKETCH

Refer to characterization report

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
 Bellingham, WA 98229  
 (360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-089  
 PROJECT Cornwall Avenue Landfill Refuse Mapping  
 LOCATION Bellingham Bay  
 PROJECT NUMBER 1733017  
 LOGGED BY Mark Herrenkohl, LG, LEG  
 DATE 9/29/08 1146

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.1	2.5	41	N	--	<25	OL	Organic clayey SILT with fine sand and worms observed in surface sediment, dark brown in color.		
			N	--	25-50			1--	OL/PT Wood debris (chips, fibers, dust) increasing at 0.5 ft. moderate sulfide odor.
						2--			
						3--		Base of core @ 2.5 ft.	
						4--			
						5--			
						6--			
						7--			

## LOCATION SKETCH

Refer to characterization report



Not to scale

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239129.27455 N 638830.66719
WATER DEPTH IN FEET	20.0 ft
WATER LEVEL (TIDE) IN FEET	2.6 ft
SEDIMENT ELEVATION (MLLW)	-17.4 ft
WEATHER	P. Sunny, 60's F

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-031
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/29/08 1236

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.7	3.5	52	N	--	<25		OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)  Organic clayey SILT with fine sand and a few worms in surface sediment. Dark brown to olive color.	
			N	--	25-50	1--	OL	Wood debris (bark, sticks) increases at 1 ft.	
						2--		Clam shells observed at 2.5 ft.	
			N	--	<25	3--	OL	Shell hash observed from 3 to 3.5 ft. Base of core @ 3.5 ft.	
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239242.61794 N 638937.69666
WATER DEPTH IN FEET	20.7 ft
WATER LEVEL (TIDE) IN FEET	3.0 ft
SEDIMENT ELEVATION (MLLW)	-17.7 ft
WEATHER	P. Sunny, 60's F

### LOCATION SKETCH

Refer to characterization report



Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-051  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1251

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
7.8	6.8	87	N	--	<25	0-1	OL	Organic clayey SILT with sand and piece of bark at surface, dark brown in color.	
						1-2			
			N	--	25-50	2-3	OL	Wood debris (fibers, chips, dust) increase at 1.5 ft from surface.	
						3-4		Shell hash layer from 2.9 to 3.9 ft below surface.	
			N	--	<25	4-5	ML	Clayey SILT with fine sand and some organics, olive color	
						5-6			
			N	--	<25	6-7	ML/OL	Shell hash and organics increase at 5.4 ft.	
								Base of core @ 6.8 ft.	
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239344.0811 N 639053.49848
WATER DEPTH IN FEET	17.2 ft
WATER LEVEL (TIDE) IN FEET	3.2 ft
SEDIMENT ELEVATION (MLLW)	-14.0 ft
WEATHER	P. Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑

**N**

Not to scale



# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-036
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/29/08 1307

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.7	5.5	71	N	--	<25	1--	OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						2--	ML	Observed single piece of plastic (candy wrapper) at 1.8 ft below surface.	
			N	--	<25				
						5--	ML	Shell hash and mussel shell fragments increase at 4.5 ft.	
			N	--	<25				
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239374.13855 N 639215.85112
WATER DEPTH IN FEET	19.0 ft
WATER LEVEL (TIDE) IN FEET	3.4 ft
SEDIMENT ELEVATION (MLLW)	-15.6 ft
WEATHER	P. Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-057  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1324

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
6.5	3.7	57	N	--	<25		OL	Organic clayey SILT with fine sand and mud clams in surface sediments. Dark brown in color.	
						1-			
			N	--	25-50		OL	Wood debris (bark) increases at 1 ft. Moderate sulfide odor.	
						2-			
						3-			
						4-		Base of core @ 3.7 ft.	
						5-			
						6-			
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239515.28932 N 639381.27854
WATER DEPTH IN FEET	22.5 ft
WATER LEVEL (TIDE) IN FEET	3.7 ft
SEDIMENT ELEVATION (MLLW)	-18.8 ft
WEATHER	P. Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**HERRENKOHL CONSULTING LLC**

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER	CW-134
PROJECT	Cornwall Avenue Landfill Refuse Mapping
LOCATION	Bellingham Bay
PROJECT NUMBER	1733017
LOGGED BY	Mark Herrenkohl, LG, LEG
DATE	9/29/08 1339

SAMPLE INFORMATION						Depth (ft)	STRATA	DESCRIPTION	
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
8.5		6.5	76	N	--	<25	OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT) Organic clayey SILT with sand, dark brown to gray in color.	
							1-	OL	Bark fragments at 0.5 ft below surface.
							2-		
							3-	OL/PT	Wood debris (fibers, chips) increase from 2.7 to 3.4 ft.
				N	--	25-50			
				N	--	<25	4-	ML	Clayey SILT with fine sand, olive to dark brown in color.
							5-		
							6-		
							7-		Base of core @ 6.5 ft.

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239764.94728 N 639541.93223
WATER DEPTH IN FEET	20.0 ft
WATER LEVEL (TIDE) IN FEET	4.0 ft
SEDIMENT ELEVATION (MLLW)	-16.0 ft
WEATHER	P. Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-132  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1404

SAMPLE INFORMATION						Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris			
6.5	2.5	38	N	--	25-50	OL	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
							1--	Organic clayey SILT with sand and wood debris, dark brown in color.
							One piece of plastic sheet observed at 1.5 ft below surface.	
			Y	--	25-50	OL/PT	Wood debris (chips, dust, fibers) increase at 1.5 ft.	
							2--	Base of core @ 2.5 ft.
						3--		
						4--		
						5--		
						6--		
						7--		

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239876.69987 N 639538.3045
WATER DEPTH IN FEET	17.1 ft
WATER LEVEL (TIDE) IN FEET	4.5 ft
SEDIMENT ELEVATION (MLLW)	-12.6 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980


CORE NUMBER CW-108  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1424

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION <small>USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)</small>
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.8	2.0	29	N	--	>50		PT	Wood debris (saw dust, chips) with large 3-4 inch wood chip at bottom of core which likely reduced recovery (pile-drive).	
						1--			
						2--		Base of core @ 2.0 ft.	
						3--			
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239098.45012 N 638111.81402
WATER DEPTH IN FEET	11.2 ft
WATER LEVEL (TIDE) IN FEET	5.2 ft
SEDIMENT ELEVATION (MLLW)	-6.0 ft
WEATHER	Sunny, 60's F

LOCATION SKETCH

Refer to characterization report



N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-005  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1455

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
7.1	1.8	25	Y	--	25-50	1-	OL	Organic clayey SILT with wood debris (chips, fibers).  One piece of plastic observed at 1 ft below surface.	
			N	--	25-50		OL/PT	Wood debris (chips, fibers) increasing at 1 ft. Base of core @ 1.8 ft. Poor recovery likely a result of wood debris (pile-drive).	
						2-			
						3-			
						4-			
						5-			
						6-			
						7-			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239045.66593 N 638331.30447
WATER DEPTH IN FEET	15.4 ft
WATER LEVEL (TIDE) IN FEET	5.4 ft
SEDIMENT ELEVATION (MLLW)	-10.0 ft
WEATHER	Sunny, 60-70's F

### LOCATION SKETCH

Refer to characterization report



Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-124  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1503

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris				
6.2	3.8	61	N	--	<25	1--	OL	Organic clayey SILT with sand, strong sulfide odor, dark brown to gray in color.	
					to 25-50				
						2--	OL/PT	A single piece of fabric or textile at bottom of core. Base of core @ 3.8 ft.	
			Y	--	25-50				
						3--			
						4--			
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239073.88187 N 638389.69147
WATER DEPTH IN FEET	13.8 ft
WATER LEVEL (TIDE) IN FEET	5.8 ft
SEDIMENT ELEVATION (MLLW)	-8.0 ft
WEATHER	Sunny, 60-70's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-025  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1519

SAMPLE INFORMATION						Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	% Recovery	Refuse?	% Refuse	% Wood Debris			
						1-		NO RECOVERY. Unable to penetrate bottom. There was glass fragments and fine gravel in core catcher.
						2-		
						3-		
						4-		
						5-		
						6-		
						7-		

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239071.88205 N 638613.55816
WATER DEPTH IN FEET	12.5 ft
WATER LEVEL (TIDE) IN FEET	6.1 ft
SEDIMENT ELEVATION (MLLW)	-6.4 ft
WEATHER	Sunny, 60-70's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale



# HERRENKOHL CONSULTING LLC

321 Summerland Road  
Bellingham, WA 98229

(360) 319-0721 FAX (360) 647-6980

CORE NUMBER CW-117  
PROJECT Cornwall Avenue Landfill Refuse Mapping  
LOCATION Bellingham Bay  
PROJECT NUMBER 1733017  
LOGGED BY Mark Herrenkohl, LG, LEG  
DATE 9/29/08 1538

SAMPLE INFORMATION							Depth (ft)	STRATA	DESCRIPTION
Penetration Depth (ft)	Recovery Depth (ft)	%Recovery	Refuse?	% Refuse	% Wood Debris				
4.0	4.0	100	N	--	>50		PT	USCS group name, density, moisture, color, minor, MAJOR constituents, odor, sheen, organics, biology, weathering, cementation, geologic interpretation, etc. (REFUSE OR WOOD DEBRIS PRESENT)	
						1--		Wood debris (chips and saw dust).	
						2--			
						3--	SM	Silty fine-medium SAND with fine shell fragments, gray in color.	
						4--		Base of core @ 4.0 ft.	
						5--			
						6--			
						7--			

SAMPLING CONTRACTOR	Bio-Marine Enterprises, Inc.
SAMPLING METHOD	Vibracoring
SAMPLING EQUIPMENT	4-inch-diameter Lexan core
POSITIONING METHOD	DGPS
COORDINATES (E,N)	E 1239900.11212 N 639486.10105
WATER DEPTH IN FEET	9.5 ft
WATER LEVEL (TIDE) IN FEET	6.6 ft
SEDIMENT ELEVATION (MLLW)	-2.9 ft
WEATHER	Sunny, 60-70's F

LOCATION SKETCH

Refer to characterization report

↑  
N

Not to scale

**APPENDIX F  
PHOTOGRAPHS  
BELLINGHAM, WASHINGTON**



Photograph 1 - Surface sediment grab sample RGH-SS-02. Silty, sandy GRAVEL (GM) with moderate cobbles.



Photograph 2 - Sediment core sample RGH-SC-06, 0 to 2 feet. Sandy SILT to clayey SILT (ML).





Photograph 3 - Sediment core sample RGH-SC-06, 2 to 4 feet. Layers of wood chips/fragments (1- to 3-cm thick) with shell hash.



Photograph 4 - Sediment core sample RGH-SC-06, 4 to 6 feet. Layers of wood chips/fragments (1- to 3-cm thick) with shell hash.



Photograph 5 - Sediment core sample RGH-SC-08, 0 to 2 feet. Sandy SILT (ML) with some wood chips.



Photograph 6 - Sediment core sample RGH-SC-08, 2 to 4 feet. Sandy SILT (OL) with increased wood chips/sawdust with depth.





Photograph 7 - Sediment core sample RGH-SC-08, 4 to 5.5 feet. Silty PEAT (PT) with wood pieces (0.5- to 2-inch), with a plastic syringe in shoe (lower left corner of photograph).



Photograph 8 - Sediment surface grab sample BBP-SS-02. Silty SAND (SM) with scattered gravel and cobbles, moderate shell fragments, and abundant eel grass.





Photograph 9 - Sediment surface grab sample BBP-SS-03. Fine organic PEAT (PT) with sand and scattered gravels and shell fragments.



Photograph 10 - Sediment core sample BBP-SC-02, 0 to 3 feet. Slightly gravelly, silty SAND (SM) with abundant wood debris (wood chips, sticks, and bark).



Photograph 11 - Sediment surface grab sample BBDx-SS-03. Clayey SILT (CL) with sand.



Photograph 12 - Sediment surface grab sample BBDx-SS-04. Clayey SILT (CL) with sand.