REPORT

REMEDIAL INVESTIGATION REPORT
FORMER POPE & TALBOT INC. SAWMILL SITE,
PORT GAMBLE, WASHINGTON

Prepared for

Pope Resources LP and Olympic Property Group L.L.C.
Poulsbo, Washington 98370

Washington Department of Ecology
Olympia, Washington 98504

Prepared by

Anchor QEA, LLC
Seattle, Washington 98101

Environmental Partners, Inc.
Issaquah, Washington 98027

February 2011

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	microgram per liter
AGI	Applied Geotechnology, Inc.
ARI	Analytical Resources, Incorporated
bgs	below ground surface
CAP	Cleanup Action Plan
CFR	Code of Federal Regulations
cm	centimeters
cm/sec	centimeters per second
COC	chain-of-custody
COPCs	chemicals of potential concern
Corps	U.S. Army Corps of Engineers
cPAH	carcinogenic polynuclear aromatic hydrocarbon
CSL	cleanup screening levels
CSM	conceptual site model
cy	cubic yards
DAHP	Washington Department of Archaeology and Historic Preservation
DGPS	differential global positioning system
DMMP	Dredged Material Management Program
DNR	Washington State Department of Natural Resources
DO	dissolved oxygen
DPT	direct-push technology
DRPH	diesel range petroleum hydrocarbons
DTW	depth to groundwater
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
EPI	Environmental Partners, Inc.
ft/d	feet/day
ft/s	feet/second
HRA	Historical Research Associates, Inc.
HRPH	hydrogen range petroleum hydrocarbons
HSA	hollow stem auger

ICP-MS	Inductively Coupled Plasma Mass Spectrometry
MCUL	minimum cleanup levels
mg/L	milligrams per liter
MLLW	mean lower low water
MTCA	Model Toxics Control Act
NAD	North American Datum
NAS	Northwestern Aquatic Sciences
NTR	National Toxics Rule
NTU	nephelometric turbidity units
OPG	Olympic Property Group L.L.C.
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
P&T	Pope & Talbot Inc.
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pg/g	picograms per gram
ppt	parts per thousand
PQLs	practical quantitation limits
PR	Pope Resources LP
PSDDA	Puget Sound Dredged Disposal Analysis
PSEP	Puget Sound Estuary Program
PVC	polyvinyl chloride
PVP	plan-view photography
PVV	plan-view video
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
Site	P&T Sawmill Site or Port Gamble Mill Site
SMARM	Sediment Management Review Meetings
SMS	Sediment Management Standards
SPI	sediment profile imaging

SQS	Sediment Quality Standards
SVOC	semivolatile organic compounds
SWI	sediment water interface
TEE	terrestrial ecological evaluation
TEF	Toxicity Equivalency Factor
TEQ	toxicity equivalent concentration
TOC	total organic carbon
TS	total solids
TVS	total volatile solids
UCL 95	95 percent upper confidence level
USCS	Unified Soil Classification System
UW	University of Washington
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation

1 INTRODUCTION

Pope Resources LP (PR) and Olympic Property Group L.L.C. (OPG) conducted a Remedial Investigation/Feasibility Study (RI/FS) at the former Pope & Talbot Inc. (P&T) Sawmill Site (hereinafter the "Port Gamble Mill Site" or "Site") in Port Gamble, Washington under the terms of the Washington State Department of Ecology (Ecology) Agreed Order No. DE 5631, implemented pursuant to the Model Toxics Control Act (MTCA), Revised Code of Washington (RCW) 70.105D.050 (1). Sampling under the Ecology-approved RI/FS Work Plan and Sampling and Analysis Plan (SAP; Anchor and EPI 2008) was initiated in July 2008. The overall objective of the RI was to collect, develop, and evaluate sufficient information to determine if any additional cleanup, beyond the interim actions completed to date, is necessary to address remaining soil, groundwater, and/or sediment contamination at the Site. For completeness, the significant findings concerning the nature and extent of contamination at the Site from earlier (pre-RI) investigations and interim actions are included in this report. This RI report summarizes site characterization data describing the nature and extent of soil, groundwater, and sediment contamination at the Site, and also summarizes interim remedial actions previously completed at the Site.

2 SITE DESCRIPTION

As defined by Ecology in the Agreed Order, the Site is generally located at the eastern terminus of Northeast View Drive in Port Gamble, Washington, and includes uplands, adjacent tidelands, and a portion of Port Gamble Bay, and is further defined by the extent of contamination caused by the release of hazardous substances at the Site. The Site is located in north Kitsap County, Washington, and includes the former sawmill property, which is bounded by Hood Canal to the north, Port Gamble Bay to the east, and the Kitsap Peninsula to the west and south (Figure 2-1).

2.1 Background

The Site was continuously operated as a sawmill facility for a period of approximately 142 years (1853 to 1995). Over that period, the Site underwent a variety of changes, including expansion of the Site by filling, as well as changes in the location and function of buildings and structures. A detailed history of the Site operations is presented in Parametrix (1999a) and is briefly summarized below.

In 1853, the corporate predecessor to P&T established one of the first sawmills on Puget Sound at the Site. At that time, the Site was a relatively small sand spit projecting east from the base of a bluff that forms the western boundary to the mouth of Port Gamble Bay. The Site occupied the location of a former Port Gamble S'Klallam Tribe village and possibly other areas of cultural significance. The Port Gamble Bay region is known to be archaeologically sensitive. Archaeological site records on file at the Washington Department of Archaeology and Historic Preservation (DAHP) indicate that two aboriginal shell midden sites have been recorded on the eastern shore of the bay across from the Site. A third lithic and tool scatter site on the eastern side of the bay has historically been used as a cemetery by the Port Gamble S'Klallam Tribe. At the time of contact with American settlers, the Port Gamble area was home to a S'Klallam Tribe village, which relocated to the Point Julia ("Little Boston") village site directly across the bay when operations began at the sawmill in 1853.

The mill operated as a forest products manufacturing facility from 1853 to 1995. The Site underwent several changes over that period including filling activities, which expanded the upland area of the Site, moving building locations, and causing changes in functions of buildings and structures. Between 1853 and 1995, operations at the Site included a succession of sawmill buildings, two chip loading facilities, a log transfer facility, and log rafting and storage areas.

During the mill's operating period, logs were rafted and stored offshore of the sawmill property (Figure 2-2). In the late 1920s, a chip barge loading facility was installed on the north end of the Site (denoted the northern embayment). During the mid-1970s, an additional chip barge loading facility (referred to as the alder mill) was constructed in the southeast portion of the sawmill property.

In 1985, P&T transferred ownership of the uplands and adjacent tidelands portion of the Site to PR. P&T continued wood products manufacturing at the Site until 1995 under a lease with PR. Mill operations ceased in 1995 and the sawmill facility was dismantled and removed in 1997. Since 1997, the uplands portion of the Site has been leased to a variety of parties for use as a log sort and wood chipping yard, material handling activities, a marine laboratory, and parking for Washington State Department of Transportation (WSDOT) operations.

In January 1997, Ecology conducted an initial investigation of the Site, which consisted of sampling sediment in four catch basins. The results of that investigation indicated that concentrations of petroleum hydrocarbons and metals were present at levels above MTCA (Washington Administrative Code [WAC] 173-340) and Sediment Management Standards (SMS; WAC 173-204) chemical criteria for these compounds. Subsequently, Clean Services Company, Inc. removed accumulated materials from 12 catch basins, four valve vaults, and four sumps on April 23, 1997.

In July 1998, Ecology notified P&T of the potential listing of the former sawmill site on Ecology's Confirmed and Suspected Contaminated Site List. Subsequently, detailed environmental investigations were conducted by P&T, PR, and OPG to characterize soil, groundwater, surface water, and sediment quality conditions at the Site (Parametrix 2000b). The Site characterization data confirmed the presence of hazardous substances in soil and groundwater at the upland portion of the Site. The investigations also confirmed the presence of wood waste in nearshore sediments. Based on these data, Ecology added the Site to the hazardous sites list in 2001.

Between 2002 and 2005, approximately 26,310 tons of contaminated soils were excavated from the Site uplands, and in 2003 approximately 13,500 cubic yards (cy) of sediment containing accumulations of wood waste was dredged from a 2-acre area of the aquatic portion of the Site. Both the upland soils and the 2003 wood waste dredge material were disposed of at approved upland facilities. In 2004, follow-on surface sediment sampling and sediment profile imaging (SPI) were conducted by P&T to characterize post-dredge sediment quality conditions at the Site and to provide a baseline dataset for evaluation of anticipated future natural recovery (Parametrix 2004b). In 2006, P&T and Ecology performed additional sediment characterization, including benthic infaunal abundance, sediment bioassays, and SPI across a gradient of wood waste levels.

In early 2007, Ecology dredged an additional 17,500 in situ cy of wood waste in a 1-acre area adjacent to the 2003 dredging action and placed a 6-inch layer of clean sand over a portion of the newly dredged area. In cooperation with this Ecology-led project, P&T took over the day-to-day management of the dredged material once it was transferred from Port Gamble Bay and subsequently removed salt from the material utilizing an on-site upland holding cell and freshwater washing system. From May to October 2007, porewater salinity levels within the dredged materials were successfully reduced from 26 parts per thousand (ppt) to less than 1 ppt to allow for upland beneficial reuse (see Section 4.2.2).

In November 2007, P&T filed for bankruptcy (Delaware Case No. 07-11738). In accordance with Kitsap County Grading Permit 08-52323, PR subsequently relocated all of the suitable dredged sediments for off-site beneficial reuse at the location depicted in Figure 2-1. Unsuitable solid waste materials were segregated and disposed of at an approved off-site landfill facility. All soil segregation, disposal, treatment, and relocation tasks were successfully completed in spring 2009.

2.2 Site Units

For the purpose of the RI, the Site is organized into two units, as follows:

- Former Sawmill Facility Uplands (defined as landward of the current ordinary high water elevation)
- Port Gamble Bay Sediments

Each of these Site units is addressed separately in the following sections.

3 PRE-RI DATA COMPILATION

As discussed above, a series of environmental investigations have been conducted prior to the RI by P&T, PR, and OPG to characterize soil, groundwater, surface water, and sediment quality conditions at the Site. These data are summarized in the sections below.

3.1 Summary of Upland Investigations

Beginning in 1999, detailed upland investigations at the Site were performed by Parametrix and Environmental Partners, Inc. (EPI). The upland investigations are briefly summarized below. The data informed a series of upland interim actions and resulted in the removal of approximately 26,310 tons of contaminated soils from the Site uplands between 2002 and 2005 (see Section 4.1).

3.1.1 Source Area Evaluation

The upland investigations were based on a focused-area sampling strategy. Potential source areas were delineated based on historical mill site maps, records, and recollections of former mill workers. Areas containing historical structures or activities where materials were processed or stored and may possess the potential to release hazardous substances, contaminants, or materials into the soil or groundwater were identified as potential source areas. These areas are discussed in detail in the following documents:

- Port Gamble Mill Site, Phase I Groundwater and Surface Water Investigation Sampling and Analysis Plan (January 13, 1999; Parametrix 1999a)
- Interim Report – Phase I Soil Sampling, Pope & Talbot, Inc. Port Gamble Mill Site (June 28, 1999; Parametrix 1999b)

Eleven source areas were identified at the Site and are shown on Figure 3-1. These source areas were grouped into four main categories to aid in identifying chemicals of potential concern (COPCs). These source categories and their associated general COPCs are summarized in Table 3-1.

3.1.2 Soil and Groundwater Investigations

Multiple soil and groundwater investigations were completed at the Port Gamble Mill Site from 1999 through 2001 to characterize the nature and extent of contamination at the Site. A brief summary of the findings from these investigations is presented below. A more complete discussion of the investigations is provided in the following documents:

- Interim Report - Pope & Talbot, Inc. Port Gamble Mill Site, Phase I Soil Sampling (June 28, 1999; Parametrix 1999b)
- Interim Report No. 2 - Pope & Talbot, Inc. Port Gamble Mill Site, Results of Phase I Groundwater and Surface Water Investigation (October 10, 1999; Parametrix 1999d)
- Interim Report No. 3 – Pope & Talbot, Inc. Port Gamble Mill Site, Phase II Groundwater and Surface Water Sampling Results (May 2, 2000; Parametrix 2000a)
- Port Gamble Mill Site, Phase II Soil Sampling Investigation (January 2001; Foster Wheeler 2001)
- Revised Remedial Investigation Report, Former Pope & Talbot Sawmill Property (Mill Site), Port Gamble, Washington (September 13, 2002; EPI 2002a)

Subsurface Conditions. Soil conditions encountered at the Site were consistent with regional geologic conditions and with the general facility development history summarized above. Figure 3-2 shows the locations of cross-sections at the Site. Figures 3-3 through 3-5 depict the subsurface formations. Fill materials were encountered across the Site from ground surface to depths varying between 2 and 12 feet below ground surface (bgs). The fill material generally consisted of well graded to poorly graded sand and gravel with limited areas of debris, such as brick, wood chips, and concrete. Native material, deposited in nearshore marine and glaciofluvial environments, underlies the fill material and generally consisted of well graded to poorly graded sand with some gravel and shell fragments. Additional descriptions of soil conditions at the Site can be found in the following documents:

- Interim Report No. 2 - Pope & Talbot, Inc. Port Gamble Mill Site, Results of Phase I Groundwater and Surface Water Investigation (October 10, 1999; Parametrix 1999d)
- Revised Remedial Investigation Report, Former Pope & Talbot Sawmill Property (Mill Site), Port Gamble, Washington (September 13, 2002; EPI 2002a)

Hydrogeology. The depth to groundwater at the Site ranged from near ground surface in areas of standing water to greater than 12 feet bgs. Appendix A of the Ecology-approved RI/FS Work Plan (Anchor and EPI 2008) presents water level measurements and water level potentiometric contour maps from June 2001 through March 2007. The observed water level measurements indicate that the groundwater flow direction is generally towards Port Gamble Bay and Hood Canal (towards the east and northeast).

Slug tests were performed on eight monitoring wells. Calculated hydraulic conductivity values ranged from 6.3 x 10-5 to 1.5 x 10-3 feet/second (ft/s), or 5 to 130 feet/day (ft/d). Additional details on the slug tests can be found in the following document:

- Interim Report No. 2 - Pope & Talbot, Inc. Port Gamble Mill Site, Results of Phase I Groundwater and Surface Water Investigation (October 10, 1999; Parametrix 1999d)

Groundwater fluctuations due to tidal influence have been observed at the Site. A tidal study was completed at selected wells in June 1999. Four wells (MW-2, MW-3, MW-4, and MW-7) and a stilling well were monitored using continuously recording transducers for a period of 72 hours. Figure 3-6 presents the results of tidal efficiency calculations at the Site. Due to limited historical data, the tidal efficiency was calculated using the highest and lowest observed water levels in available monitoring wells. Groundwater fluctuations were highest at MW-2, located closest to the shoreline. In contrast, little tidal influence was observed at MW-3, which is located the farthest inland. The time lag was calculated between 2 to 3 hours at MW-2 and 3 to 4 hours at MW-4 and MW-7. Additional details on the tidal study can be found in the following document:

- Interim Report No. 2 - Pope & Talbot, Inc. Port Gamble Mill Site, Results of Phase I Groundwater and Surface Water Investigation (October 10, 1999; Parametrix 1999d)

Soil Chemistry. Table 3-2 presents a summary of analyses for soil samples, and Tables 3-3 through 3-11 present summaries of all soil analytical data for samples collected between 1999 and 2001. Soil sampling locations are shown on Figure 3-7.

Based on the soil chemistry data summarized in Tables 3-3 to 3-11, COPCs in soil (i.e., exceeding MTCA soil cleanup levels) were largely limited to semivolatile-range petroleum hydrocarbons, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), arsenic, and mercury. Figure 3-8 shows the areas where soil contaminants previously exceeded applicable cleanup levels.

Groundwater Chemistry. Table 3-12 presents a summary of analyses for groundwater samples, and Tables 3-13 through 3-19 present summaries of all groundwater analytical data for samples collected between 1999 and 2001 at the Site. Groundwater sampling locations are shown on Figure 3-9.

Based on the groundwater chemistry data summarized in Tables 3-13 to 3-19, COPCs in groundwater were largely limited to arsenic. Several other metals were also detected in localized areas. Copper and nickel were detected above applicable cleanup levels at MW-2, and mercury was detected above applicable cleanup levels at MW-5.

Arsenic detected in groundwater at the Site is attributable to natural geochemical processes, as no source of arsenic contamination has been detected in Site soils. Inorganic arsenic generally occurs in two oxidation states or species in natural waters, As(V) and As(III). Reducing conditions in soil, which is common in shoreline fill areas, has been documented to result in the mobilization of naturally-occurring arsenic caused by the reduction of As(V) to As(III), with As(III) being the more mobile of these two species. Parametrix sampled Site groundwater in November 1999 and characterized the species of inorganic arsenic in groundwater. Results indicated that more than 90 percent of groundwater arsenic at the Site was present as As(III). Additional details on this investigation are presented in the following document:

- Interim Report No. 3 – Pope & Talbot, Inc. Port Gamble Mill Site, Phase II Groundwater and Surface Water Sampling Results (May 2, 2000; Parametrix 2000a)

3.2 Summary of Sediment Investigations

Beginning in 1990, P&T performed a series of investigations of wood waste distributions, sediment quality conditions, and physical/oceanographic characteristics in Port Gamble Bay. Details of these investigations can be found in the following documents:

- Supporting Documentation P&T Dredge Sediment Landfill (AGI 1990)

- Port Gamble Bay Geophysical Sediment Survey Report (Parametrix 1999c)
- Preliminary Oceanographic Report (Parametrix 2000b)
- Sediment Chemistry Reconnaissance Investigation Report (Parametrix 2000c)
- Underwater Wood Waste Video Survey (Parametrix 2002a)
- Sediment Data Summary and Cleanup Study Plan (Parametrix 2002b)
- Sediment Bioassay Summary Report: Wood Waste Samples (Anchor 2002)
- Wood Waste Dredging Report (Parametrix 2003)
- Sediment Cleanup Action Plan (Parametrix 2004a)
- Baseline Natural Recovery Sediment Monitoring Report (Parametrix 2004b)

Between July 2006 and April 2007, P&T and Ecology performed additional sediment sampling within Port Gamble Bay to support the 2007 interim sediment cleanup action and further inform the overall RI. These more recent investigations included the following:

- July 2006 sediment core sampling and analysis to further characterize the vertical extent of wood waste and evaluate sediment deposition processes (radioisotope analysis).
- July 2006 surface sediment sampling to further evaluate natural recovery time trends in wood waste parameters (total volatile solids [TVS], total organic carbon [TOC], and porewater sulfide).
- August 2006 confirmatory sediment bioassay testing following SMS and Puget Sound Estuary Program (PSEP) protocols, using species and test methods appropriate for the specific physical sediment conditions present in Port Gamble Bay. Bioassay testing requires that appropriate reference sediments be collected and tested simultaneously with Site sediments. Concurrent tests on reference sediment were conducted to control for possible sediment grain size effects on bioassay organisms. Sediment bioassays were performed on reference sediments collected from Sequim Bay, matched to the grain size of Port Gamble test sediments. Bioassay tests included the following:
  - 10-day acute sediment toxicity test using the amphipod *Eohaustorius sp*.
  - Larval mortality and abnormality using the sand dollar *Dendraster excentricus*. In addition to the standard PSEP larval test, a sediment water interface (SWI) test

was run concurrently using the screen tube methodology developed by Anderson et al (2001).

  - 20-day growth test using the juvenile polychaete *Neanthes sp*.

- August 2006 benthic infauna enumeration (by Ecology) and concurrent SPI/plan-view video (PVV)/plan-view photography (PVP) surveys conducted by Germano and Associates Inc., to provide a direct measure of benthic infauna abundance in Port Gamble Bay across a gradient of wood waste levels and evaluate SPI as a predictive tool for assessing the health or impairment of benthic communities.
- October 2006 synoptic water column dissolved oxygen (DO), salinity, and temperature profiling in the larger Port Gamble Bay area to generally characterize regional water quality conditions.
- February and April 2007 post-dredge and post-cover surface sediment verification sampling following completion of Ecology's interim sediment cleanup action.

Sediment sampling station locations are depicted in Figure 3-10. Brief summaries of the pre-RI physical, chemical, and biological data available for Port Gamble Bay sediments are provided in the sections below.

3.2.1 Physical Data

1990 Dredged Sediment Evaluation. Sampling by Applied Geotechnology, Inc. (AGI) in 1990 consisted of core sampling in two proposed dredge areas—the chip barge area and the log raft area—and one existing dredged material stockpile. Approximate station locations are depicted on Figure 3-10. Sediment samples were collected by coring using a 4-inch hollow stem auger (HSA) drill rig mounted on a barge. The thickness of wood waste above the native sediment contact was logged (Figure 3-11).

Samples consisted of composites of cores within the sample areas. Four cores were collected for the composite sample in the log raft area (sample C-1) and four cores were collected for the composite and duplicate (C-2-1 and C-2-2) samples in the chip barge area. Sample C-3 consisted of composites of four cores in a dredged sediment stockpile. Samples making up the composites were taken from discrete, relatively even, intervals throughout the length of the core, as depicted on the core logs (AGI 1990).

The four composite sediment samples were analyzed by Amtest Laboratories for the suite of Puget Sound Dredged Disposal Analysis (PSDDA) analytes (nine metals and 58 organic compounds) and including grain size, total solids (TS), TVS, TOC, ammonia, and total sulfides. The sample collected from the log raft area (sample C-1) and the two samples collected in the chip barge area (samples C-2-1 and C-2-2) passed PSDDA guidelines for open-water disposal. However, the sample collected from the dredged sediment stockpile contained concentrations of woody material degradation products (2-methylphenol and 4-methylphenol) that ranged between the PSDDA screening level and maximum level.

1998 and 1999 Geophysical Survey. A geophysical wood waste survey, initiated in 1998, was performed to characterize wood waste accumulations near the log rafting area adjacent to the former sawmill facility. Geophysical data collection consisted of high-resolution sub-bottom reflection profiling, side-scan sonar mapping, and bathymetric surveys. To calibrate and verify interpretation of the acoustic signals, a focused sediment sampling program was conducted. Samples were collected at locations where changes in the acoustic signal had been observed, including control samples collected outside the anticipated wood waste area.

Sediment samples were collected for TVS analysis to verify sub-bottom profile interpretation. A 2-inch diameter piston corer was used at 19 stations to collect stratigraphic information up to approximately 4 feet below the sediment-water interface. Surface sediment was sampled at 28 stations using either a van Veen or Ekman grab sampler. To provide information in the area between the nearshore portion of the geophysical survey and the shoreline, 10 intertidal surface sediment samples were collected by hand on March 22, 1999. Sediment samples were sent under appropriate chain-of-custody and storage methods to Rosa Environmental & Geotechnical Laboratory, L.L.C., Seattle, Washington for TVS analysis.

The sediment reflection data were processed to provide estimates of in situ acoustic impedance for sediment units in the survey area. The relationship between measured sediment porosity and acoustic impedance allowed for the development of sediment porosity and density maps as a function of measured acoustic impedance. A standard error analysis was performed comparing the actual TVS measurements from the sediment sample data with the model predictions of TVS. The error analysis indicated a ± 6.2 percent standard error over the range of TVS levels encountered.

Overall, the geophysical delineation of areas with low-density subsurface sediment provided a preliminary estimate of areas where subsurface sediment has the potential for wood waste-related impacts. While the sampling to calibrate these data to TVS and visual observations of wood was helpful, uncertainty remained regarding the nature and extent of wood waste in the subsurface sediments derived from the geophysical data. This uncertainty was corroborated during the 2007 sediment interim action (see Section 4.2). Compared with geophysical methods, coring data provide a more accurate method to delineate the vertical extent of sediment with the potential for wood waste-related impacts, particularly within the southern mill site area (Figure 2-2).

1999, 2004, and 2007 Bathymetric Surveys. Bathymetric surveys were completed at the Site in 1999, 2004, and 2007. The 1999 survey findings are discussed in detail in the Port Gamble Geophysical Sediment Survey Report (Parametrix 1999c). The multibeam bathymetric hydrographic survey performed in June 2004 is discussed in detail in the Baseline Natural Recovery Report (Parametrix 2004b). Current bathymetric conditions in the Site area, including the most recent post-dredge (2007) surveys of Port Gamble Bay, are depicted on Figure 3-10.

2000 Underwater Video Survey. An underwater video survey was conducted in July 2000 in subtidal marine waters in the vicinity of the former mill site and associated log raft storage area. The purpose of the underwater video assessment was to evaluate general wood distributions on the sediment surface and to identify marine epibenthic/benthic conditions adjacent to and near the Site.

The underwater video survey coincided with transects surveyed for the 1999 geophysical survey, where possible, to provide a comparison between the geophysical study results and the videotape assessment of surface sediment conditions. Analysis was performed by visual interpretation of the raw video data. Results are provided in the following reports:

- Underwater Video Survey of Former Pope & Talbot, Inc. Sawmill Area Report (Parametrix 2002a)

- Sediment Cleanup Action Plan (Parametrix 2002b)

2000 Oceanographic Assessment. Oceanographic investigations were performed at the Site to characterize general sediment transport conditions in Port Gamble Bay, focusing on Site areas where wood waste accumulations could potentially occur. The oceanographic investigation was conducted in 2000 (Parametrix 2000b).

Seven stationary current meters were deployed for a 1-month time period to measure current velocity and direction 1 meter above the bottom at 15-minute intervals throughout the month (continuous measurements). Vertical profile current transects were also collected during the same month at prescribed locations during flood and ebb tide current conditions.

A recording tide gage was deployed during the entire current measurement period to measure tides and non-directional waves. A recording meteorological station was also established during the same period to record barometric pressure and wind speed and direction near the water surface.

The results of the oceanographic assessment are provided in Parametrix (2000b). Relatively high velocity tidal currents were measured offshore of the former mill facility. Based on a review of these data, Parametrix (2000b) estimated that sediment deposition near the Site is only occurring in areas within approximately 500 feet of the shoreline. These areas also generally coincide with observed areas of woody debris accumulation, as measured by TVS and TOC.

2006 SPI Survey. As discussed above, in August 2006 Germano and Associates Inc. performed a SPI/PVV/PVP survey of Port Gamble Bay across a gradient of wood waste levels (Gries 2007). An earlier SPI survey of Port Gamble Bay had also been performed in 2004 (Parametrix 2004b). The objectives of the 2006 Port Gamble survey included:

- Characterizing the spatial distribution of sediment types
- Characterizing the spatial distribution of benthic habitats and benthic communities
- Augmenting existing data on the surface sediment distribution of wood waste

SPI is a benthic sampling technique in which a specialized camera is used to obtain vertical cross-section photographs (profiles) of the upper 15 to 20 centimeters (cm) of the seafloor (Rhoads and Germano 1982 and 1986). Measurements obtained from sediment profile images can be used to characterize surface sediment types and small-scale (less than 20 cm) depositional layering, map benthic habitat disturbance gradients, and follow ecosystem recovery after disturbance abatement.

Plan view (i.e., horizontal plane) photographic and video records of the Site sediment surface were obtained in conjunction with the sediment profile images at each station. The plan view photographs and video records were acquired with a downward-looking camera and strobe light system attached to the sediment profile camera frame. The images were taken immediately prior to landing of the frame on the bottom and while the camera was sitting on the bottom.

There were 33 stations sampled during the SPI/PVV/PVP survey of the Site, including a total of 99 SPI images (three replicate images per station). Surface sediment TVS and TOC data were also collected from many of these stations. Benthic infauna abundance and/or bioassay data were collected from selected stations.

The area surveyed in 2006 was dominated by the presence of fine and medium sands, which were ubiquitous across the Site. Hard, sorted sands and gravels were particularly prevalent in the eastern and southern ends of the study area. Stations with finer sediment particles (e.g., silt) were clustered in the western portion of the study area within the vicinity of the 2003 and 2007 dredge areas (Figure 3-10). Moving eastward away from the fine-grained sediments, the substratum transitioned to a mix of silts and fine sands, then becoming dominantly fine to medium sands on the eastern to southeastern portion of the survey area. The relatively small northern embayment was composed primarily of fine to medium sands with varying proportions of admixed silts and clays.

The SPI/PVV/PVP survey of Port Gamble Bay across a gradient of wood waste levels is described in the following report:

- Using Sediment Profile Imaging (SPI) to Evaluate Sediment Quality at Two Cleanup Sites in Puget Sound: Part II - Port Gamble Bay (Gries 2007)

3.2.2 Chemical Data

2000 Phase I Reconnaissance Investigations. Phased sediment chemistry investigations were conducted to characterize marine areas near the former mill site and to evaluate compliance with SMS chemical criteria. Phase I sediment sampling occurred in March 2000 (Parametrix 2000c). Sample locations were selected to target potential upland chemical source areas (see above) and to provide representative spatial coverage of the former mill site (Figure 3-10). Phase I samples were collected in the following areas:

- Nine surface sediment samples were collected from the intertidal area adjacent to the former mill site in the vicinity of stormwater outfalls or other surface water runoff discharge points (samples SG-1001, 1002, 1005, 1007, 1008, 1010, 1012, 1013, and 1014)
- Seven surface sediment samples were collected near the base of former mill site overwater structures where chemicals may have been used or stored (SG-1003, 1004, 1006, 1009, 1011, 1015, and 1027)
- Six surface samples were collected within the former mill site log rafting area (samples SG-1016 through 1021)
- One composite sample was collected (from four locations) across the base of the former log transfer facility pier (SG-2003)
- Two composite samples were collected (from four to five evenly spaced subsampling locations) across the base of each of two historic landfill sites (SG-2001 and 2002)

The COPCs targeted in the 2000 sediment investigation were selected based on a review of historical facility operations and the results of previous upland soil, surface water, and groundwater sampling, as summarized in Section 3.1. Based on this review, the following COPCs were identified for the 2000 sediment investigation:

- Semivolatile organic compounds (SVOCs; U.S. Environmental Protection Agency [EPA] Method 8270)
- Metals (PSEP Methods)
- Mercury (EPA Method 7471)
- Polychlorinated biphenyls (PCBs; EPA Method 8081)
- Conventional analysis including grain size, TS, TVS, TOC, ammonia, and total sulfides

In addition, surface water DO, ammonia, and sulfide data were collected from the sediment-water interface as part of the 2000 investigation. Surface water data are reported in the Sediment Cleanup Action Plan (Parametrix 2004b). Bottom water DO was measured immediately above the sediment-water interface, no more than 40 cm above the sediment surface. The minimum bottom water DO concentration measured during the March 2000 sampling was 8.5 milligrams per liter (mg/L), within the acceptable range defined in the State Surface Water Quality Standards for marine waters (Chapter 173-201A WAC). No sulfide was detected in the water column.

2002 Phase II Confirmation Sampling. Parametrix performed additional sediment sampling at the Site in May and June of 2002 pursuant to the Cleanup Study Plan (Parametrix 2002b). The COPCs for Phase II sampling consisted of those analytes detected at concentrations above Sediment Quality Standards (SQS) chemical criteria in one or more Phase I samples.

Previous sediment samples collected from near the mill site at stations SG-1011 and SG-1027 were obtained in the intertidal area near the former bull-chain operation. Since the Phase I composite sediment samples collected in this area marginally exceeded SQS chemical criteria, with subsamples spaced approximately 120 feet apart, a systematic grid-based sampling design was used in Phase II to determine the extent of COPCs in this area that exceeded SQS chemical criteria. The systematic sampling consisted of evenly spaced 50-foot sampling locations stemming out from the two original sampling points. Discrete sediment samples were also collected again at SG-1014 and SG-1020. Discrete samples were collected at SG-1014 (intertidal), and the one subtidal sample SG-1020. The Sediment Cleanup Action Plan (Parametrix 2004a) reported chemistry results for the Phase II confirmation.

Phase II samples were sent to Columbia Analytical Services in Kelso, Washington for analysis of metals and PCBs and conventional analysis of grain size, TVS, TOC, sulfides, ammonia, and TS.

2003 Post-Dredge Sediment Sampling. Surface sediment sampling was conducted in 2003 to characterize post-dredge sediment quality conditions in the dredged area, relative to SMS criteria. Three surface grab samples were collected from representative locations within the 1.8-acre dredge area shortly after dredging was deemed to have been completed, as depicted on Figure 3-10. Sediment analytes included metals, PCBs, SVOCs, grain size, TS, TVS, ammonia, and sulfides. Samples were collected using PSEP protocols and were delivered to Columbia Analytical Services laboratory under appropriate procedures. Results are presented in the Wood Dredging Report (Parametrix 2003).

2004 Baseline Natural Recovery Sediment Monitoring. A total of 51 surface monitoring stations in Port Gamble Bay were sampled in May 2004. Sampling at each station included SPI images and surface sediment (0 to 10 cm) collection. A total of 185 SPI images were collected (three to five replicates per sample location). The data are presented in the Baseline Natural Recovery Sediment Monitoring Report (Parametrix 2004b).

Bulk sediment chemistry samples were collected using a van Veen grab using PSEP protocols at each sample location. Samples were analyzed by Columbia Analytical Services laboratory in Kelso, Washington. Samples were analyzed for grain size, TS, TVS, TOC, ammonia, sulfides, biological oxygen demand, and chemical oxygen demand. Data are summarized in Appendix C of the Baseline Natural Recovery Sediment Monitoring Report (Parametrix 2004b).

2006 Core Sampling. Sediment cores from the Site were collected by Anchor on July 10 and 11, 2006. Cores were collected using a diver-operated pneumatic impact corer (Mudmole). A total of eight core locations were sampled (AS-03, AS-04, AS-06, AS-07, AS-08, AS-10, AS-11, and AS-12; Figures 3-10 and 3-11). The vertical extent of wood waste was characterized at all eight coring locations. Radiochemistry and porewater profiles were collected at three selected locations (AS-06, AS-07, and AS-12). Sediment cores were extruded and subsampled on shore at the Site using procedures detailed in the Field Sampling Plan (Anchor 2006). Sediment samples were homogenized, composited, labeled, placed in jars, and stored for transfer from the processing area to the appropriate laboratories.

The wood waste cores were sectioned in 10-cm intervals starting at the mudline, and up to four samples per core were collected representing non-native material (i.e., wood waste). Samples were obtained from intervals 0 to 10 cm, 10 to 20 cm, 20 to 30 cm, and one sample from the midpoint between 30 cm and the interface of native material. One sample from the native material (Z-layer) was also collected and archived. Samples were analyzed for TS, TVS, TOC, and grain size.

The radiochemistry cores were collected to provide samples to evaluate net sedimentation rates and sediment stability. Samples were collected from 2-cm sections of each core at approximately 20-cm intervals to a core depth between 100 and 150 cm. A sample from the native sediment (at 110 to 112 cm) was collected from the core at AS-07. Vertical profiles of porewater ammonia and sulfide concentrations included analyses of sample intervals from 0 to 10 cm, 10 to 20 cm, 20 to 30 cm, and one sample at the mid-point of the wood waste deposit.

As discussed above, additional surface sediment chemistry samples were collected from Port Gamble Bay during 2006 and 2007 (GAI 2007) as part of SPI and post-dredge sediment surveys.

3.2.3 Biological Data

2002 Sediment Bioassays. Surface sediment samples were collected in July 2002 at 17 stations within the general former mill area for bioassay analyses. The stations formed four approximately parallel transects along the four log slips, separated by rows of piling. Two stations were also located within the former chip-loading area in the northern embayment of the Site.

In addition to bioassay determinations, surface sediments collected at each bioassay station were analyzed for grain size, TS, TVS, ammonia, and sulfide. Porewater ammonia and porewater sulfide concentrations in the samples were also measured.

Northwestern Aquatic Sciences (NAS) performed the 2002 bioassay testing. As required by SMS, biological tests included one amphipod acute effects test, one larval acute effects test, and one chronic effects test. The amphipod bioassay was the 10-day acute sediment toxicity test that assessed mortality of *Rhepoxynius* sp. The bivalve larval test assessed mortality and abnormality using *Crassostrea gigas*. The chronic effects test was a 20-day sublethal effects bioassay that assessed decreased biomass in the juvenile polychaete *Neanthes* sp. Some of the bioassay analyses were conducted using both unpurged and purged conditions to identify specific toxicants (e.g., ammonia and/or sulfide), following updates to PSEP (1995) protocols as cited in the SMS with modifications from EPA protocols.

All bioassays met the quality control performance requirements stipulated under SMS, and bioassay data were evaluated relative to SMS criteria. A complete report of bioassay methods, results, and interpretation is provided in Appendix C of the final Sediment Cleanup Action Plan, Former Pope & Talbot, Inc. Mill Site (Parametrix 2004a).

2006 Sediment Bioassays. Surface sediment samples were collected in August 2006 using a hydraulically operated van Veen grab sampler in accordance with PSEP (1997a, b, and c) and Ecology (2003) protocols and described in detail in Anchor (2006). The sampler utilizes a modified hydraulic hinged jaw assembly for sample collection, and was used to collect large volume, surficial sediment samples. Eight surface grab (0 to 10 cm) samples were collected from the Site at stations AS-01, AS-02, AS-03, AS-05, AS-07, AS-09, AS-13, and AS-14 (see Figure 3-10), and submitted for physical, chemical, and bioassay analyses. In addition, three bioassay reference samples were collected from Ecology-approved locations in Sequim Bay, Washington (the two with the closest grain size match with Site sediments – AS-R1 and AS-R3 – were submitted for bioassay analyses).

Test methods followed guidance provided by PSEP (1995) and the various updates presented during the Annual Sediment Management Review meetings (SMARM). Sediment toxicity was evaluated using three standard PSEP bioassays, the 10-day amphipod test, the 20-day juvenile polychaete test, and the 48- to 96-hour benthic larval test. Because sediment in the vicinity of the Site contains wood waste, there was some concern that the responses in the larval test might be affected by the physical nature of fine flocculent material that has been observed at other wood waste sites (Weston 2005). In order to discern between the physical effects of suspended flocculent material and those from COPCs, a screen-tube larval test was conducted concurrent to the PSEP larval test. Bioassay testing data and statistical evaluations relative to SMS and Dredged Material Management Program (DMMP) suitability criteria are provided in Weston (2006).

2006 SPI and Benthic Infauna Surveys. Concurrent with the 2006 sediment bioassays discussed above, in August 2006 Germano and Associates Inc., performed a SPI/PVV/PVP survey of Port Gamble Bay across a gradient of wood waste levels (Gries 2007), building on an earlier SPI survey of the bay in 2004 (Parametrix 2004b). The 2004 comprehensive SPI survey reported Stage 3 successional stage benthic communities in sediments at the Site. The 2006 SPI survey reported the same general observations.

Another goal of the 2006 Port Gamble survey was to directly assess benthic infaunal abundance across a representative gradient of wood waste levels to characterize the spatial distribution of benthic communities at the Site. Ecology's station selection was based on a gradient of effects/parameters extending from a presumed source area from the Site. To this end, Ecology collected surface sediment samples for enumeration of benthic infauna abundance from a total of 23 stations in Port Gamble Bay.

The benthic infauna population data were compiled by Gries (2007) and summarized relative to standard SMS benthic abundance metrics (i.e., numbers of polychaetes, crustaceans, and molluscs per sample). Abundance for the major taxa varied widely across the Site and general patterns were weak or absent between abundance and separate sediment conventional factors (e.g., percent fines, percent solids, TVS, and TOC).

Although benthic taxa richness and diversity are not SMS biological criteria, Gries (2007) reported that these benthic community descriptive metrics within the Port Gamble Bay were generally lowest in areas of wood waste and greatest along the margins or perimeter of the Site. However, relatively clean (i.e., no discernable wood waste) sand sampling locations further south of the Site had some of the lowest taxa abundances. Gries (2007) attributed these general relationships to "statistical anomalies," consistent with sample variability commonly reported in taxa richness and diversity metrics.

3.2.4 Preliminary Evaluation of the Nature and Extent of Sediment Impacts

Regulation of contaminated sediments in the marine environment of Washington State falls under the authority of Ecology. In 1991, Ecology adopted the SMS (Chapter 173-204 WAC) for designating marine sediments that have acute or chronic adverse effects on aquatic organisms. Two sets of standards were established under the SMS: SQS and cleanup screening levels (CSL).

The SQS criteria correspond to sediment quality that will result in no adverse effects, including acute or chronic adverse effects on biological resources and no significant health risk to humans. The SQS includes chemical concentration criteria for 47 chemicals or chemical groups (Table 3-20). If sediment chemical concentrations exceed SQS chemical concentration criteria, the sediments being evaluated are designated as having a potential adverse effect on biological resources. Sediments exceeding the SQS chemical criteria may be re-evaluated using biological tests described in WAC 173-204-315 and summarized in Table 3-21 to confirm or refute the original designation.

If sediments exceed SQS chemical or biological criteria, they are subject to sediment cleanup standards set forth in WAC 173-204-520, which establishes sediment chemical and/or biological screening concentrations that determine if contaminated sediments require cleanup. CSLs set the maximum degree of contamination at a site before cleanup is required. Similarly, minimum cleanup levels (MCUL) establish the maximum degree of contamination to be allowed at a site after cleanup and are used in the evaluation of cleanup alternatives as specified in the SMS. Minimum cleanup levels are set at the same concentration as CSLs (see Tables 3-20 and 3-21).

The point of compliance for sediment cleanup is determined on a case-by-case basis, but is typically the biologically active zone, which is operationally defined as surface sediments collected across the 0 to 10 cm (0 to 4 inch) interval below the mudline. The 10-cm biologically active zone is also consistent with the depth of bioturbation observed in site-specific SPI images and radioisotope profiles.

3.2.5 Sediment Characterization

Sediment Deposition. Near-bottom current vectors for flood and ebb tide conditions are presented in the Data Summary and Cleanup Study Plan (Parametrix 2002b) and summarized herein. Strong currents averaging approximately 80 cm per second (cm/sec) move south through the entrance to the bay, and preclude sediment deposition in these areas. However, current velocities in embayment and nearshore areas adjacent to the Site are relatively low (less than 15 cm/sec) during both ebb and flood tides, creating potential sediment depositional zones within these pocket embayments. Potential sediment sources for transport into this area include resuspended cohesive sediments from the bay, marine sands moving along the bottom as bedload, and sediment loads from streams and shoreline erosion.

Based on the 2000 oceanographic assessment described in Section 3.2.1, two depositional areas at the Site were identified based on measured current speeds: one in the relatively small northern embayment where the historical chip barge loading area was located and a larger southern area near the more recent chip barge loading facility and encompassing the log storage area (and potentially extending about 1,500 feet southward). These two areas contain a relatively high percentage of fines in surface sediment (greater than 25 percent fines), consistent with the depositional nature of these areas. Recent sampling stations have generally been targeted towards these two embayments (Figure 3-10).

A total of 16 sediment cores have been advanced within these two depositional embayments and have characterized the vertical distribution of sediment layers and organic woody material in each core, along with the elevation of the native (pre-1850) sediment contact (Figures 3-10 and 3-11). Generally, an average 4- to 6-foot-thick layer of recent sediments containing discernable wood waste accumulations is present in these areas. Two additional cores advanced near the shoreline area immediately northeast of the 2003 and 2007 interim action dredging areas (stations B3 and AS-04) did not encounter the native contacts within approximately 10 to 14 feet below mudline, indicating that thicker wood waste deposits extend under the shoreline area in this part of the Site. There were other cores where the native sediment contact was not encountered or recovered, resulting in uncertain depth of wood waste in areas extending south of the southern chip loading facility. The native contact for the cores collected in the northern embayment ranged from approximately -15 to -18 feet mean lower low water (MLLW). However, a nearshore core advanced by WSDOT in the northern embayment revealed the presence of wood waste layers buried well below this elevation. Within the southern depositional area, the native contact is present at elevations ranging from approximately -20 to -30 feet MLLW.

Sediment Chemistry. AGI (1990) analyzed three composite samples collected from core samples advanced in the northern embayment area (four cores), the southern mill area (four cores), and from a storage pile of existing dredged sediment (four cores). None of the sediment samples exceeded SQS chemical criteria or PSDDA screening levels.

2000 Phase I and 2002 Phase II surface sediment chemistry results are described in detail in Parametrix (2000c and 2002b). In Phase I samples, four of 22 stations sampled had detected analytes that exceeded the SMS chemical criteria (Table 3-22): station SG-1011 exceeded the SQS criteria for cadmium, copper, lead, and zinc; SG-1014 exceeded the SQS criterion for total PCBs; SG-1020 exceeded the SQS criterion for arsenic; and SG-1027 exceeded the SQS criterion for cadmium. No samples exceeded the CSL criteria and no other detected analytes exceeded SQS chemical criteria, nor were there any detection limits that exceeded SQS chemical criteria.

The 12 Phase II sediment samples collected for metals and PCB analysis from locations near the former mill site had no detected values above SQS chemical criteria and provided a more comprehensive Site characterization than the limited Phase I dataset for these areas. The Phase II data thus confirmed the absence of sediment concentrations at the Site above SQS chemical criteria.

Wood Waste. As discussed above, a series of detailed investigations performed within the last 10 years provide data to evaluate surface sediment TVS, TOC, and porewater sulfide levels both spatially and temporally. In the 2000 sediment investigation, 48 surface samples were collected at the Site and analyzed for TVS and TOC. In 2002, 17 samples were analyzed for TVS and TOC in support of the bioassays. In 2004, 51 samples were analyzed for TVS and TOC (as part of the SPI evaluation). A total of 31 TVS and TOC samples were collected in 2006, and an additional nine samples were collected in 2007. In general, the highest surface TVS and TOC concentrations have consistently been detected in the 2003 and 2007 dredge areas (Figure 3-10), extending around 1,500 feet southward where log rafts were staged for the mill; the lowest concentrations have been reported along the jetty adjacent to the northern embayment and along the southern and eastern (outside) edges of the former log rafting area. Additional discussion of sediment TVS and TOC distributions, including the 2008 RI data, is provided in Section 7.7 of this RI Report.

Porewater. Ammonia and sulfide was measured in surface sediment porewater as part of the 2002 bioassay study at 17 stations across the study area, and again at 10 stations as part of the 2006 bioassay and SPI study. Porewater unionized ammonia concentrations at the Site ranged from 0 to 0.6 mg/L with no apparent pattern in distribution. Maximum porewater unionized ammonia concentrations were generally below surface water quality criteria, indicating a low potential for ammonia toxicity in Site sediments. However, porewater sulfide concentrations in these sediments ranged from less than 0.5 to approximately 40 mg/L with the highest concentrations observed in stations in the northern embayment. Additional discussion of porewater sulfide distributions, including the 2008 RI data, is provided in Section 7.7 of this RI Report.

2002 and 2006 Bioassay Data. The 2002 and 2006 bioassay test results revealed that surface sediments collected from the northern and southern embayments of the Site were potentially toxic, but to varying degrees, in laboratory exposures to SMS test organisms. Bioassay data from the 2002 and 2006 testing are summarized in Table 3-23; most of the samples exceeded SQS and/or CSL biological criteria for one or more bioassay tests.

The 2002 and 2006 amphipod bioassay data (unpurged samples; undredged areas only) reveal that relatively high toxicity to this test species (exceeding CSL biological criteria; see Table 3-23) occurred when exposed to sediment collected from a portion of the northern embayment. In general, toxicity to the amphipod test species exhibited a spatial trend of declining toxicity with distance from the primary wood waste deposits in the northern embayment. Discernable spatial trends in the other bioassay data were less apparent in the 2002 and 2006 dataset. Additional discussion of sediment bioassay data, including the 2008 RI data, is provided in Section 7.7 of this RI Report.

2006 Benthic Infauna Data. As discussed above, the 2006 Port Gamble benthic infauna survey conducted by Ecology (Gries 2007) assessed resident benthic infaunal abundance and other community metrics across a gradient of wood waste levels in the Site area.

3.2.6 Preliminary Sediment Conceptual Site Model

A conceptual site model (CSM) is a representation of the environmental system and the physical, chemical, and biological processes that determine the transport of contaminants or other substances of concern from sources to receptors. For sediment sites, perhaps even more so than for other types of sites, the CSM can be an important element for evaluating risk and risk reduction approaches. The initial CSM typically is a set of hypotheses derived from existing Site data and knowledge gained from other sites. This initial model can provide a simple understanding of the Site based on available data. Essential elements of a CSM generally include information about sources, transport pathways, exposure pathways, and receptors. The CSM can also be a valuable tool in evaluating the potential effectiveness of remedial alternatives. Summarizing this information in one place can help in testing assumptions and identifying data gaps/areas of critical uncertainty for additional investigation in the RI. The pre-RI data summarized in the sections above support the following CSM statements and/or hypotheses:

- Historical releases of sawdust, wood chips, and bark were the primary sources of wood waste in sediment; these sources were controlled between 1995 and 2004.
- Deposition of wood waste, immediately adjacent to the Site, has historically occurred in two areas: 1) the northern embayment; and 2) the southern mill area. Log-rafting in support of mill operations may also have contributed to deposition of wood waste at locations beyond these two locations.
- Wood waste accumulations in these two areas are highly variable, ranging from approximately 2 feet to more than 11 feet thick. Wood waste accumulations in the northern embayment are now partly buried below cleaner sands. The thickest accumulations of woody debris currently occur in the southern depositional area, near the boundary of the 2003 and 2007 dredge areas.
- Bottom water DO concentrations measured to date in Port Gamble Bay (sampled approximately 0.5 to 0.8 feet above the sediment/water interface) have been within the acceptable range defined in the State Surface Water Quality Standards for marine waters (Chapter 173-201A WAC). The presence of relatively strong offshore currents and the formation of eddies in both the northern and southern embayments promote circulation and flushing processes in the depositional areas immediately adjacent to the Site and likely contribute to maintenance of oxygen in the overlying waters of the

Site. However, the water column sampling in 2006 indicates that the lowest DO concentrations occur immediately above the bottom substrate in the Site (Table 3-24).
- The 2003 and 2007 interim action dredging projects successfully removed a total of approximately 31,000 cy of sediments from the southern mill area that contained much of the accumulation of wood waste.

Site characterization data are evaluated in greater detail in Section 7 to refine the sediment CSM outlined above.

3.2.7 Preliminary Upland Conceptual Site Model

The upland data summarized in the sections above support the following CSM statements and hypotheses:

- The Site is located at the foot of a steep bluff on a peninsula bounded by Hood Canal to the west and Port Gamble Bay to the east.
- The Site was expanded over time by the addition of fill material to the original tideflat along the shore of Port Gamble Bay.
- Fill material is generally 2 to 12 feet thick and is made up of mixtures of well-graded to poorly-graded sand and gravel with minor amounts of silt, clay, shell fragments, and debris including bricks and wood in limited areas.
- Native soils underlying the fill are gray, well graded to poorly graded sand with gravel and shell fragments.
- A regionally extensive glacial lake deposit, the Kitsap Formation, consisting of clay and silt underlies the Site and separates near-surface aquifers from the regional Salmon Springs Aquifer (Parametrix 1999c).
- The fill material supported the formation of an unconfined shallow aquifer that is recharged by precipitation falling on site and over land and shallow flow from the bluffs to the west.
- The shallow aquifer is moderately tidally-influenced and is subject to transient nearshore groundwater flow reversals during high tide events. The short-term groundwater flow reversals do not prevent the eventual discharge of groundwater to Port Gamble Bay.
- Tidal efficiency is greatest in well MW-2, with an efficiency of 22.7 percent. MW-2

is located close to the shoreline with Hood Canal. However, tidal efficiency dissipates significantly farther inland and wells MW-3, MW-4, and MW-7 have tidal efficiencies of 1.1 percent, 3.6 percent, and 1.2 percent, respectively. Rapid dissipation of tidal effects with distance from the shoreline is common for unconfined aquifers.

- Groundwater is generally encountered at approximately 5 to 10 feet bgs but can range from at ground surface in areas of standing water to more than 12 feet bgs.
- Slug test data indicate that hydraulic conductivity values in the shallow aquifer range from 6.3 x 10-5 cm/sec to 1.5 x 10-3 cm/sec.
- Groundwater flow directions are generally toward the northeast in the northern half of the site and toward the east in the southern half of the Site. Groundwater flow from the surrounding bluffs appears to be the most significant influence on groundwater flow directions at the Site.

During the conduct of the RI, the CSM was refined as necessary based on the results of additional site characterization.

3.3 Marine Resources and Habitat

As part of early planning for the redevelopment of Port Gamble, OPG retained NewFields Northwest, L.L.C. to evaluate existing marine resources in the Port Gamble area. The NewFields (2007) report, which summarizes available data from state, tribal, and private sources, as well as reconnaissance surveys performed by NewFields and others within the nearshore and subtidal areas of Port Gamble Bay, is presented as Appendix B of the Ecology-approved RI/FS Work Plan (Anchor and EPI 2008). A brief summary of the NewFields report is provided below.

Ecology has classified the waters of Port Gamble Bay as Excellent (Class A) and the adjacent waters of North Hood Canal as Extraordinary (Class AA; Chapter 173-201A WAC). The mouth and other areas of the bay currently exceed fecal coliform standards, largely attributable to failing septic systems in the existing Gamblewood residential development (NewFields 2007). Currently, there are no 303d listed waters in the Site area, though low DO conditions occur seasonally in the adjacent waters of Hood Canal. There is limited bottom water exchange between the northern and southern regions of Hood Canal due to the presence of a prominent "sill." Because Port Gamble Bay empties into the area of Hood Canal north of this sill, there is little potential for water quality impacts between Port Gamble Bay and low DO areas identified by Ecology and the UW in the southern and middle portions of Hood Canal, consistent with the Site survey data summarized in Table 3-24. That water column survey showed that stations at the Site exhibit the lowest DO concentrations immediately above the substrate.

There are several classes of priority habitat that exist in the nearshore areas of Port Gamble Bay, including steep banks, emergent marsh, intertidal and subtidal eelgrass beds, and hardened reef structures. In addition, there are a number of important marine species that occur throughout the area, including commercially important finfish and shellfish species.

Salmonids that frequent Port Gamble Bay waters include the northeast Hood Canal summer and fall chum, Hood Canal coho, Hood Canal summer/fall Chinook, pink salmon, and coastal cutthroat trout. Forage fish (herring, surf smelt, and sand lance) spawn in parts of the bay and along the Hood Canal shoreline. Port Gamble Bay has the second largest herring spawning population in the state. Available herring spawning substrates within the Site area largely consist of constructed structures (e.g., piling), and many of these structures are constructed of material treated with creosote. Shellfish that occur in the area include geoduck, clams, oysters, Dungeness crab, and shrimp.

Eelgrass beds are critical habitat for a number of fish and invertebrate species, including juvenile salmonids. There are significant subtidal eelgrass beds of *Zostera marina* along the northern shoreline of the bay, with the greatest densities occurring from approximately -2 to -5 feet MLLW. Intertidal eelgrass (*Z. japonica*) also occurs in a band between approximately 0 to +2 feet MLLW and is patchy along the northern shoreline. Within the Site area immediately adjacent to the former mill facility, there are considerable opportunities for subtidal and intertidal eelgrass restoration, as currently there is no documented eelgrass within this former industrial area.

There are a number of constructed structures in Port Gamble Bay, including docks, piers, and piles. Many of these are aging, creosote structures. Abandoned dock structures within the

Site area include more than 31,000 square feet of overwater surface. In addition, approximately 21,000 lineal feet of the Site shoreline is currently armored with riprap (NewFields 2007).

4 INTERIM REMEDIAL ACTIONS

As set forth in the Agreed Order, upland and sediment remedial actions completed at the Site between 2002 and 2007 are interim actions consistent with WAC 173-340-430. This section compiles and summarizes existing data regarding previous upland and sediment interim remedial actions completed at the Site.

4.1 Upland Interim Remedial Actions

Between 2002 and 2005, approximately 26,310 tons of contaminated soils were excavated from the Site uplands and were disposed of at approved upland facilities. This section provides a summary of the upland interim actions.

4.1.1 2002 Interim Actions

The 2002 interim action addressed soil and groundwater contamination discovered during the 1999 to 2001 investigations. The selected remedial alternative consisted of excavation with off-site disposal for contaminated soils, which provided a "presumptive remedy" and thus greater certainty of environmental protection. Monitoring was performed during and following implementation of the interim action to ensure environmental protection, to verify the extent of soil impacts, and to verify expected natural attenuation of groundwater impacts. Additional details on the 2002 interim action can be found in:

- Revised Cleanup Action Plan, Former Pope & Talbot Sawmill Property (Mill Site) (September 19, 2002; EPI 2002b)
- Remedial Action Report, Former Mill Site (April 9, 2003; EPI 2003a)

Prior to any remedial activities, soil characterization samples were collected from test pit excavations near the former sawmill and near the concrete bunker. Tables 4-1 through 4-2 present the results of the characterization samples; sampling locations are presented on Figures 4-1 and 4-2.

A total of about 20,460 tons of contaminated soil were removed from the Site in 2002 from 10 discrete areas. The locations of these areas are shown on Figure 4-3. In areas with cPAH contamination, cleanup was guided using the Toxicity Equivalency Factor (TEF) normalization of total PAHs concentrations as described in WAC 173-340-708(8)(e)(ii). A summary of the 2002 upland remediation at each discrete area is provided below:

Area	Source	COPCs	Soil Removed	Reference Tables and Figures
1	Former Sawmill and Nearby Buildings	diesel range petroleum hydrocarbons (DRPH) higher range petroleum hydrocarbons (HRPH) cPAHs Select samples analyzed for hexavalent chromium, lead, and mercury	13,200 tons	Tables 4-3 to 4-6 Figure 4-4
2	Former Wood Treatment Buildings	Lead	1,900 tons	Table 4-7 Figure 4-5
3	Area Formerly Used for Diesel Fuel and Oil Storage	cPAHs Arsenic	500 tons	Tables 4-8 to 4-9 Figure 4-6
4	Area Formerly Used for Oil Storage	cPAHs	570 tons	Table 4-10 Figure 4-7
5	Area Formerly Used for Diesel Fuel and Oil Storage	DRPH HRPH	2,300 tons	Table 4-11 Figure 4-8
6	Area Formerly Used for Diesel Fuel and Oil Storage	cPAHs	150 tons	Table 4-12 Figure 4-9
7	Area Formerly Used for Oil Storage and Wood Treatment	cPAHs Mercury	1,000 tons	Tables 4-13 to 4-14 Figure 4-10
8	Area Formerly Used for Wood Treatment	Mercury One sample analyzed for hexavalent chromium	320 tons	Table 4-15 Figure 4-11
9	Area Formerly Used for Wood Treatment	Mercury	300 tons	Table 4-16 Figure 4-12
10	Area Formerly Used for Wood Treatment and Maintenance	Mercury	220 tons	Table 4-17 Figure 4-13

Groundwater Performance Monitoring. Post-remediation performance monitoring was completed to monitor changes in groundwater quality resulting from the 2002 upland interim action. Monitoring was also performed to verify predictions that the interim action removal of contaminated soil from the Site would eliminate an ongoing source of COPC dissolution to groundwater and would result in improved groundwater quality.

Prior to the start of the 2002 interim action, two monitoring wells, MW-3 and MW-5, were decommissioned. After completion of the interim action, five additional groundwater monitoring wells (MW-9 through MW-13) were installed downgradient of the remedial excavations. Figure 4-14 shows the location of all monitoring wells at the Site. Monitoring well installation, development, and sampling procedures are described in detail in the following document:

- Quarterly Groundwater Monitoring Report, Former Mill Site (September 30, 2003; EPI 2003b)

Groundwater performance monitoring data are presented on Tables 4-18 through 4-21. During the two years of quarterly monitoring following the 2002 interim action (September 2002 through September 2004), all analytes were below laboratory detection limits and/or below cleanup levels for at least four sequential quarters with the exception of the following:

- Chromium and nickel at MW-2
- Mercury at MW-7
- Arsenic and lead at MW-8
- Mercury at MW-9
- Mercury and nickel at MW-10

4.1.2 2004/2005 Interim Actions

Due to the consistent presence of mercury impacts in groundwater near MW-9 and MW-10 and arsenic impacts in groundwater near MW-8, several focused investigations were completed in 2004 to determine if residual sources were present in Site soil. These investigations are discussed in Mill Site Status and Remedial Action Scope of Work Memorandum to Gail Colburn (Ecology) (August 17, 2004; EPI 2004). Tables 4-22 through 4-26 present the analytical results of the 2004 investigations. Figures 4-15 and 4-16 present the sampling locations along with the extent of identified soil impacts.

Soil impacts identified during the 2004 investigations led to the development of the 2004/2005 interim action. The selected remedial alternative for the 2004/2005 interim action was the same as the 2002 interim action outlined above: excavation and off-site disposal of contaminated soils, followed by monitored natural attenuation of groundwater impacts. Since arsenic was not observed at concentrations exceeding applicable soil cleanup levels near MW-8 during the 2004 investigations, the presence of petroleum hydrocarbons was used to determine the extent of soil excavation because it was thought to be increasing the mobility of arsenic in groundwater.

Approximately 5,850 tons of contaminated soil was removed from the Site in 2004 and 2005 from two discrete areas. Figure 4-17 shows the extent of the 2004/2005 interim action excavation areas. Additional details on the interim action can be found in Supplemental Remedial Action Report, Former Pope & Talbot Sawmill Property (Mill Site) (EPI 2005). A summary of the remediation at each area is provided below:

Area	Source	COPCs	Soil Removed	Reference Tables and Figures
Near MW-8	Formerly Used for Wood Treatment	DRPH HRPH	704 cy stockpiled for backfill 343 tons transported off-site	Table 4-27 Figure 4-18
Near MW-9/ MW-10	Former Sawmill	Mercury	5,508 tons	Table 4-28 Figure 4-19

Groundwater Performance Monitoring. Post-remediation performance monitoring was completed to monitor changes in groundwater quality resulting from the 2004/2005 interim action. During the 2004/2005 interim action, one monitoring well, MW-10, was decommissioned. After the completion of the interim action, two wells were installed, MW-10R (replacement well for MW-10) and MW-14. Figure 4-14 shows the location of all monitoring wells at the Site.

Table 4-20 presents the groundwater performance monitoring data for the 2004/2005 interim action (February 2005 through March 2007). Mercury impacts to groundwater at MW-9 and MW-10 continued for approximately three quarters following completion of the 2004/2005 interim action, but were below laboratory detection limits during the subsequent four quarters. Arsenic impacts at MW-8 continued to be observed in groundwater following the 2004/2005 interim action.

Since the 2004/2005 interim action, several additional investigations have been completed at the Site to characterize arsenic in groundwater near MW-8. Follow-up sampling was also performed after the discovery of additional Permatox formulations that were potentially used at the Site. These investigations are discussed below.

Arsenic Investigations 2005/2006. Additional focused investigations near MW-8 were performed in December 2005 and October 2006. A total of 35 direct-push borings were advanced to approximately 12 feet bgs. Soil and groundwater samples were collected from each boring. Groundwater samples were analyzed for total and dissolved arsenic concentrations. Soil samples were only analyzed at those boring locations where arsenic was detected in groundwater. Turbidity was measured in the field to determine if detected total arsenic concentrations were biased high due to direct-push sampling techniques. Tables 4-29 and 4-30 present the groundwater and soil analytical data from these investigations. Sampling locations and groundwater concentrations are presented on Figure 4-20.

The results of the additional arsenic investigation did not indicate a clear source of arsenic in Site soils. The extent of observed dissolved arsenic impacts are shown on Figure 4-20. Sampling locations SP-A-21 and SP-A-22 had arsenic in soil concentrations of 30 mg/kg and 40 mg/kg, respectively, for the 10.0 to 10.5 foot bgs interval. Further investigation of the area to the west of those two probe locations is limited by the steep bluff. Based on the available data, the source of the arsenic in groundwater near MW-8 is likely attributable to limited areas of moderately elevated arsenic concentrations in soil in combination with reducing groundwater geochemistry that mobilizes the arsenic. Geochemical conditions in groundwater were evaluated further during the RI (see Section 6).

Permatox Investigation 2006. Permatox 100 was previously identified as a wood treatment chemical used at the Site. In 2006, during an informal interview with a former mill employee, EPI discovered additional Permatox formulations that may have been used at the former Port Gamble Mill Site. Table 4-31 presents the Permatox formulations and their main compounds, which include chlorophenols, mercury, tributyltin, and carbamates. Chlorophenols and mercury had previously been analyzed at the Site; however, tributyltin and carbamates had not. During the June 2006 quarterly groundwater sampling event, additional samples were collected and analyzed for tributyltin and carbamates to verify that these compounds were not present in groundwater at the Site. The analytical results are presented on Table 4-32. None of the groundwater samples contained detectable tributyltin or carbamates.

4.2 Sediment Interim Remedial Actions

In 2003, approximately 13,500 cy of wood waste from the aquatic portion of the Site containing the greatest bark and wood chip accumulations was dredged and disposed of at approved upland facilities. In early 2007, Ecology dredged an additional 17,500 cy of wood waste in an area adjacent to the 2003 dredging action and placed a 6-inch layer of clean sand over a portion of the newly dredged area. This section provides a summary of the 2003 and 2007 sediment interim actions.

4.2.1 2003 Interim Actions

In 2003, P&T implemented a permitted maintenance dredging project for an area to the west of the southern chip loading facility. A description of the 2003 dredging project is presented in Parametrix (2003). The dredging footprint covered 1.8 acres and resulted in the removal of materials containing more than 50 percent wood waste by both volume and surface cover. Portions of this area had also been historically dredged as part of facility maintenance operations (AGI 1990). The dredging plan generally consisted of removing wood waste close to the underlying native sediment. The 2003 dredging footprint is shown in Figure 3-10.

Dredging operations occurred during July and August 2003. The dredging contractor (Caicos) used a clamshell bucket mounted on an extended reach excavator on a barge. Wood waste removal occurred over an elevation range of approximately -2 to -15 feet MLLW, and included dredge cuts up to 12 feet thick. Following completion of initial dredging operations, bathymetric surveys were performed. The post-dredge bathymetric data verified that the dredging action had substantially achieved the target dredge elevations (Parametrix 2004b). The estimated in situ volume of material removed by the dredging project (approximately 13,500 cy) agreed favorably with measurements of post-dredge upland stockpile volumes (roughly 12,000 cy of dewatered, consolidated materials).

As discussed in Section 3.2.2, three surface grab samples were collected in 2003 to characterize post-dredge sediment quality conditions in the dredged area, relative to SMS criteria. Results are presented in the Post-Dredging Survey Results Report (Parametrix 2003) and revealed that the post-dredge surface contained a relatively thin layer of residual woody debris containing elevated TVS and TOC concentrations.

4.2.2 2007 Interim Actions

The 2007 dredging plan consisted of removing woody debris to the extent practicable within a 1-acre project area. Approximately 17,500 cy of wood waste was dredged by Ecology from an area encompassing and adjacent to the 2003 dredging action. A 6-inch layer of clean sand was placed over a portion of the newly-dredged area. The 2007 dredging and sand cover footprints are shown on Figures 3-10 and 4-21. The 6-inch sand cover layer was only placed over that portion of the dredge plan that was verified through visual confirmation to have been advanced to the native layer. The remaining portion of the 2007 dredge area was left uncovered.

The dredging contractor (ACC-Hurlen) used a clamshell bucket mounted on a crane on a barge to accomplish the removal operations. Sediment and wood waste removal occurred over an elevation range of approximately -10 to -25 feet MLLW, and included dredge cuts up to roughly 10 feet thick. Following completion of initial dredging operations, bathymetric surveys were performed. Final post-dredge bathymetric conditions in the project area are depicted in Figure 3-10.

The 2007 dredging operations were authorized under a Section 404 Nationwide Permit issued by the U.S. Army Corps of Engineers (Corps). The permit conditions required the Corps, as lead federal permitting agency, to comply with Section 106 of the National Historic Preservation Act of 1966, as amended (36 Code of Federal Regulations [CFR] 800). The Corps consulted with the DAHP, the Port Gamble S'Klallam Tribe, and other agencies to determine how to address potential impacts to any undocumented and deeply buried archaeological resources or human remains that may be present in the bay below the accumulated woody debris (see Section 2.1). As a result of consultation, Historical Research Associates, Inc. (HRA) prepared an archaeological monitoring plan that outlined procedures to be followed in the event that dredging operations encountered intact Native American cultural materials or human remains (HRA 2007). The plan took into account the challenges posed by the submerged location of the project area and the anticipated difficulty of recognizing cultural materials in wood waste and sediments. The plan was approved by the Corps, the DAHP, and the Port Gamble S'Klallam Tribe in December 2006 and dredging operations began shortly thereafter. HRA's activities, which included frequent monitoring of dredging operations, were funded by P&T.

The ACC-Hurlen crew performed the dredging in January and February 2007. The dredged wood waste and sediments were temporarily placed on a dewatering barge. The following day, the dewatering barge was offloaded onto dump trucks via a hopper/conveyor line anchored at the shoreline. The dump trucks transported the offloaded material to the sparging basin located at the south end of the former sawmill property.

Dredged sediments were generally characterized as a mixture of dark silts and organic materials including bark, sawdust, timbers/piles, and similar woody debris material. Live sand shrimp, blood worms, crabs, and occasional horse clams were observed in the dredged materials. Submerged piles and milled timbers were the most common cultural materials observed. No prehistoric cultural materials, significant historical materials, or Native American cultural materials were observed during the monitoring of dredge operations (HRA 2007).

In April 2007, post-cover surface sediment verification sampling was performed by Anchor following completion of the interim sediment cleanup action. The achieved thickness of the placed sand cover, as determined through piston core sampling, is depicted on Figure 4-21. These data verified that a minimum of 6 inches of clean sand was successfully placed over the dredge area, with less than 1 inch of sand mixing into the underlying residual sediments.

In cooperation with the Ecology-led project, P&T took over the day-to-day management of the dredged material once it was removed from the bay and successfully removed salt from the material utilizing an on-site holding cell and freshwater washing system. From May to October 2007, sediments within the sparging basin were sparged with freshwater flows of roughly 5 to 10 gallons per minute applied via sprinklers. Porewater salinity levels within the dredged materials were successfully reduced from 26 ppt to less than 1 ppt over the 6-month sparging period (see Figure 4-22). Leachate and surface water monitoring parameters also included temperature, DO, pH, sulfides, ammonia, nitrite, nitrate, total nitrogen, reactive phosphorus, total phosphorus, and total silica. All monitoring parameters remained below surface water quality criteria and/or regional background levels throughout the sparging period. Return flows from the dewatering/sparging basin were discharged back to Port Gamble Bay through groundwater infiltration. The temporary outfall diffuser was never required.

In April 2008, pursuant with Kitsap County Grading Permit 08-52323, Anchor collected confirmatory soil samples from individual 500-cy plots within the sparging basin for characterization of dredged materials for upland beneficial reuse or further treatment. One representative grab sample was collected from each plot (30 total) using an excavator to retrieve a composite sample throughout the depth of the soil column. Each soil sample was analyzed for the following parameters:

- Total Resource Conservation and Recovery Act (RCRA) metals (Method 6010/7471)
- Semivolatiles including PAHs (Method 8270)
- Pesticides/PCBs (Method 8081A/8082)

The validated data were compared with MTCA Method B unrestricted use soil cleanup levels. A total of 25 plots representing 13,300 cy of material complied with Method B cleanup levels and were deemed suitable by Kitsap County for unrestricted beneficial reuse. In October 2008, PR segregated suitable and unsuitable soils with offsets to ensure than unsuitable materials do not become intermixed with suitable soils during excavation. PR also arranged for separation from the sparged soils large wood waste, tires, metal, filter fabric, and other materials unsuitable for land placement, transporting these solid waste items to an approved landfill. Pursuant to Kitsap County Grading Permit 08-52323, the suitable dredged sediments were transported by PR for off-site beneficial reuse at a location on the west side of State Route 104 (see Figure 2-1).

Based on the April 2008 sampling data, a total of five plots representing approximately 3,000 cy of material contained cPAH concentrations between 0.15 and 0.99 milligrams per kilogram (mg/kg), exceeding the MTCA Method B unrestricted use soil cleanup level of 0.14 mg/kg. No other analytes exceeded MTCA cleanup levels. Pursuant to Section VII.E of the Agreed Order, in October 2008 PR relocated these materials to the southern portion of the former sawmill facility (see Figure 2-2), where these soils underwent additional on-site aerobic bioremediation in the on-site holding cell to facilitate beneficial reuse of these materials (see below). In January 2009, representative grab samples were collected from each plot (5 total) using an excavator to retrieve composite samples throughout the depth of the soil column. Each sample was analyzed for cPAHs, and composite cPAH concentrations in all 5 plots were below 0.14 mg/kg. Following verification from Kitsap County that these soils were suitable for unrestricted beneficial reuse, in March 2009 PR transported the materials to the same location depicted on Figure 2-1 under Kitsap County Grading Permit 08-52323. All sparged materials have now been removed from the site, and the sparging basin was removed from the upland staging and handling area.

5 RI DATA COLLECTION

5.1 Upland Data Collection

The following upland data gaps were identified to complete the RI for the upland portion of the Site and were addressed in the Ecology-approved Work Plan and SAP (Anchor and EPI 2008):

- Mercury impacts in soil identified during the 1999 to 2001 investigations were removed during the 2002 interim action. However, total mercury continued to be detected sporadically at concentrations greater than its cleanup level in groundwater samples from MW-7. Dissolved mercury has never been detected in groundwater samples from MW-7. Additional quarterly sampling for mercury in groundwater is currently being performed to achieve four consecutive "clean" quarters. Clean is defined as not detected at a reporting limit of 0.2 micrograms per liter (µg/L).
- Arsenic has been detected at concentrations greater than its cleanup levels in groundwater samples from MW-8. Investigations in 2005/2006 delineated the extent of arsenic in groundwater toward the south and partially delineated the extent of arsenic in groundwater toward the west. The northern and eastern extents of arsenic in groundwater were not fully characterized during previous studies and therefore warranted further investigation. Accordingly, Ecology required installation of two new monitoring wells, MW-15 and MW-16, located near the shoreline of Port Gamble Bay downgradient of existing well MW-8. The two new wells, along with MW-8, were sampled for total and dissolved arsenic.
- Arsenic was detected in soil at sampling locations SP-A-21 and SP-A-22 along the foot of the bluff west of well MW-8. Additional soil sampling west of that location was warranted to help define the western extent of elevated arsenic concentrations in soil. A source of elevated arsenic concentrations in soil has not been identified.
- Ecology was concerned that the former hog fuel burner might have released dioxins and furans when burning wood wastes from logs that were soaked in the seawater at Port Gamble Bay. Ecology required a focused soil investigation to evaluate the potential presence of dioxins and furans in shallow soil in the area west and northwest of the former hog fuel burner.
- Ecology required an additional surface soil investigation to test for the potential presence of organochlorine pesticides in shallow surface soil in the north and south

ends of the Site.

- Consistent with MTCA requirements, a simplified site-specific terrestrial ecological evaluation (TEE) was performed to characterize the potential for wildlife to become exposed to soil-borne chemicals on the upland portion of the Site and to characterize the expected future presence of plants and soil invertebrates that are the food base for wildlife. While additional analysis of invertebrate tissue lead concentrations within the former Mill fueling area was initially determined to be desirable to support the TEE, habitat conditions within the target sampling area (active roadway areas with a gravel surface) precluded collection of tissue data at this location. As presented in Sections 6.2 and 7.2.6 and in Appendix C, the TEE was successfully completed without the invertebrate tissue data.

5.2 Sediment Data Collection

The following sediment data gaps were identified to complete the RI, and were addressed in the Ecology-approved Work Plan and SAP:

- Further refine the volume of significant wood waste accumulations in the north embayment and in the southern portion of the Site.
- Further refine areas exceeding SMS cleanup criteria using bioassays in the northern and southern embayments at locations suspected to be affected by wood waste.
- Collect data as necessary to refine comparative analyses of remedial alternatives in the FS, including:
    - Logging the vertical distribution of wood waste near the former chip loading facilities located within the Site
    - Performing selected physical, chemical, and/or biological analyses in these borings to assess disposal options (e.g., potential open-water disposal down-ranking) and to evaluate the effectiveness of alternative cap designs.
    - Assessing areas impacted by wood waste that exceed SMS (biological) criteria.

5.3 Habitat Restoration Opportunities and Data Gaps

As part of the RI/FS and related planning for cleanup decisions at the Site, Ecology, the Washington State Department of Natural Resources (DNR), PR, OPG, and the Port Gamble

S'Klallam Tribe are continuing to evaluate opportunities to perform remedial actions and concurrently restore habitat. As discussed in Section 3.3, there are considerable opportunities for subtidal and intertidal restoration within the Site area. Presented below is a non-exclusive list of some of the habitat restoration alternatives that may be considered during the RI/FS.

Eelgrass restoration in the Site area would require modifications of the existing grades to restore shallow subtidal elevations, as the greatest densities of this species occur from approximately -2 to -5 feet MLLW. Historical shoreline filling and dredging activities (including recent interim actions) within the Site area have created relatively steep shallow subtidal banks characterized by a very narrow band of substrate within this optimal elevation range, also containing debris (see Figure 3-10).

Analyses of the distribution and abundance of eelgrass along the Ruston/Tacoma shoreline suggest that eelgrass survival and growth can be limited by elevated porewater sulfide concentrations near the sediment surface, concurrent with colonization by the sulfide-oxidizing bacterium *Beggiatoa* (Elliott et al. 2005). Elevated porewater sulfide levels can result from degradation of relatively high concentrations wood waste, and *Beggiatoa* has been observed within those areas of the Site that contain the highest porewater sulfide concentrations, including areas dredged and left uncovered by the 2007 interim action. Work underway in other areas of Puget Sound is evaluating different pilot cap thicknesses to effectively attenuate and mitigate sulfide migration from underlying wood waste deposits, to inform eelgrass restoration design. Depending on the results of the pilot study, relatively thick (e.g., 3-foot) caps overlying wood waste may be required to ensure effective eelgrass restoration.

There are a number of constructed structures in Port Gamble Bay, including docks, piers, and pilings. Many of these are aging, creosote structures. Abandoned dock structures within the Site area include more than 31,000 square feet of overwater surface. In addition, approximately 21,000 lineal feet of the Site shoreline is reportedly armored with riprap (NewFields 2007). These existing data are sufficient to inform RI/FS evaluations of potential integrated cleanup and restoration actions within the Site area.

6 SUPPLEMENTAL RI INVESTIGATIONS

6.1 Supplemental Upland Investigations

As presented in the RI/FS Work Plan, upland data gaps at the Site addressed by the SAP included:

- Total mercury and cadmium in groundwater at monitoring well MW-7
- Arsenic in groundwater at and around MW-8 and arsenic in soil along the bluff west of MW-8, including the installation and sampling new monitoring wells MW-15 and MW-16 downgradient of MW-8
- Dioxins and furans in shallow soil downwind of the former hog fuel burner
- Organochlorine pesticides in shallow soil at the north and south ends of the Site

The four upland data gaps identified above are described in greater detail in the following paragraphs.

Mercury and Cadmium at MW-7: Quarterly groundwater samples were collected from monitoring well MW-7, which is located along the eastern shoreline of the southern portion of the Site as shown in Figure 6-1. Groundwater samples were collected from MW-7 in February, May, August, and November 2009 and were analyzed for total and dissolved mercury. Based on data from these sampling events (summarized in Table 7.2), Ecology's objective of four consecutive "clean" quarters (not detected at a reporting limit of 0.2 µg/L) has been achieved.

Although total mercury was detected historically at well MW-7, dissolved mercury was not previously detected in groundwater samples collected from this well. This indicates that the previous total mercury detections were likely due to mercury adsorbed onto silt particles present in the unfiltered total mercury sample aliquot rather than mercury dissolved in groundwater. Careful application of low-flow purging and sampling techniques and verifying low turbidity prior to sample collection has provided four consecutive quarters of non-detects at a reporting limit of 0.2 µg/L in samples from MW-7.

Between 1999 and 2004, nine quarterly samples were collected from MW-7 and submitted for cadmium analysis (see Section 3.1.2). Cadmium was detected only once during this period, followed by two consecutive quarters of non-detects. At Ecology's request, additional sampling of MW-7 was conducted in June and September 2010. During both sampling events, cadmium was not detected in groundwater collected from MW-7 (at a reporting limit of 0.4 µg/L). Based on data from these sampling events (summarized in Table 7.2), Ecology's objective of four consecutive "clean" quarters has been achieved.

Arsenic at and near MW-8: Direct-push technology (DPT) was used to advance 14 borings near MW-8. Soil and groundwater samples were collected at all 14 borings to provide data to delineate the northern and eastern extent of elevated arsenic concentrations in soil and groundwater near MW-8. Soil samples were also collected at two hand-auger sampling locations to the west of soil sampling locations SP-A-21 and SP-A-22, where elevated arsenic concentrations were noted during a previous investigation. These additional soil samples were obtained to evaluate arsenic concentrations in soil to the west. Two new monitoring wells, MW-15 and MW-16, were installed to the east and northeast of MW-8 to monitor concentrations of arsenic in groundwater near the bay. Figure 6-1 presents the DPT groundwater sampling locations, hand auger locations, and new monitoring wells MW-15 and MW-16, which were located between MW-8 and the Port Gamble Bay shoreline.

All 14 DPT borings were advanced to approximately 12 feet bgs, which was approximately 4 feet below the static water table at the time of drilling. Soil and groundwater samples were collected from each location. All groundwater samples were analyzed; soil samples were archived pending evaluation of the analytical results for the groundwater samples. Because arsenic was detected at concentrations greater than its most conservative cleanup level in all but three of the groundwater samples, all soil samples were subsequently submitted for analysis.

Monitoring wells MW-15 and MW-16 were installed using standard HSA drilling techniques and constructed in accordance with WAC 173-160, Minimum Standards for Construction and Maintenance of Wells. Each well has 15 feet of screened interval extending from approximately 9 feet below the water table to approximately 6 feet above the water table at the time of drilling. This screened interval intersects the unsaturated/saturated interface throughout the expected range of tidal fluctuations. Monitoring wells were completed to a depth of approximately 20 feet bgs, with depths and screened intervals similar to existing nearby well MW-8. Boring logs and as-built well completion drawings are presented in Appendix A.

Moderately elevated salinity (approximately 3 to 5 ppt) was observed in groundwater collected from the new shoreline monitoring wells MW-15 and MW-16, relative to interior monitoring well MW-8 (salinity of 0.9 ppt). The elevated salinity observed at MW-15 and MW-16 is likely a result of tidal-induced mixing of groundwater and seawater near the Site shoreline. Under these conditions, the standard Inductively Coupled Plasma Mass Spectrometry (ICP-MS) method often used for arsenic analyses can be affected by spectral interferences originating from the saline sample matrix. Saline matrix interferences have been documented to cause false positive results and a high bias in arsenic analyses, which can produce results that are significantly greater than the true concentrations in the samples. A more accurate analytical method for arsenic analysis in saline water, known as the hydride method, has been used successfully at other sites to overcome the matrix interference issues.

During the May 2009 groundwater sampling event, two sets of groundwater samples were collected from wells MW-8, MW-15, and MW-16 and submitted for dissolved arsenic analysis. One set of samples was analyzed by the standard ICP-MS method and the second set of samples was analyzed by the hydride method. All hydride method results were less than the standard ICP-MS method results by a range of 10 to 97 percent (see Section 7.2.4). Consistent with spectral interferences from saline matrices, the degree of high bias was correlated with salinity. These data verified that there was a matrix interference affecting the results of the standard ICP-MS analytical method. Based on the results of the side-by-side analytical testing, Ecology approved use of the hydride method for subsequent dissolved and total arsenic monitoring.

Dioxins and Furans in Surface Soil. Ten discrete surface soil samples were obtained from the 0 to 6-inch depth interval in the area surrounding the former refuse (hog fuel) burner. Five of the ten surface soil samples were submitted for dioxin and furan analyses. The remaining five surface soil samples were archived pending evaluation of analytical results from the five samples that were submitted for analysis.

Soil sampling was performed in the areas west and northwest of the former refuse burner at the locations shown in Figure 6-2. Areas that were previously excavated and backfilled with clean fill material were not sampled because they were not exposed to potential windborne deposition of dioxins and furans during historical operation of the former refuse burner. In addition, soil from beneath former buildings was also not sampled for the same reason.

Organochlorine Pesticides in Surface Soil. Fifteen surface soil samples were obtained from the 0 to 6-inch depth interval in the north and south ends of the Site. Ten of the samples were obtained at the north end of the site near the former refuse burner at the same locations as the dioxin and furan surface soil samples as shown in Figure 6-2. Five of the samples were obtained at the south end of the Site near the former log storage yard at five of the DPT arsenic sampling locations as shown in Figure 6-1.

6.2 Preliminary Upland Cleanup Levels

Preliminary soil and groundwater cleanup levels for the Site were presented in the Revised Cleanup Action Plan, Former Pope & Talbot Sawmill Property (Mill Site) (EPI 2002b). The preliminary soil cleanup levels included a TEE; the completed simplified TEE exposure analysis worksheet is presented in Appendix C of the Ecology-approved RI/FS Work Plan. Final cleanup levels will be set at the Cleanup Action Plan (CAP) stage.

Preliminary Soil Cleanup Levels. During prior interim actions, COPCs in shallow unsaturated soils at the Site were generally remediated to MTCA Method A soil cleanup levels for unrestricted land use, based on direct contact exposure scenarios. COPCs in deeper saturated soils were assessed relative to National Toxics Rule Criteria (40 CFR 131.36) for protection of human health for consumption of aquatic organisms, using Equation 747-1 (WAC 173-340-747(4)(b)) to derive soil concentrations for the protection of surface water. Additionally, all soils (i.e., unsaturated and saturated) impacted with petroleum hydrocarbons were remediated to applicable MTCA Method A or Method B soil cleanup levels. MTCA Method A or Method B soil cleanup levels and the derived soil concentrations, which are protective of the National Toxics Rule Criteria for COPCs, are summarized in Table 6-1. Modifications to previous cleanup levels for individual cPAHs have been made due to physical property data updates and application of the TEF normalization method [WAC 173-340-708(8)(e)(ii)].

In June 2009, pitfall traps were deployed at the Site in an attempt to collect invertebrate tissue (and co-located soil) samples at selected locations within the Site uplands, consistent with an Ecology-approved RI/FS Work Plan addendum to develop site-specific TEE-based soil cleanup criteria. However, all of the targeted soil sampling areas with marginally elevated soil COPC concentrations were located within active roadway areas with a gravel surface, rendering the pitfall sampling method unsuccessful. Therefore, preliminary soil cleanup levels were developed based on Simplified TEE values for unrestricted land use [WAC 173-340-900, Table 749-2] and are presented in Appendix C. Statistical (MTCAStat) analyses of the upland soil data are presented in Appendix D.

Preliminary Groundwater Cleanup Levels. Concentrations of COPCs in groundwater at the Site were compared to both National Toxics Rule (NTR) criteria (40 CFR 131.36) for protection of human health from consumption of aquatic organisms and Washington Surface Water Quality Standards (WAC 173-201A) marine water quality chronic criteria for protection of aquatic organisms; the most restrictive criterion was applied. Since the NTR arsenic criterion for protection of human health from consumption of aquatic organisms (0.14 µg/L) is below the Washington natural background concentration (8 µg/L; PTI 1989), the preliminary MTCA groundwater arsenic cleanup level was based on the background concentration. If both NTR Criteria and Washington Surface Water Quality Standards were not available for a COPC, then MTCA Method A groundwater cleanup levels were applied. Preliminary groundwater cleanup levels for COPCs are summarized in Table 6-2.

6.3 Supplemental Sediment Investigations

As discussed above, sediment data gaps that needed to be filled to complete the Site RI included verification of the presence or absence of significant wood waste accumulations within the northern and southern portions of the Site, collecting samples for bioassays to assess compliance with the SMS, and collecting data necessary to refine comparative analyses of remedial alternatives, including dredging and capping.

Consistent with the Ecology-approved RI/FS Work Plan (Anchor and EPI 2008), a phased sediment sampling program was performed in August and September 2008, beginning with collection of 13 surface sediment samples located throughout the area and analysis of each sample for conventional parameters (grain size, wood waste percentage, TVS, TOC, and porewater ammonia and sulfide). Following collaborative evaluation of the data with Ecology, stations with relatively high wood waste indicators (e.g., relative to cleanup levels developed for other similar sites) received follow-on sampling to refine the nature and extent of wood waste in these areas, including sediment borings to define vertical distributions, and confirmatory biological determinations to assess potential sediment toxicity.

Sediment borings were advanced at nine locations at the Site (stations AS-101 to AS-109; see Figure 6-3). Each boring was logged across the entire vertical core thickness and sectioned/sampled generally as follows:

- Physical determinations including grain size and other engineering parameters as necessary to support alternative dredging and cap foundation designs
- Chemical determinations including TVS; TOC; porewater salinity, ammonia, and sulfide; and full SMS analytes at the apparent native contact
- Focused analyses at two core locations (AS-104 and AS-107) for DMMP chemical and biological parameters to assess possible disposal options (e.g., potential DMMP down-ranking).

Sediment bioassays were performed on 12 surface sediment (0 to 10 cm) samples and two subsurface (DMMP) samples collected at the Site (stations AS-101 and AS-102; AS-104; AS-106 to AS-108; AS-112 and AS-113; AS-B08 and AS-B09; AS-B11; and AS-B14 to AS-B16). Each sample was analyzed for a suite of acute and chronic tests, as follows:

- 10-day amphipod acute toxicity test: the amphipod test species *Eohaustorius estuarius* was selected by Ecology based on the predominant grain size distribution of the test sediments
- 2 to 4-day benthic larval mortality and abnormality test: the sand dollar *Dendraster excentricus* was selected based on the seasonality of candidate larval species
- Microtox® porewater chronic toxicity test: the Marine Microtox 100 Percent Porewater Toxicity test was selected by Ecology for use in this RI.

Wood waste bioassay responses in the larval test can be affected by fine flocculent material. Thus, consistent with DMMP guidance, for subsurface (0 to 4 feet below mudline) samples that were representative of materials that may be considered for open-water dredged material disposal (AS-104 and AS-107), the larval test was conducted using the SWI screen-tube testing method originally developed by Anderson et al. (2001). The SWI test uses a screen tube in each test chamber to expose the larvae to water at the sediment surface. This modification to the larval test allows discrimination between effects from some chemical contaminants and physical factors.

Bioassay testing requires that test sediments be matched and conducted simultaneously with appropriate Ecology-approved reference sediment in order to factor out sediment grain size effects on bioassay organisms. The selection of the reference sediment was based on the percent fines determined from the analytical laboratory's grain size analysis of the test sediments and was coordinated with Ecology. Reference sediment was collected from two reference stations in Carr Inlet (CR-1, CR-22) on September 12, 2008, and one reference station in Sequim Bay (SBR-35) on September 16, 2008.

7 SUPPLEMENTAL REMEDIAL INVESTIGATION RESULTS

This section summarizes the results of the supplemental upland and sediment investigations designed to address remaining RI data gaps identified at the Site. Each element of the investigation is discussed in the sections below.

7.1 Supplemental Upland Mercury and Cadmium Investigations

As discussed above, since completion of the 2002 interim action, total mercury has been detected sporadically in groundwater samples from MW-7 at concentrations greater than the practical quantitation limit (PQL) of 0.2 µg/L for mercury. However, no trends are apparent in the total mercury data. Dissolved mercury has never been detected in samples from MW-7, indicating that the historical total mercury detections could be caused by mercury adsorbed to particulates in the total mercury samples.

Groundwater samples were collected in February, May, August, and November 2009 from existing well MW-7 and submitted for total and dissolved mercury as part of the RI data gaps investigation. Groundwater sampling for total and dissolved mercury in MW-7 followed the low flow purging and sampling procedures described in Section 7.1.2.5 of the RI/FS Work Plan (Anchor and EPI 2008). Samples were hand-delivered to CCI Analytical Laboratories for total and dissolved mercury analysis by EPA Method 7470. At Ecology's request, additional sampling of MW-7 was conducted in June and September 2010 (again using low flow purging and sampling procedures described in the RI/FS Work Plan) and submitted to ALS Environmental for total and dissolved mercury analysis by EPA Method 200.8.

Both total and dissolved mercury samples were not detected at the mercury reporting limit of 0.2 µg/L for all four 2009 quarterly monitoring events as shown in Table 7-2 and Figure 7-1. Similarly, cadmium was not detected during the 2010 monitoring events (at a reporting limit of 0.4 µg/L). These data confirm that Ecology's objective of four consecutive "clean" quarters has been achieved for both mercury and cadmium. Appendix E contains the laboratory data sheets for groundwater samples from MW-7. No further quarterly sampling for mercury and cadmium at MW-7 is planned.

7.2 Supplemental Upland Arsenic Investigations

The following sections describe the work that was performed to delineate and monitor arsenic concentrations in groundwater and soil near existing well MW-8. The arsenic investigation consisted of DPT soil and groundwater sampling, hand auger soil sampling, installation and development of monitoring wells MW-15 and MW-16, and sampling groundwater in wells MW-8, MW-15, and MW-16. These investigation elements are described in the following sections.

7.2.1 Direct-Push Technology Investigation

Fourteen DPT borings were installed to delineate the northern and eastern extent of arsenic at concentrations greater than its cleanup level in groundwater near MW-8. Figure 7-1 shows the locations of the DPT borings. DPT sampling for soil and groundwater was performed on January 14 and 15, 2009.

All DPT borings were advanced to approximately 12 feet bgs. Soil and groundwater samples were collected from each DPT location. All groundwater samples were analyzed for total and dissolved arsenic; soil samples were archived at the analytical laboratory pending an evaluation of the groundwater data. Soil samples collected at locations where arsenic was detected at concentrations greater than its cleanup level in groundwater were later analyzed for arsenic. Details of the DPT sampling procedures are discussed in the following paragraphs. Boring logs for the 14 DPT boring are included in Appendix A.

7.2.1.1 DPT Soil Sampling

Continuous soil samples were obtained during DPT drilling using a decontaminated core barrel with an acetate sleeve for geologic logging and analytical sampling. Soil samples were collected from 2.0 to 2.5 feet bgs, 5.5 to 6.0 feet bgs (or just above the water table), and 10.0 to 10.5 feet bgs. All soil samples were archived for arsenic analysis pending evaluation of the groundwater data. The 2.0 to 2.5 feet bgs and 10.0 to 10.5 feet bgs soil sampling intervals were selected to match previous DPT sampling for arsenic in soil performed in this area. The 5.5 to 6.0 feet bgs sample interval was added as requested by Ecology for additional vertical profiling detail.

Surface soil samples (0 to 0.5 feet bgs) were also obtained at five of the probe locations as part of the organochlorine pesticide investigation presented in Section 7.5. In addition to the pesticide analyses, the five surface samples were also analyzed for arsenic.

All soil samples were transferred to pre-labeled, laboratory-supplied sample jars using new, single-use stainless steel spoons. A description of the soil following the Unified Soil Classification System (USCS) visual-manual procedures (ASTM 2488D) was recorded in the field notebook and is presented in the boring logs included in Appendix A. Analytical results for DPT soil samples are presented and summarized in Section 7.4.

7.2.1.2 DPT Groundwater Sampling

Groundwater samples were collected during DPT probing by setting temporary well screens in the target sample interval. All DPT probes were purged using low-flow purging techniques described in Section 7.1.2.5 of the RI/FS Work Plan prior to sampling to remove fine soil particles and to ensure that the sample was representative of groundwater quality. Turbidity was recorded during purging and again prior to sample collection to determine the potential impact of fine soil particles on total arsenic concentrations. In addition to turbidity, other field parameter measurements collected prior to sampling were temperature, DO, specific conductivity, pH, and oxidation/reduction potential. Field parameter measurements are summarized in Table 7-3.

Samples were collected using a peristaltic pump and low-flow sampling techniques. Discharge tubing was new, single-use polyethylene tubing, which was changed between sampling locations. All samples were collected at a flow rate of less than approximately 100 milliliters per minute into laboratory-cleaned, pre-labeled sample bottles. Dissolved arsenic samples were field filtered prior to collection using single-use, disposable in-line 0.45-micron filters. Samples placed in iced coolers and were hand-delivered to CCI Analytical Laboratories for total and dissolved arsenic analyses. Analytical results for groundwater samples are presented and discussed in Section 7.4.

7.2.2 Hand Auger Soil Investigation

Two hand auger borings, SP-A-50 and SP-A-51, were completed on January 13, 2009 to delineate the western extent of the elevated arsenic concentrations in soil west of previous sampling locations SP-A-21 and SP-A-22. These locations are on a steep bluff making access by a DPT rig unsafe. Figure 7-2 shows the locations of the two hand auger samples.

Soil samples were collected from 1.5 to 2.0 feet bgs, 3.5 to 4.0 feet bgs, and 5.5 to 6.0 feet bgs at both hand auger locations. Sample intervals were selected to provide vertical profiling data for depth intervals that can realistically be achieved in on-site soils using a hand auger. All soil samples were directly transferred to laboratory-supplied jars using new, single-use stainless steel spoons. Samples were submitted to CCI Analytical Laboratories for arsenic analysis by EPA Method 7060. Analytical results for hand auger soil samples are presented and summarized in Section 7.4.

Soil was classified following the USCS visual-manual procedures (ASTM 2488D). Soil types and descriptions were recorded in the field notebook and are presented in the boring logs included in Appendix A.

7.2.3 Monitoring Well Installation, Development and Sampling

Two monitoring wells, MW-15 and MW-16, were installed on January 21, 2009 to the east and northeast of MW-8, where arsenic has been detected in groundwater at concentrations greater than the arsenic cleanup level for the Site. The two new wells were installed to monitor groundwater downgradient of MW-8 as it moves toward Port Gamble Bay. Figure 7-1 shows the monitoring well locations. Details of the well drilling, installation, development, and sampling are discussed in the following sections.

7.2.3.1 Monitoring Well Soil Sampling

Both wells were installed using a truck-mounted HSA drilling rig. A decontaminated split-barrel sampler was used to obtain soil samples for geologic logging and analytical sampling. Soil samples were collected at 2.0 to 2.5 feet bgs, 5.5 to 6.0 feet bgs (or just above the water table), and 10.0 to 10.5 feet bgs. Soil sampling intervals from 2.0 to 2.5 feet bgs and 10.0 to 10.5 feet bgs were selected to match previous DPT sampling intervals for arsenic in soil performed in this area. The 5.5 to 6.0 feet bgs sample interval was added as requested by Ecology for additional vertical profiling detail.

Soil from the desired interval for analytical sampling was directly transferred to laboratory-supplied jars using disposable, single-use stainless steel spoons. A description of the soil following the USCS visual-manual procedures (ASTM 2488D) was recorded in the field notebook. Soil samples were labeled and placed in an iced cooler pending submittal to the analytical laboratory. All samples were handled and transported under standard chain-of-custody (COC) protocols. Soil samples were submitted to CCI Analytical Laboratories for arsenic analysis by EPA Method 7060.

7.2.3.2 Monitoring Well Installation

MW-15 and MW-16 were constructed of 2-inch diameter, flush-threaded, Schedule 40 polyvinyl chloride (PVC) well casing and screen following Ecology's construction standards for resource protection wells found in Minimum Standards for Construction and Maintenance of Wells in WAC 173-160.

Well screen assemblies consist of 15-foot lengths of 0.010 inch (10 slot), flush-threaded, machine-slotted, Schedule 40 PVC. Screened intervals were installed from approximately 4 to 19 feet bgs and set in 2/12 Monterey silica sand filter pack. The well design included a 0.5-foot-long, flush-threaded, Schedule 40 PVC sump with a flush-threaded end cap to a total depth of approximately 20 feet bgs. As-built construction diagrams for monitoring wells MW-15 and MW-16 are presented in Appendix A.

7.2.3.3 Monitoring Well Development

Monitoring wells were developed on January 27, 2009, by surging with single-use disposable bailers followed by continuous pumping at a steady rate using a peristaltic pump. Well development was terminated when the turbidity of the discharge water decreased to less than 10 nephelometric turbidity units (NTU). During well development, field parameters including pH, temperature, conductivity, and turbidity were measured and recorded. Color changes and appearance of purged groundwater before, during, and after development were observed and recorded. Well development data are presented in Appendix B. Development water removed from wells was retained in 55-gallon drums labeled with well information and date for future disposal.

7.2.3.4 Monitoring Well Surveying

Monitoring wells and direct-push probe locations were surveyed for horizontal and vertical control using standard land surveying techniques. Surveying results are summarized in Table 7-7 and present monitoring well northings, eastings, rim elevations (top of protective casing), and measuring point elevations (top of PVC casing). The horizontal datum is North American Datum (1983, 1991), North Zone. The vertical datum is National Geodetic Vertical Datum, (1929), which is consistent with previous surveys at the Site.

7.2.3.5 Monitoring Well Sampling

Groundwater samples were collected from MW-8, MW-15, and MW-16 on February 4, May 14, August 5, and November 4, 2009. As discussed in Section 6.1, groundwater samples were initially analyzed for total and dissolved arsenic using ICP-MS. Following identification of a saline matrix interference affecting the results of the standard ICP-MS analytical method, Ecology approved use of the hydride method for subsequent dissolved and total arsenic monitoring. Groundwater data from these well sampling events are presented in Table 7-2. Groundwater arsenic results are discussed in Section 7.2.4.

Prior to groundwater sampling, the depth to water (DTW) and total well depth were measured at all wells to the nearest 0.01-foot using an electronic water level indicator. Monitoring wells were then purged using a peristaltic pump equipped with new, single-use, disposable tubing. Low-flow purging was conducted in general accordance with procedures described in Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures (Puls and Barcelona 1996).

Temperature, pH, specific conductance, DO, oxidation-reduction potential (ORP), and turbidity were measured during purging and recorded approximately every 3 to 5 minutes. In addition, the field sampler took notes describing the appearance and odor of the water if notable. Purging was performed until field parameters stabilized as specified in the RI/FS Work Plan. Final field parameter stabilization data are summarized in Table 7-3. Appendix

B presents well development logs and field sampling logs that include the measured field parameters.

Following purging, a peristaltic pump was used to obtain groundwater samples following low-flow groundwater sampling procedures as referenced above. Groundwater samples were collected into laboratory-cleaned, pre-labeled sample bottles. Upon collection, samples were placed in an iced cooler and submitted to CCI Analytical Laboratories following standard COC protocols. Samples were analyzed for total and dissolved arsenic by EPA Method 7060.

7.2.4 Groundwater Arsenic Concentrations

Analytical results for total and dissolved arsenic in groundwater from direct-push probes and from monitoring wells are summarized in Table 7-1 and Table 7-2, respectively, and are presented graphically on Figure 7-1. Appendix E contains the laboratory data sheets associated with these data. Both total and dissolved arsenic were detected in groundwater samples from 11 of the 14 DPT probe locations and in samples from the three wells, MW-8, MW-15, and MW-16.

Arsenic was not detected at a reporting limit of 5 µg/L at three probe locations: SP-A-46, SP-A-48, and SP-A-49. All three locations where arsenic was not detected in groundwater are near the northwest corner of the sampling grid near the bluff.

As noted in previous upland reports and as discussed in Section 7.2.5 below, groundwater concentrations detected at the Site do not appear to be directly related to a source of elevated arsenic concentrations in the soil. Site historical assessments did not identify any previous operations or activities on the Site that used arsenic containing compounds (Parametrix 1999a). Elevated arsenic concentrations detected in groundwater (using ICP-MS or hydride methods) are likely naturally occurring, and result from geochemically reducing conditions at the Site.

In natural water, inorganic arsenic can occur in two common redox species: As(V) and As(III), with As(III) generally being the more soluble of these two species. If geochemical conditions in groundwater become reducing, the more mobile species As(III) forms, and ferric iron, which limits the mobility of arsenic by sorption, reduces to more soluble and mobile ferrous iron (Krauskopf 1979). Therefore, reducing geochemical conditions in groundwater increases the mobility of arsenic, which results in increased concentrations of arsenic in groundwater.

The boring logs for wells MW-7, MW-8, and the DPT borings in the south end of the Site indicate that the soil in this area of the Site contains varying quantities of wood waste and other organic matter in the soil. Aerobic decomposition of these organic materials uses up the available DO in groundwater as they decay. This process can create the geochemically reducing conditions in groundwater, which increases the solubility of arsenic as described in the previous paragraph. In addition, the blue-gray to greenish gray color noted in some of the geologic materials logged at MW-7 and MW-8 indicates geochemically reducing conditions in the aquifer.

Based on the hydride analyses summarized in Table 7-2, total arsenic concentrations in MW-8, MW-15, and MW-16 ranged from 1 to 23 µg/L; dissolved arsenic in these same wells ranged from 0.1 to 14 µg/L. While arsenic concentrations in MW-8 and MW-16 were above the natural background concentration in Washington State of approximately 8 µg/L (PTI 1989), none of the groundwater samples collected from the Site exceeded the marine surface water chronic criterion of 36 µg/L.

7.2.5 Soil Arsenic Concentrations

All soil samples obtained for arsenic analysis, with the exceptions of SP-A-50 and SP-A-51, were initially archived pending evaluation of groundwater results from those locations. The samples from SP-A-50 and SP-A-51 were from the two hand auger locations, which could not be drilled deep enough by hand to encounter groundwater and, therefore, the soil samples were analyzed by default. The remaining soil samples were analyzed because groundwater results for arsenic at all but three probe locations had detections greater than the most conservative groundwater cleanup level of 0.14 µg/L.

Arsenic was detected in only three of the 59 soil samples analyzed for arsenic during the supplemental RI data gap investigation. All three detected arsenic concentrations in soil samples were less than the MTCA Method A soil cleanup level of 20 mg/kg based on regional background concentrations. Analytical results for arsenic in soil are summarized in Table 7-4 and in Figure 7-2 for the 14 DTP probe locations, two well locations, and two hand auger locations. Appendix E contains the laboratory data sheets associated with these data.

The soil arsenic analytical results do not indicate a source of arsenic at the south end of the Site. The three soil arsenic detections are widely spaced and likely represent sporadic, localized pockets of slightly to moderately higher arsenic concentration that do not indicate a contiguous source of arsenic in soil. In addition, all three soil samples with detectable concentrations of arsenic are from sample depth intervals at or near the top of the water table, rather than from the uppermost sample interval, and two of the three detections are from soil in the deepest (10.0 to 10.5 feet bgs) sample interval. This vertical distribution of arsenic, with arsenic at detectable concentrations only in deeper soil intervals and non-detections in the overlying soil, along with the Site history assessment, indicate that there is no evidence of surface releases of arsenic-containing compounds that are acting as sources for arsenic in groundwater.

7.2.6 Terrestrial Ecological Evaluation and Soil Lead Concentrations

Under MTCA, the goal of the TEE is the protection of wildlife species. The upland areas of the Site are characterized by a contiguous open space bordered by water to the north and east and terrestrial vegetation and residential properties to the west and south. The majority (greater than 95 percent) of the uplands Site area is open space lacking constructed structures. The Site is well-graded and consists of fill material made up of sand and gravel with minor amounts of silt, clay, shell fragments, and debris including bricks and wood in limited areas. There is little to no vegetative cover on the Site because of human activity; plants and shrubs characteristic of disturbed habitats grow on the western and southern borders of the property. The existing and planned future uses of the Site are industrial and commercial. To support future redevelopment actions, the Site will receive additional sand fill.

A simplified TEE was performed to screen potential chemicals of ecological concern at the Site. Based on comparisons of soil concentration with cleanup levels based on a Simplified

TEE found in MTCA Table 749-2, there were two samples, both from the former fueling area, that exceeded the MTCA simplified TEE cleanup level for unrestricted land use for lead (220 mg/kg):

- Lead in boring sample PS-72B (270 mg/kg)
- Lead in boring sample PS-122B (230 mg/kg)

However, the detected lead concentrations were within the requirements for statistical compliance as allowed by Section 173-340-740(7) of the MTCA regulation. The dataset of the performance sampling results was analyzed using MTCAStat97 to determine compliance parameters based on the distribution of the data. The calculated true mean of the data is 73 mg/kg. Because the data were neither normally nor lognormally distributed, the Z-statistic was used to calculate the 95 percent upper confidence level (UCL 95). Using this method, the UCL 95 around the true mean is 98 mg/kg. This results in a UCL 95 that is less than the 220 mg/kg TEE cleanup level for lead in soil, which satisfies WAC 173-340-740 (7)(c)(iv)(A). The MTCAStat97 report is presented in Appendix D.

The performance sampling data set for the limits of the remedial excavation therefore comply with the terrestrial soil screening level for unrestricted land uses because:

1. No more than 10 percent of sample results exceed the cleanup level for lead
2. No single sample is more than twice the cleanup level
3. The UCL 95 around the true mean is less than the cleanup level

Based upon this analysis of the post-remediation sampling dataset, the remaining in-place soil at the Site is currently in compliance with the TEE soil cleanup level. Because individual samples exceeded TEE cleanup levels, Ecology required that a site-specific TEE problem formulation be prepared to evaluate exposure pathways.

Site-Specific TEE Results

To determine chemicals of ecological concern, soil concentrations considered protective of terrestrial ecological receptors (plants and animals) were developed using a site-specific TEE (WAC 173-340-7493). The majority of soil samples collected at the Site contained non-detectable levels of most of the hazardous substances listed in MTCA Table 749-3. All samples containing detected PAHs were below the MTCA Table 749-3 screening levels for acenaphthene and benzo(a)pyrene, total gasoline range, and total diesel range organics. Because there toxicity reference values for individual PAH compounds were not available for compounds other than acenaphthene and benzo(a)pyrene, it was assumed that benzo(a)pyrene and acenaphthene were representative of low- and high-molecular weight PAH screening levels for wildlife protection, respectively. Lead was the only hazardous substance that exceeded ecological indicator soil concentrations for protection of terrestrial plants and animals standards.

Consistent with Ecology guidance, risks to wildlife receptors were evaluated for the shrew (insectivorous mammal), American robin (insectivorous bird), and the vole (herbivorous mammal). Potential exposure pathways for the Site include:

- Plants exposed via uptake from soil and groundwater
- Soil biota (earthworm) exposed via dermal contact and soil ingestion
- Mammalian herbivores (vole) exposed via dermal contact from burrowing, incidental soil ingestion, and consumption of contaminated plant material
- Mammalian predator (shrew) exposed via dermal contact from burrowing, incidental soil ingestion, and consumption of contaminated soil biota
- Avian predator (robin) exposed via dermal contact from burrowing, incidental soil ingestion, and consumption of contaminated soil biota

Detected concentrations of lead that exceed ecological indicator soil cleanup levels are located between 2 and 5 feet bgs and will receive an additional currently unspecified thickness of cover material during redevelopment. The cover will act as an appropriate engineered control under WAC 173-340-440(1) and WAC 173-340-200. The cover will effectively make all exposure pathways incomplete by preventing the movement of, or the exposure to, the chemicals of ecological concern in the subsurface soil.

Given the incomplete exposure pathways for terrestrial plants and soil biota, it is unlikely that wildlife receptors will become exposed to hazardous substances through ingestion of contaminated prey/food. Furthermore, it is unlikely that dermal contact would be a complete contaminant exposure pathway for wildlife receptors because of the lack of suitable habitat. Human activity and the compacted nature of the soil are expected to prevent wildlife from utilizing the Site while the depth of contamination and the addition of cap material are expected to prevent wildlife from utilizing any soil biota as food from the Site.

Based on the site-specific TEE exposure pathway information above, soils at the Site are unlikely to pose significant adverse effects to terrestrial ecological receptors. The FS evaluates the need for institutional controls to ensure the continued protection of human health and environment and the integrity of a cleanup action.

7.3 Supplemental Upland Dioxin and Furan Investigation

Ecology suspected that surface soil near the former refuse burner (also known as the former hog fuel burner) could have contained dioxins and furans resulting from burning wood waste from logs that were soaked in the seawater of Port Gamble Bay. Wood wastes (hog fuel) from these logs contained salts, which in some circumstances can lead to the formation of dioxins and furans when burned. Therefore, to address Ecology's concerns, a focused shallow soil investigation was conducted west and northwest of the former refuse burner area to determine the presence of dioxins and furans, if any, and their concentrations.

Five discrete surface soil samples (collected to 0 to 6 inches bgs) were obtained from the area west of the former refuse burner and five discrete surface soil samples were obtained from the area northwest of the former refuse burner, as shown in Figure 7-3. Sample locations were laid out in a grid pattern with approximately 100-foot spacing between points. Sample locations were selected to be downwind of and near the former refuse burner but not in areas that were previously excavated and backfilled or areas that were covered by former structures, which would have isolated the underlying soil from windborne emissions from the former refuse burner. Five of the ten discrete samples were selected for analysis based on a random selection of odd or even sample numbers; the remaining five samples were archived pending evaluation of the results of the initial five samples.

The five randomly selected samples were submitted to Test America's West Sacramento, California analytical laboratory for dioxin and furan analysis by EPA Method 1613B as noted in the RI/FS Work Plan. Dioxin/furan soil analytical results are presented in Table 7-5 and in Figure 7-3. Appendix E contains the laboratory data sheets for dioxin and furan analyses.

Individual dioxin and furan compounds were detected in four of the five soil samples analyzed. Data were evaluated by applying the appropriate MTCA TEF to detected individual dioxin and furan compounds to produce total toxicity equivalent concentrations (TEQs).

The cumulative TEQ concentrations for dioxin compounds ranged from 0.53 picograms per gram (pg/g) to 3.8 pg/g, less than the TEE-based soil cleanup levels for total chlorinated dibenzo-p-dioxins of 5 pg/g, and also well below the Method B human health-based soil cleanup level of 11 pg/g. Similarly, the cumulative TEQs for furans ranged from 0.07 pg/g to 0.42 pg/g, and were well below the TEE-based soil cleanup level for total chlorinated dibenzofurans of 3 pg/g and the human health-based level of 11 pg/g. The data sheets presenting the total TEQ calculations are presented in Appendix E.

Sampling locations selected for analysis represent a conservative evaluation of dioxin and furan concentrations at the Site. The samples were all surface soil samples from the area of the Site located immediately downwind of the former refuse burner in soil that was not covered by buildings during the period that the former burner operated. Although the sampling program was conservatively designed to focus on the area of soil most likely impacted by dioxins and furans, none of the sample results exceeded the preliminary soil cleanup level. Thus, no additional sampling for dioxins and furans is needed for this RI.

7.4 Supplemental Upland Pesticide Investigation

Ecology was also concerned that shallow soil from across the Site may contain elevated concentrations of organochlorine pesticides. To address this concern, a focused shallow soil investigation was conducted to determine the presence of organochlorine pesticides, if any, and their concentrations. Five discrete surface soil samples were obtained from the southern part of the Site near the former log storage yard as shown in Figure 6-1. Ten discrete surface soil samples were obtained from the north area of the Site near the former refuse burner as shown in Figure 6-2. The ten north area sample locations were coincident with dioxin/furan sampling locations and the five south area sample locations were coincident with arsenic DPT probe sampling locations.

Soil samples were obtained from the 0 to 6 inch interval (surface) at the 15 sampling locations shown in Figures 6-1 and 6-2. A new, single-use stainless steel spoon was used to fill 4-ounce clear wide mouth glass sample jars with soil from each location. All fifteen discrete samples were submitted to CCI Analytical Laboratories for organochlorine pesticide analyses by EPA Method 8081, as noted in the RI/FS Work Plan Addendum.

Appendix E contains the laboratory data sheets for the organochlorine pesticide analyses. Analytical results are summarized in Table 7-6 and Figures 7-4 and 7-5. None of the organochlorine pesticide compounds were detected in any of the 15 samples analyzed. Thus, no additional sampling for pesticides is needed for this RI.

7.5 Upland and Sediment Surveying

All DPT, monitoring well, surface soil, and hand auger soil sampling locations associated with this data gaps investigation were surveyed for horizontal and vertical coordinates. Ground surface elevations were surveyed to the nearest 0.01 foot with reference to MLLW elevation. Horizontal coordinates were surveyed to the nearest 0.1 foot and tied to the State Plane Coordinate System, North American Datum (NAD1983/91). Upland surveying data are summarized in Table 7-7.

Similarly, horizontal positioning at each sediment sampling location (see sections below) was determined using an on-board differential global positioning system (DGPS). Station positions were recorded in latitude and longitude to the nearest 0.01 second. The accuracy of the horizontal coordinates was within 3 meters. All position coordinates submitted for inclusion in Ecology's SEDQUAL and EIM database were provided in the NAD 83, Washington State North Zone horizontal datum.

Mudline elevations of each sampling station were determined relative to MLLW by measuring the water depth with a calibrated fathometer or lead line and subtracting the tidal elevation. Tidal elevations were determined using predicted tide charts available through Tides and Currents® navigation software.

7.6 Supplemental Sediment Coring Investigation

Consistent with the RI/FS Work Plan (Anchor and EPI 2008), a phased sampling program was employed to complete characterization of the nature and extent of wood waste indicator parameters in surface sediments within the southern log rafting area and in the northern embayment (Figure 6-3). Following Ecology's approval, initial surface sediment sampling occurred in late August 2008. After collaborative review of these data with Ecology, follow-on sediment core (and bioassay; see below) sampling occurred in mid-September 2008. Core sediment sample collection was conducted off of the research vessel operated under the direction of Gary Maxwell of Geomatrix. The vessel was equipped with an A-frame and winch, seawater pumps, DGPS, and a depth sounder. All cores were processed on land and fully logged. Core logs are presented in Appendix A.

As discussed in Section 3.2.5, two depositional areas at the Site have been identified: one in the relatively small northern embayment where the historical chip barge loading area was located, and a larger southern area near the more recent chip barge loading facility, encompassing the log storage area (and potentially extending about 1,500 feet southward). These two areas contain a relatively high percentage of fines in surface sediment (greater than 25 percent), consistent with the depositional nature of these areas (Figure 7-6). Portions of these depositional areas also contain locally elevated concentrations of wood waste in surface sediments, as generally depicted on Figure 7-7.

Based on the results of the initial surface sediment sampling, a total of nine supplemental sediment cores were advanced in the vicinity of the former north and south chip loading areas to complete characterization of the horizontal and vertical distribution of wood waste in these areas (stations AS-101 to AS-109; see Figure 6-3). Within each sediment core, wood waste indicator parameters (grain size, wood waste percentage, TVS, TOC, and porewater ammonia and sulfide) were analyzed within representative stratigraphic intervals from the surface (0 to 10 cm) to the Z-layer of native sediments. At Ecology's request, selected samples were also analyzed for other target COPCs.

When combined with the 16 pre-RI sediment cores, the supplemental RI coring increased the number sediment cores advanced within the two depositional embayments to 25 cores total. The combined coring data provide a refined characterization of the vertical distribution of sediment layers and organic woody material at the Site, along with the elevation of the native (pre-1850) sediment contact. The approximate thickness of woody debris at the Site (greater than roughly 20 percent by volume) is summarized in Figure 7-8. As discussed in Section 3.2.5, generally an average 4- to 6-foot-thick layer of recent sediments containing discernable woody debris accumulations is present in the two depositional areas. However, more than 10 to 14 feet of woody debris is present near the south chip loading shoreline area immediately northeast of the 2003 and 2007 interim action dredging areas (stations B3 and AS-04), indicating that thicker wood waste deposits extend under the shoreline area in this part of the Site. Within the southern depositional area, the native contact is present at elevations ranging from approximately -20 to -30 feet MLLW.

The native contact for the cores collected in the northern embayment ranged from approximately -15 to -18 feet MLLW, and substantial accumulations of woody debris in this area extended up to approximately -10 feet MLLW. Similar to the southern area, wood waste deposits also extend under the shoreline area in the northern part of the Site. Overall, woody debris in the northern embayment is present at a substantially higher elevation, compared with woody debris in the southern area, which makes the northern area more susceptible to tidal-driven inputs of sulfate into the woody debris deposits. That is, because relatively permeable sand and gravel soils present in near-surface depths at the Site are underlain by less permeable clay and silt (Parametrix 1999c), the shallow aquifer near the northern embayment shoreline is moderately tidally-influenced and is subject to transient nearshore groundwater flow reversals during high tide events (see Section 3.2.5). This tidal influence promotes greater sulfide production within the woody debris deposits, which in turn leads to more pronounced biological effects (see Section 7.7 below). The relatively shallow elevation of woody debris deposits in the northern embayment also increases the opportunity for intertidal exposure and resultant habitat impacts, including impacts to eelgrass (see Section 5.3). By comparison, the deeper woody debris deposits in the southern bay are associated with less sulfide production and are also more isolated from the productive intertidal zone.

As part of the initial DMMP evaluation to assess possible open-water disposal options for sediments as may be dredged from the Site (e.g., as a part of remedial actions), 4-foot composite samples of subsurface sediment with TVS concentrations up to 41 percent were collected from Stations AS-104 and AS-107 and analyzed for a wide range of physical, chemical, and biological parameters. Each of these samples was analyzed for the full suite of DMMP chemical parameters (including dioxins and furans), along with confirmatory sediment bioassays following DMMP protocols. Concentrations of all COPCs detected in these subsurface sediment samples were below both SQS chemical criteria and DMMP screening levels. Similarly, analyses of selected COPCs in stratigraphic intervals of subsurface Site sediments as requested by Ecology were also below SQS chemical criteria.

Cumulative dioxin/furan TEQ concentrations in the DMMP samples ranged from 0.03 to 2.0 pg/g, which are within the Puget Sound background range. Confirmatory sediment bioassays performed on these subsurface DMMP samples also passed screening criteria for non-dispersive open-water disposal (see Appendix H). Thus, these data suggest that sediments that may be dredged from certain target areas of the northern and southern embayments of the Site are potentially suitable for open-water disposal at the Port Gardner non-dispersive disposal site. Down-ranking and other open-water disposal suitability determinations are subject to approval by the DMMP. Further evaluations of sediment cleanup alternatives are presented in the FS report.

7.7 Supplemental Surface Sediment Chemistry and Bioassay Testing

As discussed above, following Ecology's approval, initial surface (0 to 10 cm) sediment sampling at 13 stations occurred in late August 2008 using a modified van Veen sampler on a vessel equipped with DGPS and a depth sounder. Each sample was analyzed for TVS, TOC, and porewater ammonia and sulfide. After collaborative review of these data with Ecology, follow-on sediment bioassay sampling occurred in mid-September 2008, targeting 12 Site locations, along with reference samples collected from Carr Inlet and Sequim Bay.

Analytical Resource, Inc. (ARI), an Ecology-certified laboratory located in Seattle, Washington, conducted all physical and chemical testing of sediments. Chemistry data and validation reports are provided in Appendices E and F, respectively. Biological testing was performed by NewFields at their laboratory facility in Port Gamble, and the bioassay report is provided in Appendix H. All bioassay control, reference, and other quality assurance/quality control (QA/QC) evaluations met SMS performance requirements, and none of the samples required purging. Consistent with the RI/FS Work Plan and SAP (Anchor and EPI 2008), all testing adhered to the most recent QA/QC procedures and analysis protocols. All physical, chemical, and bioassay data were determined to be useable for this RI.

As discussed in the RI/FS Work Plan (Anchor and EPI 2008), one of the key objectives of the supplemental RI sampling and analysis was to refine areal delineations of the extent of key woody debris indicator chemical concentrations and bioassay responses. Based on initial statistical analyses of the surface sediment sampling data set (e.g., using spatial correlation analyses and associated semivariograms), and following discussion with Ecology, geostatistical methods were applied to the combined 2006 to 2008 site characterization data to distinguish "nugget" variations in analytical results inherently associated with sediment sampling and analysis (e.g., small-scale sample variability), from the underlying spatial patterns of the data. While a range of geostatistical methods have been used successfully for this purpose at other similar sediment sites, ordinary kriging is one of the more widely applied geostatistical tools (e.g., see Goovaerts 1997), and was used for this RI report in part because this method is particularly well suited to relatively large datasets (e.g., nearly 100 surface sediment TVS samples were collected in the Site area from 2006 to 2008). However, spatial patterns developed from the initial kriging analysis are still subject to uncertainty and thus should be interpreted with appropriate qualification.

Figures 7-9 and 7-10 present surface sediment TVS and TOC data, respectively, collected from 2006 to 2008, including samples collected by Ecology in December 2008 as part of the bay-wide Port Gamble sediment investigation (Ecology, unpublished validated data). Individual sample results are posted, along with the kriging-based concentration contours. As discussed in Section 3.2.5, in general the highest surface TVS and TOC concentrations have consistently been detected near the 2003 and 2007 dredge areas, extending southward where log rafts were staged for the mill; the lowest concentrations have been reported along the jetty adjacent to the northern embayment and along the southern and eastern (outside) edges of the former log rafting area.

Ammonia and sulfide levels were measured in interstitial water collected from the surface sediment samples. Porewater unionized ammonia concentrations at the Site ranged from 0 to 0.6 mg/L with no apparent pattern in spatial distributions. Maximum porewater unionized ammonia concentrations were generally below water quality criteria, indicating a low potential for ammonia toxicity in Site sediments (Warner 2001).

Porewater sulfide concentrations in surface sediments collected at the Site over the 2006 to 2008 period ranged from less than 0.1 to 94 mg/L, with the highest concentrations consistently observed at relatively shallow depths in the northern embayment (Figure 7-11). Surface sediment porewater sulfide concentrations, particularly within the northern embayment, exceeded the preliminary amphipod toxicity screening criteria of 30 mg/L reported by Caldwell (2005) based on an analysis of woody debris sediment toxicity data available from other sites in the Puget Sound region. Thus, porewater sulfide concentrations could potentially be a contributing factor to amphipod bioassay test performance at the Site (see below). As discussed in Section 7.6 above, the shallow aquifer near the northern embayment shoreline is moderately tidally-influenced and is subject to transient nearshore groundwater flow reversals during high tide events, which promotes greater sulfide production within the woody debris deposits. By comparison, the deeper woody debris deposits in the southern bay are associated with less sulfide production and fewer adverse effects observed in the bioassays (note that the single elevated porewater sulfide concentration of 45 mg/L at southern embayment station B-14 was not associated with amphipod mortality in the confirmational bioassay; see below).

Bioassay test interpretation consists of endpoint comparisons of test sediments to the measurements observed in the controls and in reference sediments on an absolute percentage basis, as well as statistical comparison between the test and reference endpoints, where appropriate. Test interpretations followed the guidelines established through the DMMP/SMS review process (see Appendix H).

A total of five different bioassay tests were performed on surface sediments collected from the Site over the period from 2006 to 2008, as follows:

- 10-day amphipod acute toxicity test (Figure 7-12)
- 2 to 4-day PSEP larval mortality and abnormality test (Figure 7-13)
- 2 to 4-day screen tube larval mortality and abnormality test (Figure 7-14; comparison of this test with the PSEP method above allows discrimination between the effects of

chemical contaminants and physical factors on the larval test)

- 20-day juvenile polychaete growth bioassay (Figure 7-15)
- Microtox® porewater chronic toxicity test (Figure 7-16)

The 2006 to 2008 bioassay test results revealed that surface sediments collected from the northern and southern embayments of the Site were potentially toxic, but to varying degrees, in laboratory exposures to SMS test organisms. Overall SMS bioassay interpretations are summarized in Figure 7-17; many of the surface samples collected from the Site (and from the larger bay-wide study performed by Ecology) exceeded SQS and/or CSL biological criteria for one or more bioassay tests. Test results from each of the five bioassay tests are discussed below.

The 2006 and 2008 amphipod bioassay data (unpurged samples only) reveal that relatively high toxicity to this test species (to 32 percent survival relative to the matched reference sample) occurred in parts of the northern embayment (Figure 7-12). Note that SQS biological criteria for the amphipod bioassay test are defined by an absolute survival of 75 percent (CSL exceedances are defined by survival of less than 70 percent of the matched reference; Table 3-21). In general, amphipod bioassays exhibited a spatial trend of declining toxicity with distance from the primary wood waste deposits in the northern embayment. The amphipod toxicity results and spatial patterns are consistent with the porewater sulfide hypothesis discussed above, where the tidally influenced characteristic of this area promotes greater sulfide production within the woody debris deposits, which in turn leads to more pronounced biological effects. By comparison, the deeper wood waste deposits in the southern bay are associated with less sulfide production and fewer adverse effects observed in the amphipod bioassays.

In contrast to the amphipod bioassay data, which exhibited only localized toxicity in the northern embayment, the 2006 to 2008 PSEP larval bioassay tests and kriging analyses of these data revealed widespread SQS-level biological responses across the Site (Figure 7-13). Ecology's bay-wide sampling data also reported similar SQS and CSL bioassay responses in PSEP larval tests at many locations throughout Port Gamble Bay (Ecology; unpublished data). Correlation analyses of the bay-wide PSEP larval data (including 2002 sampling data) indicated a variable but nevertheless statistically significant relationship ($P<0.01$) between normal larval survivorship and the sediment TVS concentration (Figure 7-18). Statistically, SQS biological effects (defined for this evaluation as less than 85 percent normal larval survivorship relative to the matched reference sample) occurred when sediment TVS concentrations exceeded approximately 15 percent (dry weight basis). Sediment TVS cleanup levels ranging from 12 to 15 percent have been developed at other wood waste cleanup sites in Puget Sound based on bioassay correlation analyses (e.g., Hylebos Waterway and Former Scott Mill). The correspondence of these benchmark values lends additional support to the 15 percent TVS site-specific sediment screening level.

The screen tube larval mortality and abnormality test data, while more limited in scope than the PSEP larval data, nevertheless reveal that no adverse biological effects occur at the Site using this bioassay method (Figure 7-14). As noted above, comparison of this test with the PSEP method above allows discrimination between the effects of chemical contaminants and physical factors. The combined larval bioassay data reveal that all of the biological effects observed in the PSEP larval tests are attributable to physical factors; no chemical effects (e.g., porewater toxicity) are indicated to this test species. This result is evaluated further in the FS report.

Two different chronic toxicity bioassay tests have been performed on Site sediments: the juvenile polychaete growth bioassay (Figure 7-15) and the Microtox® porewater chronic toxicity test (Figure 7-16). While no biological effects have been observed at the Site using the Microtox® test, a localized reduction in polychaete growth rate exceeding SQS criteria has only been observed at a single location in the southern chip loading area (sample AS-05; see Figures 6-3 and 7-15). Note that SQS biological criteria for the polychaete bioassay test are defined by growth rates in test sediments that are less than 70 percent of the matched reference sediment (CSL exceedances are defined by growth rates of less than 50 percent of reference; Table 3-21).

7.8 Preliminary Wood Waste Screening Levels

Under the SMS, wood waste may include a wide range of natural or processed material of woody origin, ranging from lumber on or near the sediment surface; to deposits of sawdust, wood chips, or similar materials; to decomposed fibrous materials mixed with sediments. As discussed in previous sections of this RI report, historical sources of woody debris to the Site area likely included former log rafting operations, overwater storage and handling of wood and wood chips, wood waste contained in stormwater runoff from Site uplands, and spillage of materials containing woody debris (including sawdust, bark, and wood chips). Log handling and woody debris releases of processed material from P&T's mill operations on the Site ceased in 1995. Log rafting operations at the Site ceased in 2004.

The need for woody debris cleanup arises when the effects of decomposition of these materials in the aquatic environment lead to depletion of DO and accumulation of compounds such as sulfide to levels that are toxic to benthic organisms. Since wood waste effects in surface sediments are dependent on a number of factors, such as the physical form of the wood, degree of incorporation into sediments, amount of wood waste present, amount of flushing in the area, and the type of wood from which the waste was derived, wood waste cleanup requirements are site-specific and are handled by Ecology on a case-by-case basis.

While there is no promulgated SMS criterion for wood waste in sediment, a SMS Clarification Paper published by Ecology (Kendall and Michelsen 1997) presents an approach to addressing the impacts of wood waste accumulations in sediments. Consistent with the Clarification Paper and general Ecology policy under SMS, surface sediment TOC concentrations greater than roughly 10 percent (dry weight basis) and/or TVS levels greater than 25 percent (dry weight basis) were initially identified as having the potential for adverse benthic impacts. Site-specific bioassay correlations using the available data from Port Gamble Bay suggest a slightly lower effects benchmark of roughly 15 percent TVS (Figure 7-18), consistent with sediment TVS cleanup levels developed at other similar wood waste cleanup sites in Puget Sound (i.e., Former Scott Mill Site, Anacortes; Head of Hylebos Wood Waste Site, Tacoma), providing additional support for this screening level. As discussed above, surface sediment porewater sulfide concentrations exceeding the preliminary amphipod toxicity screening criteria of 30 mg/L reported by Caldwell (2005) can also be used as a relevant site-specific screening level.

Thus, Site sediment areas of potential concern identified for further evaluation in the FS were identified through a weight-of-evidence screening evaluation using the following criteria:

- TVS greater than 15 percent (compare with Figure 7-9)
- TOC greater than 10 percent (compare with Figure 7-10)
- Porewater sulfide greater than 30 mg/L (compare with Figure 7-11)
- Amphipod survival less than 75 percent (compare with Figure 7-12)
- Polychaete growth less than 70 percent (compare with Figure 7-15)

Site-specific sediment cleanup levels are developed in more detail and presented in the FS report.

7.9 Human Health Risk Screening

As part of this RI/FS, Ecology performed a focused screening-level human health risk evaluation to evaluate exposure of tribal members to chemicals from direct contact to sediment during shellfish gathering and from consumption of shellfish using tribal ingestion rates. For the screening-level analysis, Ecology used an upper-bound daily subsistence-level shellfish consumption rate of 499 grams per day (g/day), or nearly 20 times greater than the upper-bound recreational consumption rate of 27 g/day (incorporating a diet fraction of 0.5) used to derive MTCA surface water cleanup levels (WAC 173-340-730). Appendix G presents the methods and results of Ecology's risk assessment, and also includes comparisons of Port Gamble Bay surface sediments with representative regional background concentrations of human health chemicals of potential concern. Sediment concentrations of arsenic, copper, dioxin/furan TEQs, and PCBs in Port Gamble Bay were not statistically different from those in background areas in Puget Sound. For cadmium, because the range of detected concentrations in Port Gamble Bay sediment falls within the range of concentrations in background Puget Sound sediment, but statistically the Port Gamble Bay sediment concentrations exceed background, there is uncertainty whether cadmium in sediment of the bay is within regional background. Sediment cPAH concentrations detected in Port Gamble Bay exceed regional background concentrations. Further evaluation of cadmium and cPAH concentrations at the Site is included in the FS.

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TABLES

Table 3-1
Mill Site Upland Source Areas

Source Category	Description	General COPCs
Petroleum Hydrocarbons	Fuels, lubricants, and hydraulic fluids storage and use areas	Petroleum Hydrocarbons (TPH)
Wood Treatment Areas	Anti-Stain Wood Treatment and End Seal Areas	Pentachlorophenol (PCP) 2-Mercaptobenzothiazole (MBT) Didecyl Dimethyl Ammonium Chloride (DDAC) Mercury
Polychlorinated Biphenyls (PCBs)	Transformer Locations	PCBs TPH
Maintenance Areas (includes Power Plant and Wood Burner Area)	Fuels, lubricants, hydraulic fluids, metals, PCBs, solvents	TPH Volatile Organic Compounds (VOCs) PCBs Polycyclic Aromatic Hydrocarbons (PAHs) Metals

Table 3-2
Summary of Soil Sample Analyses
1999-2001 Investigations

Location	Depth (feet)	Date	TPH-Gx	TPH-Dx	EPH	VPH	PAHs	SVOCs	VOCs	PCBs	Wood Treatment	Metals
Potential Source Area 1 - Diesel Storage/Train House												
TP-1001D	6.5-8	2/10/1999		x	x		x					
TP-1001S	0.5-2	2/10/1999		x	x		x					
TP-1002D	4.5-6	2/10/1999		x								
TP-1002S	1.25-2.75	2/10/1999		x								
TP-1003D	5.5-7	2/10/1999		x				x	x	x		x
TP-1003D (DUP)	5.5-7	2/10/1999		x				x	x	x		x
TP-1003S	1.5-3	2/10/1999		x				x	x	x		x
TP-1004D	6-7.5	2/10/1999		x								
TP-1004S	0.5-2	2/10/1999		x								
TP-1005D	6-7.5	2/10/1999		x						x		
TP-1005S	0.5-2	2/10/1999		x						x		
TP-1006D	5.5-7	2/10/1999		x								
TP-1006S	0.5-2	2/10/1999		x								
MW-2D	5-6	6/17/1999		x								
MW-2S	0.5-1.5	6/17/1999		x								
TP-1001-TP1-S	2-3	7/20/2000		x			x					
TP-1001-TP1-D	6-7	7/20/2000		x			x					
TP-1001-TP2-S	0-1	7/20/2000		x			x					
TP-1001-TP2-D	6-7	7/20/2000		x			x					
TP-1001-TP3-S	2-3	7/20/2000		x			x					
TP-1001-TP3-D	5-6	7/20/2000		x			x					
TP-1001-TP4-S	1-2	7/20/2000		x			x					
TP-1001-TP4-D	5-6	7/20/2000		x			x					
TP-1001-TP5-S	0-1	7/20/2000		x								
EPI-SP-1007	2.0	6/7/2001										x
EPI-SP-1007	7.0	6/7/2001										x
EPI-SP-1008	2.0	6/7/2001										x
EPI-SP-1008	7.0	6/7/2001										x
EPI-TP-1009	2.0	6/13/2001					x					
EPI-TP-1010	5.0	6/13/2001					x					
EPI-TP-1011	2.0	6/14/2001					x					
EPI-TP-1012	2.0	6/13/2001					x					
EPI-TP-1013	2.0	6/13/2001					x					
Potential Source Area 2 - Fueling Area												
SP-2003D	5.5-7	2/15/1999		x	x	x	x		x1			
SP-2003S	1.5-3	2/15/1999		x	x	x	x		x1			
TP-2001D	5.5-7	2/11/1999		x								
TP-2001S	0.5-2	2/11/1999		x								
TP-2002S	0.5-2	2/11/1999		x								
MW-1D	5-6	6/17/1999		x								
MW-1S	0.5-1.5	6/17/1999		x								
Potential Source Area 3 - Wood Treatment												
TP-3001D	5.5-7	2/12/1999		x						x		
TP-3001S	0.5-2	2/12/1999		x						x		
TP-3002D	5.5-7	2/10/1999		x				x				

Table 3-2
Summary of Soil Sample Analyses
1999-2001 Investigations

Location	Depth (feet)	Date	TPH-Gx	TPH-Dx	EPH	VPH	PAHs	SVOCs	VOCs	PCBs	Wood Treatment	Metals
TP-3002S	0.5-2	2/10/1999		x				x				
TP-3003D	5.5-7	2/12/1999		x				x				
TP-3003S	0.5-2	2/12/1999		x	x		x	x				
TP-3004D	5.5-7	2/11/1999		x				x				
TP-3004D (DUP)	5.5-7	2/11/1999		x				x				
TP-3004S	0.5-2	2/11/1999		x				x				
EPI-SP-3005	2.0	6/8/2001		x			x	x				x
EPI-SP-3005	7.0	6/8/2001										x
EPI-SP-3006	2.0	6/8/2001					x	x				x
EPI-SP-3006	7.0	6/8/2001										x
EPI-SP-3007	2.0	6/8/2001					x	x				x
EPI-SP-3007	7.0	6/8/2001					x					x
Potential Source Area 4 - End Paint 1												
TP-4001D	6.5-8	2/10/1999		x				x	x	x	x	x
TP-4001S	0.5-2	2/10/1999		x				x	x	x	x	x
MW-4D	5-6	6/18/1999		x								
MW-4S	0.5-1.5	6/18/1999		x								
Potential Source Area 5 - Maintenance Area/Boiler/Sawmill												
SP-5008D	9.5-11	2/15/1999		x	x	x	x		x1			
SP-5008S	0.5-2	2/15/1999		x								
SP-5009D	6-7.5	2/15/1999		x								
SP-5009S	1-2.5	2/15/1999		x	x	x	x		x1			
SP-5010D	7.5-9	2/15/1999		x	x	x	x		x1			
SP-5010S	1-2.5	2/15/1999		x								
SP-5011D	5-6.5	2/15/1999		x								
SP-5011S	1-2.5	2/15/1999		x								
SP-5012D	5.5-7	2/15/1999		x								
SP-5012S	0.5-2	2/15/1999	x	x					x1			
SP-5015D	5.5-7	2/15/1999		x								
SP-5015D (DUP)	5.5-7	2/15/1999		x								
SP-5015S	0.5-2	2/15/1999		x								
TP-5001D	4.5-6	2/10/1999		x	x		x			x		
TP-5001S	0.5-2	2/10/1999		x						x		
TP-5002D	6.5-8	2/10/1999		x				x		x		
TP-5002S	0.5-2	2/10/1999		x	x		x	x		x		
TP-5003D	5.5-7	2/10/1999		x				x	x	x		x
TP-5003S	1.5-3	2/10/1999		x				x	x	x		x
TP-5004D	6-7.5	2/10/1999		x						x		
TP-5004S	0.5-2	2/10/1999		x						x		
TP-5005D	5.5-7	2/10/1999		x								
TP-5005S	1-2.5	2/10/1999		x								
TP-5006D	4.5-6	2/10/1999		x								
TP-5006S	0.5-2	2/10/1999		x	x		x					
TP-5007D	4.5-6	2/11/1999		x				x	x	x		x
TP-5007S	0.5-2	2/11/1999		x				x	x	x		x
TP-5013D	4.5-6	2/12/1999		x	x		x					

Table 3-2
Summary of Soil Sample Analyses
1999-2001 Investigations

Location	Depth (feet)	Date	TPH-Gx	TPH-Dx	EPH	VPH	PAHs	SVOCs	VOCs	PCBs	Wood Treatment	Metals
TP-5013S	1-2.5	2/12/1999		x								
TP-5014D	5.5-7	2/12/1999		x								
TP-5014S	0.5-2	2/12/1999		x								
TP-5016D	4.5-5.5	2/11/1999		x								
TP-5016S	0.5-1.5	2/11/1999		x	x	x	x		x1			
TP-5017D	6-7	2/11/1999		x				x	x	x		x
TP-5017S	0.5-1.5	2/11/1999		x				x	x	x		x
MW-5D	5-6	6/17/1999		x	x		x					
MW-5S	0.5-1.5	6/17/1999		x	x		x					
TP-5018D	6-7	7/14/1999		x				x		x		x
TP-5018S	1-2	7/14/1999		x	x		x	x		x		x
SP-5008-TP1-S	2-3	7/20/2000		x			x					
SP-5008-TP1-D	5.5-6.5	7/20/2000		x			x					
SP-5008-TP2-D	5-6	7/20/2000		x								
SP-5008-TP3-S	2-3	7/20/2000		x								
SP-5008-TP3-D	3.5-4.5	7/20/2000		x			x					
SP-5008-TP4-D	5.5-6.5	7/20/2000		x								
SP-5008-TP5-D	6-7	7/20/2000		x								
TP-5018-TP1-S	1-2	7/21/2000		x								
TP-5018-TP2-S	1-2	7/21/2000		x			x					
TP-5018-TP2-D	5-6	7/21/2000		x	x		x					
TP-5018-TP3-S	0.5-1.5	7/21/2000		x	x		x					
TP-5018-TP4-S	0-1	7/21/2000		x								
TP-5018-TP5-S	1-2	7/21/2000		x								
EPI-SP-5019	2.0	6/8/2001		x			x					
EPI-SP-5019	7.0	6/8/2001					x					
EPI-SP-5020	2.0	6/8/2001		x			x			x		
EPI-SP-5020	7.0	6/8/2001		x			x					
EPI-SP-5021	2.0	6/14/2001		x			x			x		x
EPI-SP-5021	7.0	6/14/2001		x			x					x
EPI-SP-5022	2.0	6/8/2001		x			x			x		
EPI-SP-5022	7.0	6/8/2001		x								
EPI-SP-5023	2.0	6/8/2001		x			x			x		
EPI-SP-5025	2.0	6/13/2001		x			x			x		x
EPI-SP-5025	7.0	6/13/2001								x		x
EPI-SP-5026	2.0	6/13/2001		x			x			x		x
EPI-SP-5026	7.0	6/13/2001										x
EPI-SP-5027	2.0	6/14/2001		x						x		
EPI-SP-5027	7.0	6/14/2001		x			x					
EPI-SP-5029	2.0	6/14/2001		x			x					x
EPI-SP-5030	2.0	6/14/2001		x			x			x		x
EPI-SP-5030	7.0	6/14/2001										x
EPI-SP-5031	2.0	6/14/2001		x			x					
EPI-SP-5031	7.0	6/14/2001					x					
EPI-SP-5032	2.0	6/14/2001		x			x			x		
EPI-SP-5033	2.0	6/14/2001		x			x					

Table 3-2
Summary of Soil Sample Analyses
1999-2001 Investigations

Location	Depth (feet)	Date	TPH-Gx	TPH-Dx	EPH	VPH	PAHs	SVOCs	VOCs	PCBs	Wood Treatment	Metals
EPI-SP-5034	2.0	6/14/2001		x			x			x		
EPI-SP-5035	2.0	6/14/2001		x						x		
EPI-SP-5035	7.0	6/14/2001		x			x					
EPI-SP-5036	2.0	6/14/2001		x						x		
EPI-SP-5037	2.0	6/15/2001		x						x		x
EPI-SP-5038	2.0	6/15/2001		x			x					x
EPI-SP-5039	2.0	6/15/2001		x			x					
EPI-SP-5040	2.0	6/15/2001		x			x					
EPI-SP-5041	2.0	6/15/2001		x			x			x		
EPI-SP-5041	7.0	6/15/2001										
EPI-SP-5042	2.0	6/15/2001		x			x					
Potential Source Area 6 - Bull Chain Area												
SP-6005D	7.5-8.5	2/15/1999		x	x	x	x		x1		x	
SP-6005S	0.5-1.5	2/15/1999		x	x	x	x		x1		x	
TP-6001D	4.5-5.5	2/12/1999		x				x	x	x		x
TP-6001S	0.5-1.5	2/12/1999		x	x	x	x	x	x1/x	x		x
TP-6002D	4.5-5.5	2/12/1999		x								
TP-6002S	0.5-1.5	2/12/1999		x	x		x					
TP-6003D	4.5-5.5	2/12/1999		x	x		x	x	x	x		x
TP-6003D (DUP)	4.5-5.5	2/12/1999		x				x	x	x		x
TP-6003S	0.5-1.5	2/12/1999		x	x		x	x	x	x		x
TP-6004D	4.5-5.5	2/12/1999		x	x		x			x		
TP-6004S	0.5-1.5	2/12/1999		x						x		
MW-6D	5-6	6/18/1999		x								
MW-6S	0.5-1.5	6/18/1999		x								
SP-6005-SP1-S	1-3	7/24/2000		x								
SP-6005-SP2-S	1-2	7/24/2000		x								
SP-6005-SP3-S	1-2	7/24/2000		x								
SP-6005-TP4-S	1-2.5	7/24/2000		x								
SP-6005-SP5-S	1-2	7/24/2000		x								
SP-6005-SP6-S	1-2	7/24/2000		x								
EPI-SP-6006	2.0	6/13/2001		x								
EPI-SP-6007	2.0	6/13/2001		x								
EPI-SP-6008	2.0	6/13/2001		x								
Potential Source Area 7 - Wood Treatment 2												
SP-7001D	6.5-7.5	2/15/1999		x				x				
SP-7001S	0.5-1.5	2/15/1999		x				x				
SP-7003D	6.5-7.5	2/15/1999		x				x				
SP-7003S	0.5-1.5	2/15/1999		x				x				
TP-7002D	4.5-5.5	2/11/1999		x	x		x	x	x	x		x
TP-7002S	0.5-1.5	2/11/1999		x				x	x	x		x
TP-7004D	4.5-5.5	2/11/1999		x				x		x		
TP-7004S	0.5-1.5	2/11/1999		x				x		x		
MW-7D	5-6	6/18/1999		x								
MW-7S	0.5-1.5	6/18/1999		x								
TP-7002-SP1-D	6-7	7/24/2000		x								

Table 3-2
Summary of Soil Sample Analyses
1999-2001 Investigations

Location	Depth (feet)	Date	TPH-Gx	TPH-Dx	EPH	VPH	PAHs	SVOCs	VOCs	PCBs	Wood Treatment	Metals
TP-7002-SP2-D	6-7	7/24/2000		x								
TP-7002-SP3-D	6-7	7/24/2000		x								
TP-7002-SP4-D	6-7	7/24/2000		x								
TP-7002-SP5-D	6-7	7/24/2000		x								
EPI-SP-7005	2.0	6/13/2001										x
EPI-SP-7006	2.0	6/13/2001					x	x				
EPI-SP-7007	2.0	6/13/2001					x	x				
EPI-SP-7008	2.0	6/14/2001					x					
Potential Source Area 8 - Wood Treatment 3												
TP-8001D	5.5-6.5	2/11/1999		x				x	x	x		x
TP-8001S	0.5-1.5	2/11/1999		x				x	x	x		x
EPI-SP-8002	2.0	6/13/2001					x	x				x
EPI-SP-8003	2.0	6/13/2001					x	x				x
Potential Source Area 9 - End Paint 2												
TP-9001D	7-8	2/11/1999		x				x	x	x		x
TP-9001S	0.5-1.5	2/11/1999		x	x		x	x	x	x		x
Potential Source Area 10 - Locomotive Shed												
TP-10001D	5.5-6.5	2/11/1999		x								
TP-10001S	0.5-1.5	2/11/1999		x								
TP-10002D	4.5-5.5	2/11/1999		x				x	x	x		x
TP-10002S	0.5-1.5	2/11/1999		x	x		x	x	x	x		x
TP-10003D	4.5-5.5	2/11/1999		x								
TP-10003S	0.5-1.5	2/11/1999		x	x		x					
MW-8D	0-1	6/18/1999		x								
MW-8S	5-6	6/18/1999		x								
Potentail Source Area 11 - Fuel Oil Storage												
MW-3D	5-6	6/17/1999		x	x		x					
MW-3S	0.5-1.5	6/17/1999		x	x		x					
MW-3-TP1-S	0-1.5	7/22/2000		x			x					
MW-3-TP1-D	6-6.5	7/22/2000		x								
MW-3-TP2-S	1-2	7/22/2000		x								
MW-3-TP3-S	1-2	7/22/2000		x								
MW-3-TP4-S	1-2	7/22/2000		x								
EPI-SP-11001	2.0	6/7/2001		x			x					
EPI-SP-11002	2.0	6/7/2001		x			x					
EPI-SP-11003	2.0	6/7/2001		x			x					

Note:

x1 – Indicates only BTEX was analyzed for this sample

Table 3-3
Petroleum Hydrocarbons in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Gasoline Range Petroleum Hydrocarbons (mg/kg)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Oil-Range Petroleum Hydrocarbons (mg/kg)
SP-2003D	5.5-7	2/15/1999	--	120	390
SP-2003S	1.5-3	2/15/1999	--	140	540
SP-5008D	9.5-11	2/15/1999	--	56	880
SP-5008S	0.5-2	2/15/1999	--	ND (<21)	ND (<43)
SP-5009D	6-7.5	2/15/1999	--	ND (<21)	ND (<43)
SP-5009S	1-2.5	2/15/1999	--	330	1,300
SP-5010D	7.5-9	2/15/1999	--	ND (<28)	380
SP-5010S	1-2.5	2/15/1999	--	ND (<20)	ND (<40)
SP-5011D	5-6.5	2/15/1999	--	ND (<21)	ND (<43)
SP-5011S	1-2.5	2/15/1999	--	ND (<20)	ND (<41)
SP-5012D	5.5-7	2/15/1999	--	ND (<22)	ND (<43)
SP-5012S	0.5-2	2/15/1999	ND (<4.8)	22 J	80
SP-5015D	5.5-7	2/15/1999	--	ND (<22)	ND (<43)
SP-5015D (DUP)	5.5-7	2/15/1999	--	ND (<21)	ND (<42)
SP-5015S	0.5-2	2/15/1999	--	31 J	110
SP-6005D	7.5-8.5	2/15/1999	--	980	***6,900***
SP-6005S	0.5-1.5	2/15/1999	--	***4,500***	***29,000***
SP-7001D	6.5-7.5	2/15/1999	--	ND (<25)	ND (<50)
SP-7001S	0.5-1.5	2/15/1999	--	22	65
SP-7003D	6.5-7.5	2/15/1999	--	ND (<21)	ND (<43)
SP-7003S	0.5-1.5	2/15/1999	--	ND (<21)	ND (<42)
TP-1001D	6.5-8	2/10/1999	--	75	480
TP-1001S	0.5-2	2/10/1999	--	130	740
TP-1002D	4.5-6	2/10/1999	--	ND (<21)	ND (<43)
TP-1002S	1.25-2.75	2/10/1999	--	ND (<30)	ND (<60)
TP-1003D	5.5-7	2/10/1999	--	ND (<20)	ND (<40)
TP-1003D (DUP)	5.5-7	2/10/1999	--	ND (<19)	ND (<38)
TP-1003S	1.5-3	2/10/1999	--	ND (<20)	ND (<40)
TP-1004D	6-7.5	2/10/1999	--	ND (<20)	ND (<40)
TP-1004S	0.5-2	2/10/1999	--	ND (<21)	ND (<43)
TP-1005D	6-7.5	2/10/1999	--	ND (<21)	ND (<41)
TP-1005S	0.5-2	2/10/1999	--	ND (<21)	ND (<41)
TP-1006D	5.5-7	2/10/1999	--	ND (<22)	ND (<44)
TP-1006S	0.5-2	2/10/1999	--	ND (<20)	ND (<40)
TP-2001D	5.5-7	2/11/1999	--	17 J	38 J
TP-2001S	0.5-2	2/11/1999	--	14 J	60
TP-2002S	0.5-2	2/11/1999	--	30	130
TP-3001D	5.5-7	2/12/1999	--	ND (<22)	ND (<44)
TP-3001S	0.5-2	2/12/1999	--	ND (<24)	ND (<47)
TP-3002D	5.5-7	2/10/1999	--	ND (<23)	ND (<45)
TP-3002S	0.5-2	2/10/1999	--	ND (<20)	ND (<41)
TP-3003D	5.5-7	2/12/1999	--	32 J	92
TP-3003S	0.5-2	2/12/1999	--	40	240

Table 3-3
Petroleum Hydrocarbons in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Gasoline Range Petroleum Hydrocarbons (mg/kg)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Oil-Range Petroleum Hydrocarbons (mg/kg)
TP-3004D	5.5-7	2/11/1999	--	ND (<24)	31 J
TP-3004D (DUP)	5.5-7	2/11/1999	--	ND (<23)	ND (<46)
TP-3004S	0.5-2	2/11/1999	--	ND (<24)	ND (<47)
TP-4001D	6.5-8	2/10/1999	--	ND (<20)	ND (<39)
TP-4001S	0.5-2	2/10/1999	--	ND (<19)	ND (<39)
TP-5001D	4.5-6	2/10/1999	--	26	200
TP-5001S	0.5-2	2/10/1999	--	ND (<20)	ND (<40)
TP-5002D	6.5-8	2/10/1999	--	13 J	43
TP-5002S	0.5-2	2/10/1999	--	43	250
TP-5003D	5.5-7	2/10/1999	--	20	110
TP-5003S	1.5-3	2/10/1999	--	ND (<21)	ND (<43)
TP-5004D	6-7.5	2/10/1999	--	23	140
TP-5004S	0.5-2	2/10/1999	--	ND (<22)	92
TP-5005D	5.5-7	2/10/1999	--	ND (<22)	ND (<45)
TP-5005S	1-2.5	2/10/1999	--	ND (<21)	ND (<42)
TP-5006D	4.5-6	2/10/1999	--	ND (<23)	33 J
TP-5006S	0.5-2	2/10/1999	--	32	300
TP-5007D	4.5-6	2/11/1999	--	ND (<21)	ND (<42)
TP-5007S	0.5-2	2/11/1999	--	ND (<19)	ND (<39)
TP-5013D	4.5-6	2/12/1999	--	37	260
TP-5013S	1-2.5	2/12/1999	--	ND (<21)	ND (<43)
TP-5014D	5.5-7	2/12/1999	--	ND (<22)	ND (<44)
TP-5014S	0.5-2	2/12/1999	--	ND (<20)	ND (<39)
TP-5016D	4.5-5.5	2/11/1999	--	ND (<21)	65
TP-5016S	0.5-1.5	2/11/1999	--	200	***3,000***
TP-5017D	6-7	2/11/1999	--	18 J	77
TP-5017S	0.5-1.5	2/11/1999	--	ND (<20)	45
TP-6001D	4.5-5.5	2/12/1999	--	ND (<22)	42 J
TP-6001S	0.5-1.5	2/12/1999	--	84	950
TP-6002D	4.5-5.5	2/12/1999	--	ND (<22)	ND (<44)
TP-6002S	0.5-1.5	2/12/1999	--	27	290
TP-6003D	4.5-5.5	2/12/1999	--	29	220
TP-6003D (DUP)	4.5-5.5	2/12/1999	--	ND (<21)	66
TP-6003S	0.5-1.5	2/12/1999	--	29	230
TP-6004D	4.5-5.5	2/12/1999	--	490	***4,200***
TP-6004S	0.5-1.5	2/12/1999	--	ND (<200)	1,100
TP-7002D	4.5-5.5	2/11/1999	--	83	590
TP-7002S	0.5-1.5	2/11/1999	--	28	190
TP-7004D	4.5-5.5	2/11/1999	--	20 J	100
TP-7004S	0.5-1.5	2/11/1999	--	ND (<20)	33 J
TP-8001D	5.5-6.5	2/11/1999	--	23	120
TP-8001S	0.5-1.5	2/11/1999	--	ND (<21)	ND (<42)
TP-9001D	7-8	2/11/1999	--	ND (<23)	ND (<45)

Table 3-3
Petroleum Hydrocarbons in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Gasoline Range Petroleum Hydrocarbons (mg/kg)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Oil-Range Petroleum Hydrocarbons (mg/kg)
TP-9001S	0.5-1.5	2/11/1999	--	140	620
TP-10001D	5.5-6.5	2/11/1999	--	ND (<23)	ND (<45)
TP-10001S	0.5-1.5	2/11/1999	--	ND (<21)	97
TP-10002D	4.5-5.5	2/11/1999	--	ND (<23)	ND (<45)
TP-10002S	0.5-1.5	2/11/1999	--	120	1,000
TP-10003D	4.5-5.5	2/11/1999	--	ND (<23)	ND (<47)
TP-10003S	0.5-1.5	2/11/1999	--	140	720
MW-1D	5-6	6/17/1999	--	ND (<20)	57
MW-1S	0.5-1.5	6/17/1999	--	ND (<20)	39 J
MW-2D	5-6	6/17/1999	--	ND (<23)	58
MW-2S	0.5-1.5	6/17/1999	--	17 J	130
MW-3D	5-6	6/17/1999	--	68 J	770
MW-3S	0.5-1.5	6/17/1999	--	170	1,000
MW-4D	5-6	6/18/1999	--	ND (<20)	43
MW-4S	0.5-1.5	6/18/1999	--	ND (<23)	ND (<46)
MW-5D	5-6	6/17/1999	--	410	***2,900***
MW-5S	0.5-1.5	6/17/1999	--	190	1,200
MW-6D	5-6	6/18/1999	--	ND (<26)	54
MW-6S	0.5-1.5	6/18/1999	--	13 J	93
MW-7D	5-6	6/18/1999	--	23	110
MW-7S	0.5-1.5	6/18/1999	--	24	130
MW-8D	0-1	6/18/1999	--	ND (<20)	46
MW-8S	5-6	6/18/1999	--	14 J	120
TP-5018D	6-7	7/14/1999	--	24 J	110
TP-5018S	1-2	7/14/1999	--	52	280
TP-1001-TP1-S	2-3	7/20/2000	--	48	280
TP-1001-TP1-D	6-7	7/20/2000	--	ND (<21)	ND (<41)
TP-1001-TP2-S	0-1	7/20/2000	--	81	430
TP-1001-TP2-D	6-7	7/20/2000	--	ND (<20)	27 J
TP-1001-TP3-S	2-3	7/20/2000	--	110	530
TP-1001-TP3-D	5-6	7/20/2000	--	ND (<20)	ND (<41)
TP-1001-TP4-S	1-2	7/20/2000	--	66	670
TP-1001-TP4-D	5-6	7/20/2000	--	91	380
TP-1001-TP5-S	0-1	7/20/2000	--	21 J	110
SP-5008-TP1-S	2-3	7/20/2000	--	35	310
SP-5008-TP1-D	5.5-6.5	7/20/2000	--	38	290
SP-5008-TP2-D	5-6	7/20/2000	--	22 J	67
SP-5008-TP3-S	2-3	7/20/2000	--	ND (<20)	50
SP-5008-TP3-D	3.5-4.5	7/20/2000	--	87	290
SP-5008-TP4-D	5.5-6.5	7/20/2000	--	ND (<20)	ND (<41)
SP-5008-TP5-D	6-7	7/20/2000	--	ND (<21)	140
TP-5018-TP1-S	1-2	7/21/2000	--	10 J	ND (<40)
TP-5018-TP2-S	1-2	7/21/2000	--	190	1,400

Table 3-3
Petroleum Hydrocarbons in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Gasoline Range Petroleum Hydrocarbons (mg/kg)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Oil-Range Petroleum Hydrocarbons (mg/kg)
TP-5018-TP2-D	5-6	7/21/2000	--	1,600	***8,900***
TP-5018-TP3-S	0.5-1.5	7/21/2000	--	190	***2,900***
TP-5018-TP4-S	0-1	7/21/2000	--	ND (<22)	47
TP-5018-TP5-S	1-2	7/21/2000	--	24	140
SP-6005-SP1-S	1-3	7/24/2000	--	11 J	40
SP-6005-SP2-S	1-2	7/24/2000	--	13 J	49
SP-6005-SP3-S	1-2	7/24/2000	--	ND (<19)	ND (<39)
SP-6005-TP4-S	1-2.5	7/24/2000	--	ND (<21)	ND (<42)
SP-6005-SP5-S	1-2	7/24/2000	--	ND (<21)	51
SP-6005-SP6-S	1-2	7/24/2000	--	ND (<20)	ND (<39)
TP-7002-SP1-D	6-7	7/24/2000	--	ND (<20)	39
TP-7002-SP2-D	6-7	7/24/2000	--	ND (<20)	ND (<41)
TP-7002-SP3-D	6-7	7/24/2000	--	47	38 J
TP-7002-SP4-D	6-7	7/24/2000	--	ND (<21)	ND (<41)
TP-7002-SP5-D	6-7	7/24/2000	--	ND (<20)	ND (<40)
MW-3-TP1-S	0-1.5	7/22/2000	--	60	290
MW-3-TP1-D	6-6.5	7/22/2000	--	ND (<32)	ND (<64)
MW-3-TP2-S	1-2	7/22/2000	--	ND (<20)	ND (<41)
MW-3-TP3-S	1-2	7/22/2000	--	ND (<20)	ND (<41)
MW-3-TP4-S	1-2	7/22/2000	--	ND (<20)	ND (<40)
EPI-SP-3005	2.0	6/8/2001	--	55	420
EPI-SP-5019	2.0	6/8/2001	--	110	
EPI-SP-5020	2.0	6/8/2001	--	1,200	
EPI-SP-5020	7.0	6/8/2001	--	110	
EPI-SP-5021	2.0	6/14/2001	--	***15,000***	
EPI-SP-5021	7.0	6/14/2001	--	ND(<50)	
EPI-SP-5022	2.0	6/8/2001	--	1,800	
EPI-SP-5022	7.0	6/8/2001	--	ND(<50)	
EPI-SP-5023	2.0	6/8/2001	--	ND(<50)	
EPI-SP-5025	2.0	6/13/2001	--	310	
EPI-SP-5026	2.0	6/13/2001	--	1,000	
EPI-SP-5027	2.0	6/14/2001	--	370	
EPI-SP-5027	7.0	6/14/2001	--	320	
EPI-SP-5029	2.0	6/14/2001	--	1,100	
EPI-SP-5030	2.0	6/14/2001	--	1,700	
EPI-SP-5031	2.0	6/14/2001	--	380	
EPI-SP-5032	2.0	6/14/2001	--	390	
EPI-SP-5033	2.0	6/14/2001	--	390	
EPI-SP-5034	2.0	6/14/2001	--	120	
EPI-SP-5035	2.0	6/14/2001	--	***2,500***	
EPI-SP-5035	7.0	6/14/2001	--	520	
EPI-SP-5036	2.0	6/14/2001	--	45	
EPI-SP-5037	2.0	6/15/2001	--	400	

Table 3-3
Petroleum Hydrocarbons in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Gasoline Range Petroleum Hydrocarbons (mg/kg)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Oil-Range Petroleum Hydrocarbons (mg/kg)
EPI-SP-5038	2.0	6/15/2001	--	ND(<50)	
EPI-SP-5039	2.0	6/15/2001	--	300	
EPI-SP-5040	2.0	6/15/2001	--	110	
EPI-SP-5041	2.0	6/15/2001	--	280	
EPI-SP-5042	2.0	6/15/2001	--	280	
EPI-SP-6006	2.0	6/13/2001	--	1,800	
EPI-SP-6007	2.0	6/13/2001	--	ND(<50)	
EPI-SP-6008	2.0	6/13/2001	--	ND(<50)	
EPI-SP-11001	2.0	6/7/2001	--	150	
EPI-SP-11002	2.0	6/7/2001	--	53	
EPI-SP-11003	2.0	6/7/2001	--	470	
MTCA Method A Soil Cleanup Level [(a)]			**100**	**2,000**	
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NV**	**NV**	

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

-- - Indicates the sample was not analyzed for this compound

J – Estimated concentration

mg/kg – milligrams/kilogram

Table 3-4
EPH in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	C8-C-10 Aliphatics (mg/kg)	C10-C-12 Aliphatics (mg/kg)	C12-C16 Aliphatics (mg/kg)	C16-C21 Aliphatics (mg/kg)	C21-C34 Aliphatics (mg/kg)	C10-C12 Aromatics (mg/kg)	C12-C16 Aromatics (mg/kg)	C16-C21 Aromatics (mg/kg)	C21-34 Aromatics (mg/kg)
SP-2003D	5.5-7	2/15/1999	ND(<3.7)	ND(<3.7)	ND(<3.7)	ND(<3.7)	15	ND(<3.7)	ND(<3.7)	8	20
SP-2003S	1.5-3	2/15/1999	ND(<2.5)	ND(<2.5)	5	19	120	ND(<2.5)	ND(<2.5)	16	83
SP-5008D	9.5-11	2/15/1999	ND(<4.7)	ND(<4.7)	ND(<4.7)	5.5	56	ND(<4.7)	ND(<4.7)	10	25
SP-5009S	1-2.5	2/15/1999	4	ND(<3.3)	ND(<3.3)	6.7	1,200	ND(<3.3)	ND(<3.3)	12	130
SP-5010D	7.5-9	2/15/1999	ND(<3.3)	ND(<3.3)	ND(<3.3)	ND(<3.3)	26	ND(<3.3)	ND(<3.3)	ND(<6.6)	41
SP-6005D	7.5-8.5	2/15/1999	ND(<2.3)	ND(<2.3)	ND(<2.3)	95	2,000	ND(<2.3)	4	21	270
SP-6005S	0.5-1.5	2/15/1999	ND(<2.4)	ND(<2.4)	5.9	350	8,800	ND(<2.4)	8.3	140	2,200
TP-1001D	6.5-8	2/10/1999	ND(<2.9)	ND(<2.9)	ND(<2.9)	12 J	240 J	ND(<2.9)	ND(<2.9)	ND(<5.7)	30 J
TP-1001S	0.5-2	2/10/1999	ND(<3.6)	ND(<3.6)	12	140	1,000	ND(<3.6)	4.9	85	590
TP-3003S	0.5-2	2/12/1999	ND(<2.4)	ND(<2.4)	ND(<2.4)	22	390	ND(<2.4)	ND(<2.4)	10	110
TP-5001D	4.5-6	2/10/1999	ND(<2.7)	ND(<2.7)	ND(<2.7)	5.1 J	73 J	ND(<2.7)	ND(<2.7)	ND(<5.4)	11 J
TP-5002S	0.5-2	2/10/1999	ND(<2.6)	ND(<2.6)	ND(<2.6)	9.2	130	ND(<2.6)	ND(<2.6)	ND(<5.1)	16
TP-5006S	0.5-2	2/10/1999	ND(<2.5)	ND(<2.5)	ND(<2.5)	5.9	130	ND(<2.5)	ND(<2.5)	ND(<5)	32
TP-5013D	4.5-6	2/12/1999	ND(<3.1)	ND(<3.1)	ND(<3.1)	7.4	28	ND(<3.1)	ND(<3.1)	ND(<6.3)	15
TP-5016S	0.5-1.5	2/11/1999	ND(<2.7)	ND(<2.7)	5.5	48	1,000	ND(<2.7)	ND(<2.7)	13	240
TP-6001S	0.5-1.5	2/12/1999	ND(<2.3)	ND(<2.3)	3.4	23	450	ND(<2.3)	ND(<2.3)	7.2	61
TP-6002S	0.5-1.5	2/12/1999	ND(<2.3)	ND(<2.3)	ND(<2.3)	2.3	51	ND(<2.3)	ND(<2.3)	ND(<4.6)	37
TP-6003D	4.5-5.5	2/12/1999	ND(<2.7)	ND(<2.7)	ND(<2.7)	5.9	230	ND(<2.7)	ND(<2.7)	ND(<5.3)	43
TP-6003S	0.5-1.5	2/12/1999	ND(<2.4)	ND(<2.4)	ND(<2.4)	2.5	73	ND(<2.4)	ND(<2.4)	ND(<4.8)	25
TP-6004D	4.5-5.5	2/12/1999	ND(<2.5)	ND(<2.5)	ND(<2.5)	79	2,300	ND(<2.5)	ND(<2.5)	13	260
TP-6004S	0.5-1.5	2/12/1999	ND(<2.4)	ND(<2.4)	ND(<2.4)	6.2	330	ND(<2.4)	ND(<2.4)	ND(<4.7)	23
TP-7002D	4.5-5.5	2/11/1999	ND(<2.4)	ND(<2.4)	ND(<2.4)	22	260	ND(<2.4)	ND(<2.4)	11	87
TP-9001S	0.5-1.5	2/11/1999	ND(<2.5)	ND(<2.5)	ND(<2.5)	6.5	140	ND(<2.5)	ND(<2.5)	ND(<5)	15
TP-10002S	0.5-1.5	2/11/1999	3	ND(<2.9)	3.5	15	270	ND(<2.9)	ND(<2.9)	ND(<5.9)	33
TP-10003S	0.5-1.5	2/11/1999	ND(<2.9)	ND(<2.9)	ND(<2.9)	6.8	97	ND(<2.9)	ND(<2.9)	ND(<5.7)	19
MW-3D	5-6	6/17/1999	ND(<4.8)	17	120	ND(<4.8)	ND(<4.8)	ND(<4.8)	ND(<4.8)	11	60
MW-3S	0.5-1.5	6/17/1999	ND(<5)	110	600	ND(<5)	ND(<5)	ND(<5)	ND(<5)	24	240
MW-5D	5-6	6/17/1999	ND(<8.8)	9.1	220	1,400	ND(<8.8)	ND(<8.8)	ND(<8.8)	89	990
MW-5S	0.5-1.5	6/17/1999	ND(<5)	ND(<5)	5.8	81	ND(<5)	ND(<2.5)	ND(<5)	41	460

Table 3-4
EPH in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	C8-C-10 Aliphatics (mg/kg)	C10-C-12 Aliphatics (mg/kg)	C12-C16 Aliphatics (mg/kg)	C16-C21 Aliphatics (mg/kg)	C21-C34 Aliphatics (mg/kg)	C10-C12 Aromatics (mg/kg)	C12-C16 Aromatics (mg/kg)	C16-C21 Aromatics (mg/kg)	C21-34 Aromatics (mg/kg)
TP-5018S	1-2	7/14/1999	ND(<2.5)	ND(<2.5)	5.8	81	ND(<2.5)	ND(<2.5)	ND(<2.5)	7.2	35
TP-5018-TP2-D	5-6	7/21/2000	ND(<6)	ND(<6)	6.7	260	2,400	ND(<6)	ND(<6)	190	1,800
TP-5018-TP3-S	0.5-1.5	7/21/2000	ND(<5.1)	ND(<5.1)	ND(<5.1)	36	1,100	ND(<5.1)	ND(<5.1)	19	450
MTCA Method A Soil Cleanup Level [(a)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

J – Estimated concentration

mg/kg – milligrams/kilogram

Table 3-5
VPH in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	EC 5-6 Aliphatics (mg/kg)	EC >6-8 Aliphatics (mg/kg)	EC >8-10 Aliphatics (mg/kg)	EC >8-10 Aromatics (mg/kg)
SP-2003D	5.5-7	2/15/1999	ND(<2)	ND(<1.4)	ND(<4.1)	ND(<0.68)
SP-2003S	1.5-3	2/15/1999	ND(<1.3)	ND(<0.86)	ND(<2.6)	ND(0.43)
SP-5008D	9.5-11	2/15/1999	ND(<2.5)	ND(<1.7)	ND(<5)	ND(<0.83)
SP-5009S	1-2.5	2/15/1999	ND(<1.7)	ND(<1.1)	ND(<3.3)	ND(<0.56)
SP-5010D	7.5-9	2/15/1999	ND(<1.7)	ND(<1.1)	ND(<3.4)	ND(<5.7)
SP-6005D	7.5-8.5	2/15/1999	ND(<1.2)	ND(<0.8)	ND(<2.4)	ND(<0.4)
SP-6005S	0.5-1.5	2/15/1999	ND(<1.3)	ND(<0.9)	ND(<2.7)	ND(<0.45)
TP-5016S	0.5-1.5	2/11/1999	ND(<1.4)	ND(<0.95)	ND(<2.8)	ND(<0.47)
TP-6001S	0.5-1.5	2/12/1999	ND(<1.2)	ND(<0.8)	ND(<2.4)	ND(<0.4)
MTCA Method A Soil Cleanup Level [(a)]			**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**	**NC**	**NC**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg - milligrams per kilogram

Table 3-6
PAHs in Soil
1999-2001 Investigations

			Non-Carcinogenic PAHs										Carcinogenic PAHs							
Location	Depth (feet)	Date	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo (g,h,i) perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naphthalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz (a, h) anthracene (mg/kg)	Indeno (1, 2, 3-cd) pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
SP-2003D	5.5-7	2/15/1999	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND(<0.03)	ND
SP-2003S	1.5-3	2/15/1999	ND(<0.02)	0.077	ND(<0.02)	ND(<0.02)	0.17	ND(<0.02)	ND(<0.02)	0.29	0.17	0.17	0.039	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.063	ND(<0.02)	ND(<0.02)	0.005
SP-5008D	9.5-11	2/15/1999	ND(<0.038)	ND(<0.038)	0.09	ND(<0.038)	0.48	ND(<0.038)	ND(<0.038)	ND(<0.038)	0.3	0.31	0.17	ND(<0.038)	ND(<0.038)	ND(<0.038)	0.086	ND(<0.038)	ND(<0.038)	0.018
SP-5009S	1-2.5	2/15/1999	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	0.15	ND(<0.026)	ND(<0.026)	0.087	0.11	0.13	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND
SP-5010D	7.5-9	2/15/1999	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	0.055	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND(<0.026)	ND
SP-6005D	7.5-8.5	2/15/1999	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND
SP-6005S	0.5-1.5	2/15/1999	ND(<0.019)	ND(<0.019)	0.086	ND(<0.019)	0.21	ND(<0.019)	ND(<0.019)	ND(<0.019)	0.051	0.21	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND
TP-1001D	6.5-8	2/10/1999	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	0.073	0.071	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND
TP-1001S	0.5-2	2/10/1999	0.17	0.32	0.52	ND(<0.029)	3.2	0.21	0.22	0.29	2.3	2.7	0.71	***0.46***	0.67	0.16	1.2	ND(<0.029)	ND(<0.029)	***0.626***
TP-3003S	0.5-2	2/12/1999	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND
TP-5001D	4.5-6	2/10/1999	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	0.049	0.064	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	0.055
TP-5002S	0.5-2	2/10/1999	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.065	0.063	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TP-5006S	0.5-2	2/10/1999	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TP-5013D	4.5-6	2/12/1999	ND(<0.025)	ND(<0.025)	ND(<0.025)	ND(<0.025)	0.17	ND(<0.025)	ND(<0.025)	0.29	0.29	0.13	ND(<0.025)	ND(<0.025)	ND(<0.025)	ND(<0.025)	ND(<0.025)	ND(<0.025)	ND(<0.025)	ND
TP-5016S	0.5-1.5	2/11/1999	ND(<0.022)	0.54	0.15	ND(<0.022)	ND(<0.022)	ND(<0.022)	ND(<0.022)	0.89	0.2	0.23	ND(<0.022)	ND(<0.022)	ND(<0.022)	ND(<0.022)	ND(<0.022)	ND(<0.022)	ND(<0.022)	ND
TP-6001S	0.5-1.5	2/12/1999	ND(<0.019)	0.11	0.069	ND(<0.019)	0.14	0.041	0.14	0.8	0.32	0.17	0.041	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	0.004
TP-6002S	0.5-1.5	2/12/1999	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND
TP-6003D	4.5-5.5	2/12/1999	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND(<0.021)	ND
TP-6003S	0.5-1.5	2/12/1999	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	0.048	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND
TP-6004D	4.5-5.5	2/12/1999	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TP-6004S	0.5-1.5	2/12/1999	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND
TP-7002D	4.5-5.5	2/11/1999	ND(<0.019)	0.071	0.061	0.05	0.49	ND(<0.019)	ND(<0.019)	ND(<0.019)	0.51	0.46	0.16	***0.2***	0.2	0.063	0.22	ND(<0.019)	0.11	***0.256***
TP-9001S	0.5-1.5	2/11/1999	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TP-10002S	0.5-1.5	2/11/1999	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	0.073	0.068	0.054	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND(<0.024)	ND
TP-10003S	0.5-1.5	2/11/1999	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	0.096	ND(<0.023)	ND(<0.023)	0.048	0.082	0.091	ND(<0.023)	ND(<0.023)	0.048	ND(<0.023)	ND(<0.023)	ND(<0.023)	ND(<0.023)	0.005
SP-7001D	6.5-7.5	2/15/1999	ND(<0.0012)	ND(<0.0012)	ND(<0.0012)	ND(<0.0012)	0.0034	ND(<0.0012)	ND(<0.0012)	ND(<0.0012)	0.0029	0.0025	ND(<0.0012)	ND(<0.0012)	ND(<0.0012)	ND(<0.0012)	0.0014	ND(<0.0012)	ND(<0.0012)	0.00001
SP-7001S	0.5-1.5	2/15/1999	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND(<0.0011)	ND
SP-7003D	6.5-7.5	2/15/1999	ND(<0.00099)	ND(<0.00099)	ND(<0.00099)	0.0011	0.0026	ND(<0.00099)	ND(<0.00099)	0.0041	0.0028	0.0029	ND(<0.00099)	0.0011	ND(<0.00099)	0.0011	0.0011	ND(<0.00099)	ND(<0.00099)	0.001
SP-7003S	0.5-1.5	2/15/1999	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND
TP-1003D	5.5-7	2/10/1999	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND
TP-1003S	1.5-3	2/10/1999	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND
TP-3002D	5.5-7	2/10/1999	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	0.0043	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	0.0023	0.0042	0.0015	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	0.0019	ND(<0.00097)	ND(<0.00097)	0.0002
TP-3002S	0.5-2	2/10/1999	ND(<0.00088)	0.0013	ND(<0.00088)	ND(<0.00088)	0.0062	ND(<0.00088)	ND(<0.00088)	0.0016	0.0035	0.0069	0.0016	ND(<0.00088)	0.0039	ND(<0.00088)	0.0024	ND(<0.00088)	ND(<0.00088)	0.001
TP-3003D	5.5-7	2/12/1999	ND(<0.0015)	ND(<0.0015)	ND(<0.0015)	ND(<0.0015)	0.0042	ND(<0.0015)	ND(<0.0015)	0.0042	0.0036	0.0033	ND(<0.0015)	ND(<0.0015)	ND(<0.0015)	ND(<0.0015)	0.0022	ND(<0.0015)	ND(<0.0015)	0.00002
TP-3003S	0.5-2	2/12/1999	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	0.0024	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND
TP-3004D	5.5-7	2/11/1999	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND
TP-3004D (DUP)	5.5-7	2/11/1999	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.0021	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND
TP-3004S	0.5-2	2/11/1999	ND(<0.0011)	0.0023	0.0062	0.0059	0.0074	0.0013	ND(<0.0011)	0.0068	0.01	0.0073	0.0092	0.011	0.01	0.0091	0.021	ND(<0.0011)	0.0062	0.015
TP-4001D	6.5-8	2/10/1999	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	0.0025	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	ND(<0.00087)	0.001	0.0001
TP-4001S	0.5-2	2/10/1999	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND
TP-5002D	6.5-8	2/10/1999	0.0014	0.0022	0.01	ND(<0.00094)	0.051	0.0018	ND(<0.00094)	0.0016	0.037	0.052	0.029	0.033	0.04	0.012	0.03	ND(<0.00094)	0.015	0.043
TP-5002S	0.5-2	2/10/1999	0.0018	0.0053	0.0051	0.011	0.051	0.0021	0.0098	0.015	0.035	0.061	0.017	0.011	0.019	0.0075	0.024	ND(<0.0098)	0.0089	0.016
TP-5003D	5.5-7	2/10/1999	0.0022	0.0045	0.0043	0.013	0.027	0.0019	0.0018	0.012	0.025	0.027	0.014	0.02	0.022	0.004	0.015	ND(<0.0009)	ND(<0.0009)	0.024
TP-5003S	1.5-3	2/10/1999	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	0.0014	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	0.00097	0.0015	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	0.0011	ND(<0.00088)	ND(<0.00088)	0.00001
TP-5007D	4.5-6	2/10/1999	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	0.0011	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND
TP-5007S	0.5-2	2/11/1999	ND(<0.00086)	0.0011	ND(<0.00086)	ND(<0.00086)	0.0018	ND(<0.00086)	ND(<0.00086)	0.0041	0.0023	0.0022	ND(<0.00086)	ND(<0.00086)	ND(<0.00086)	ND(<0.00086)	ND(<0.00086)	ND(<0.00086)	ND(<0.00086)	ND
TP-5017D	6-7	2/11/1999	0.0016	0.01	0.0085	0.044	0.085	0.0024	ND(<0.0014)	0.0038	0.043	0.1	0.036	0.061	0.067	0.018	0.058	ND(<0.0014)	0.039	0.078
TP-5017S	0.5-1.5	2/11/1999	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	ND
TP-6001D	4.5-5.5	2/12/1999	ND(<0.001)	0.0027	ND(<0.001)	ND(<0.001)	0.0029	ND(<0.001)	0.003	0.0065	0.0046	0.0042	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND
TP-6001S	0.5-1.5	2/12/1999	0.015	0.074	0.032	ND(<0.00094)	0.066	0.022	0.15	0.21	0.14	0.095	ND(<0.00094)	ND(<0.00094)	ND(<0.00094)	ND(<0.00094)	ND(<0.00094)	ND(<0.00094)	ND(<0.00094)	ND

Table 3-6
PAHs in Soil
1999-2001 Investigations

			Non-Carcinogenic PAHs										Carcinogenic PAHs							
Location	Depth (feet)	Date	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo (g,h,i) perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naphthalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz (a, h) anthracene (mg/kg)	Indeno (1, 2, 3-cd) pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
TP-6003D	4.5-5.5	2/12/1999	ND(<0.001)	0.0014	0.0011	ND(<0.001)	0.0076	ND(<0.001)	ND(<0.001)	ND(<0.001)	0.0039	0.0068	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<0.00089)	0.0072	0.0038	0.0092	0.026	0.0019	0.0012	0.0029	0.019	0.026	0.0095	0.014	0.016	0.0018	0.013	ND(<0.00089)	0.0083	0.018
TP-6003S	0.5-1.5	2/12/1999	0.0018	0.0091	0.0097	ND(<0.00092)	0.023	0.0031	0.0042	0.01	0.012	0.019	0.0039	ND(<0.00092)	ND(<0.00092)	ND(<0.00092)	0.015	ND(<0.00092)	ND(<0.00092)	0.001
TP-7002D	4.5-5.5	2/11/1999	ND(<0.00092)	0.0062	0.0028	0.012	0.023	0.001	0.001	0.003	0.013	0.024	0.0082	0.019	0.019	0.0074	0.013	ND(<0.00092)	0.0089	0.023
TP-7002S	0.5-1.5	2/11/1999	ND(<0.00098)	0.0036	0.0033	0.0062	0.017	0.0014	0.0019	0.0053	0.019	0.015	0.0079	0.0083	ND(<0.00098)	ND(<0.00098)	0.0082	ND(<0.00098)	ND(<0.00098)	0.009
TP-7004D	4.5-5.5	2/11/1999	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	0.0026	ND(<0.00097)	ND(<0.00097)	0.002	0.0018	0.0022	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND(<0.00097)	ND
TP-7004S	0.5-1.5	2/11/1999	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND(<0.00088)	ND
TP-8001D	5.5-6.5	2/11/1999	ND(<0.00099)	0.0027	0.0022	0.0039	0.011	0.0013	0.0053	0.0069	0.01	0.01	0.0034	0.0058	0.0078	0.0011	0.0049	ND(<0.00099)	0.0036	0.007
TP-8001S	0.5-1.5	2/11/1999	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND(<0.0009)	ND
TP-9001D	7-8	2/11/1999	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND
TP-9001S	0.5-1.5	2/11/1999	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND(<0.00093)	ND
TP-10002D	4.5-5.5	2/11/1999	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND(<0.001)	ND
TP-10002S	0.5-1.5	2/11/1999	0.0046	0.009	0.01	ND(<0.0011)	0.03	0.0071	0.011	0.021	0.031	0.03	0.0091	ND(<0.0011)	0.008	0.0049	0.016	ND(<0.0011)	ND(<0.0011)	0.002
MW-3D	5-6	6/17/1999	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	0.052	ND(<0.019)	ND(<0.019)	ND(<0.019)	ND(<0.019)	0.081	ND(<0.019)	0.047	0.062	ND(<0.019)	0.076	ND(<0.019)	ND(<0.019)	0.054
MW-3S	0.5-1.5	6/17/1999	ND(<0.02)	0.12	0.18	0.21	0.14	0.056	ND(<0.02)	0.12	0.14	0.16	0.098	***0.21***	0.27	0.084	0.14	ND(<0.02)	0.16	***0.273***
MW-5D	5-6	6/17/1999	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	0.12	0.22	0.15	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND(<0.035)	ND
MW-5S	0.5-1.5	6/17/1999	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.048	0.094	0.06	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TP-5018S	1-2	7/14/1999	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.068	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.054	0.1	ND(<0.02)	ND(<0.02)	0.042	ND(<0.02)	0.048	ND(<0.02)	ND(<0.02)	0.005
TP-5018D	6-7	7/14/1999	0.021	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.021	0.02	ND(<0.02)	0.041	ND(<0.02)	0.021	ND(<0.02)	ND(<0.02)	0.006
TP-5018S	1-2	7/14/1999	ND(<0.022)	0.091	0.022	0.13	0.25	ND(<0.022)	ND(<0.022)	0.03	0.13	0.29	0.11	***0.19***	0.28	ND(<0.022)	0.14	ND(<0.022)	0.11	***0.241***
TP-1001-TP1-S	2-3	7/20/2000	ND(<0.021)	0.11	0.12	ND(<0.021)	0.89	0.036	0.023	0.072	0.29	0.65	0.17	***0.16***	0.24	0.094	0.29	ND(<0.021)	ND(<0.021)	***0.213***
TP-1001-TP1-D	6-7	7/20/2000	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND
TP-1001-TP2-S	0-1	7/20/2000	0.022	0.23	0.073	0.22	0.59	0.035	ND(<0.02)	0.1	0.19	0.34	0.12	***0.14***	0.2	0.092	0.19	ND(<0.02)	0.12	***0.195***
TP-1001-TP2-D	6-7	7/20/2000	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	0.036	ND(<0.016)	ND(<0.016)	0.016	0.026	0.023	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND
TP-1001-TP3-S	2-3	7/20/2000	0.11	0.58	0.5	0.39	5.7	0.22	0.074	0.25	2.1	3.9	1.4	***0.92***	1.1	0.43	1.5	0.098	0.31	***1.298***
TP-1001-TP3-D	5-6	7/20/2000	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND(<0.016)	ND
TP-1001-TP4-S	1-2	7/20/2000	0.027	0.14	0.12	0.1	0.7	0.051	0.076	0.2	0.51	0.59	0.13	***0.21***	0.28	0.055	0.21	ND(<0.02)	ND(<0.02)	***0.259***
TP-1001-TP4-D	5-6	7/20/2000	ND(<0.038)	0.2	0.1	0.31	0.96	0.034 J	ND(<0.038)	0.11	0.35	1	0.33	***0.44***	ND(<0.038)	0.38	0.37	ND(<0.038)	0.35	***0.550***
SP-5008-TP1-S	2-3	7/20/2000	ND(<0.018)	0.11	0.073	0.2	0.49	0.021	0.018	0.14	0.23	0.41	0.26	***0.31***	0.32	0.12	0.28	ND(<0.018)	0.21	***0.404***
SP-5008-TP1-D	5.5-6.5	7/20/2000	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND(<0.018)	ND
SP-5008-TP3-D	3.5-4.5	7/20/2000	0.029	0.023	0.094	ND(<0.019)	ND(<0.019)	0.044	ND(<0.019)	0.046	0.12	0.052	0.071	***0.11***	0.06	0.027	0.13	ND(<0.019)	ND(<0.019)	***0.127***
TP-5018-TP2-S	1-2	7/21/2000	ND(<0.02)	0.048	0.03	ND(<0.02)	0.17	ND(<0.02)	ND(<0.02)	0.062	0.084	0.17	0.096	***0.14***	0.24	0.056	0.12	ND(<0.02)	ND(<0.02)	***0.180***
TP-5018-TP2-D	5-6	7/21/2000	0.12	0.98	0.39	0.77	2.5	0.15	0.15	1.6	1.4	4.8	1.5	***1.8***	1	0.19	1.6	ND(<0.025)	0.54	***2.139***
TP-5018-TP3-S	0.5-1.5	7/21/2000	ND(<0.021)	0.12	0.055	ND(<0.021)	0.46	0.031	ND(<0.021)	ND(<0.021)	0.21	0.55	0.2	***0.18***	0.086	0.07	0.2	ND(<0.021)	ND(<0.021)	***0.218***
MW-3-TP1-S	0-1.5	7/22/2000	ND(<0.019)	0.023	ND(<0.019)	ND(<0.019)	0.15	ND(<0.019)	ND(<0.019)	0.031	0.069	0.084	0.021	0.032	0.029	ND(<0.019)	0.036	ND(<0.019)	ND(<0.019)	0.037
EPI-SP-1009	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.19	ND(<0.1)	--	ND(<0.1)	0.14	0.15	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-1010	5.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-1011	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.21	ND(<0.1)	--	ND(<0.1)	0.2	0.2	0.1	ND(<0.1)	0.12	ND(<0.1)	0.12	ND(<0.1)	ND(<0.1)	0.023
EPI-SP-1012	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-1013	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-3005	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-3006	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<100)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-3007	2.0	6/8/2001	0.12	ND(<0.1)	ND(<0.1)	0.26	0.37	ND(<0.1)	--	ND(<0.1)	0.31	0.48	0.15	***0.2***	0.22	ND(<0.1)	0.26	0.15	0.15	***0.315***
EPI-SP-3007	7.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5019	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.15	0.41	ND(<0.1)	--	ND(<0.1)	0.37	0.41	0.19	***0.22***	0.26	0.1	0.19	ND(<0.1)	0.14	***0.291***
EPI-SP-5019	7.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5020	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.11	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	0.14	0.11	***0.12***	0.14	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.145***
EPI-SP-5020	7.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5021	2.0	6/14/2001	ND(<0.1)	0.17	ND(<0.1)	0.15	0.13	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	0.3	0.17	***0.1***	0.2	0.15	ND(<0.1)	ND(<0.1)	0.12	***0.164***
EPI-SP-5021	7.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5022	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND

Table 3-6
PAHs in Soil
1999-2001 Investigations

			Non-Carcinogenic PAHs										Carcinogenic PAHs							
Location	Depth (feet)	Date	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo (g,h,i) perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naphthalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz (a, h) anthracene (mg/kg)	Indeno (1, 2, 3-cd) pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
EPI-SP-5023	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5025	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5026	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5027	7.0	6/14/2001	0.2	ND(<0.1)	0.15	0.36	0.82	ND(<0.1)	--	ND(<0.1)	0.63	0.88	0.48	***0.46***	0.56	0.15	0.45	ND(<0.1)	0.28	***0.612***
EPI-SP-5029	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.21	ND(<0.1)	--	ND(<0.1)	0.22	0.26	0.11	***0.11***	0.15	ND(<0.1)	0.12	ND(<0.1)	ND(<0.1)	***0.137***
EPI-SP-5030	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	0.1	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5031	2.0	6/14/2001	ND(<0.1)	0.27	0.2	0.68	1.4	ND(<0.1)	--	ND(<0.1)	1.4	1.9	0.57	***0.68***	0.86	0.29	0.91	0.12	0.53	***0.962***
EPI-SP-5031	7.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5032	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5033	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5034	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5035	7.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5036	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5037	2.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.14	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	0.12	ND(<0.1)	ND(<0.1)	0.11	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.011
EPI-SP-5038	2.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5039	2.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5040	2.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5041	2.0	6/15/2001	ND(<0.1)	0.26	0.16	0.65	1.2	ND(<0.1)	--	ND(<0.1)	1.1	1.3	0.48	***0.62***	0.85	0.23	0.57	0.13	0.54	***0.888***
EPI-SP-5041	7.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-5042	2.0	6/15/2001	ND(<0.1)	0.12	0.14	0.26	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.18***	0.17	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.26	***0.223***
EPI-SP-7006	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-7007	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.13	ND(<0.1)	--	0.15	0.2	0.13	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-7008	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-8002	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-8003	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-11001	2.0	6/7/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-11002	2.0	6/7/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-11003	2.0	6/7/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
TEF(c)			0.001	0.001	0.01	0.01	0.001	NC	NC	0.001	0.001	0.001	0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels(a)			**NV**	**NV**	**NV**	**NV**	**NV**	**NC**	**NC**	**5**	**NV**	**NV**	**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.100**
MTCA Soil Cleanup Levels (Equation 747-1)(b)			**NV**	**NV**	**5,346,000**	**NV**	**365,000**	**NC**	**NC**	**NV**	**NV**	**15,026,000**	**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

NV – Indicates that no value was available for this compound

NC – Indicates that cleanup levels were not calculated for this compound

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup leve

TEF – Toxicity Equivalency Factor

mg/kg - milligrams per kilogram

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	1,2,4-Trichloro-benzene (mg/kg)	1,2-Dichloro-benzene (mg/kg)	1,3-Dichloro-benzene (mg/kg)	1,4-Dichloro-benzene (mg/kg)	2,3,4,6-Tetrachloro-phenol (mg/kg)	2,4,5-Trichloro-phenol (mg/kg)	2,4,6-Trichloro-phenol (mg/kg)	2,4-Dichloro-phenol (mg/kg)	2,4-Dimethyl-phenol (mg/kg)	2,4-Dinotro-phenol (mg/kg)	2,4-Dinitro-toluene (mg/kg)	2,6-Dichloro-phenol (mg/kg)	2,6-Dinitro-toluene (mg/kg)	2-Chloro-napthhalene (mg/kg)	2-Chloro-phenol (mg/kg)
SP-7001D	6.5-7.5	2/15/1999	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	--	0.014	0.0042 J	ND(<0.0059)	ND(<0.0059)	--	ND(<0.0059)	--	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)
SP-7001S	0.5-1.5	2/15/1999	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	--	0.17	0.0044 J	ND(<0.0054)	ND(<0.0054)	--	ND(<0.0054)	--	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)
SP-7003D	6.5-7.5	2/15/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)
SP-7003S	0.5-1.5	2/15/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-1003D	5.5-7	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)
TP-1003S	1.5-3	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-3002D	5.5-7	2/10/1999	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	--	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	--	ND(<0.0048)	--	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)
TP-3002S	0.5-2	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-3003D	5.5-7	2/12/1999	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	--	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	--	ND(<0.0074)	--	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)
TP-3003S	0.5-2	2/12/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-3004D	5.5-7	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)
TP-3004D (DUP)	5.5-7	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)
TP-3004S	0.5-2	2/11/1999	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)
TP-4001D	6.5-8	2/10/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)
TP-4001S	0.5-2	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-5002D	6.5-8	2/10/1999	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)
TP-5002S	0.5-2	2/10/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-5003D	5.5-7	2/10/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	0.0012 J	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-5003S	1.5-3	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-5007D	4.5-6	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-5007S	0.5-2	2/11/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)
TP-5017D	6-7	2/11/1999	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	--	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	--	ND(<0.0068)	--	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)
TP-5017S	0.5-1.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-6001D	4.5-5.5	2/12/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)
TP-6001S	0.5-1.5	2/12/1999	ND(<0.0047)	0.0015 J	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)
TP-6003D	4.5-5.5	2/12/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-6003S	0.5-1.5	2/12/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-7002D	4.5-5.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-7002S	0.5-1.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-7004D	4.5-5.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-7004S	0.5-1.5	2/11/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-8001D	5.5-6.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	1,2,4-Trichloro-benzene (mg/kg)	1,2-Dichloro-benzene (mg/kg)	1,3-Dichloro-benzene (mg/kg)	1,4-Dichloro-benzene (mg/kg)	2,3,4,6-Tetrachloro-phenol (mg/kg)	2,4,5-Trichloro-phenol (mg/kg)	2,4,6-Trichloro-phenol (mg/kg)	2,4-Dichloro-phenol (mg/kg)	2,4-Dimethyl-phenol (mg/kg)	2,4-Dinotro-phenol (mg/kg)	2,4-Dinitro-toluene (mg/kg)	2,6-Dichloro-phenol (mg/kg)	2,6-Dinitro-toluene (mg/kg)	2-Chloro-napththalene (mg/kg)	2-Chloro-phenol (mg/kg)
TP-8001S	0.5-1.5	2/11/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-9001D	7-8	2/11/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)
TP-9001S	0.5-1.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-10002D	4.5-5.5	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)
TP-10002S	0.5-1.5	2/11/1999	0.0013 J	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)
TP-5018D	6-7	7/14/1999	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	--	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	--	ND(<0.098)	--	ND(<0.098)	ND(<0.098)	ND(<0.098)
TP-5018S	1-2	7/14/1999	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	--	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	--	ND(<0.11)	--	ND(<0.11)	ND(<0.11)	ND(<0.11)
EPI-SP-3005	2	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
EPI-SP-3006	2	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
EPI-SP-3007	2	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
EPI-SP-7006	2	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
EPI-SP-7007	2	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
EPI-SP-8002	2	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
EPI-SP-8003	2	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(0.25)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.1)	ND(<0.1)
MTCA Method A Soil Cleanup Levels(a)			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)(b)			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	2-Methyl-phenol (mg/kg)	2-Nitroaniline (mg/kg)	2-Nitrophenol (mg/kg)	3,3'-Dichloro-benzidine (mg/kg)	3-Nitroaniline (mg/kg)	4,6-Dinitro-2-methyl-phenol (mg/kg)	4-Bromophenyl-phenylether (mg/kg)	4-Chloro-3-methylphenol (mg/kg)	4-Chloroaniline (mg/kg)	4-Chlorophenyl phenylether (mg/kg)	4-Methyl-phenol (mg/kg)	4-Nitroaniline (mg/kg)	4-Nitrophenol (mg/kg)	Aniline (mg/kg)	Azobenzene (mg/kg)
SP-7001D	6.5-7.5	2/15/1999	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	--	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	--	--
SP-7001S	0.5-1.5	2/15/1999	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	--	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	--	--
SP-7003D	6.5-7.5	2/15/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	--
SP-7003S	0.5-1.5	2/15/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	--
TP-1003D	5.5-7	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	--
TP-1003S	1.5-3	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0017 J	ND(<0.0044)	ND(<0.0044)	--	--
TP-3002D	5.5-7	2/10/1999	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	--	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	--	--
TP-3002S	0.5-2	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	--
TP-3003D	5.5-7	2/12/1999	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	--	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	--	--
TP-3003S	0.5-2	2/12/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	--
TP-3004D	5.5-7	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	--
TP-3004D (DUP)	5.5-7	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	--
TP-3004S	0.5-2	2/11/1999	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	0.0035 J	ND(<0.0055)	ND(<0.0055)	--	--
TP-4001D	6.5-8	2/10/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	--
TP-4001S	0.5-2	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-5002D	6.5-8	2/10/1999	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	--
TP-5002S	0.5-2	2/10/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	--
TP-5003D	5.5-7	2/10/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	0.0017 J	ND(<0.0045)	ND(<0.0045)	--	--
TP-5003S	1.5-3	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	--
TP-5007D	4.5-6	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-5007S	0.5-2	2/11/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	--
TP-5017D	6-7	2/11/1999	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	--	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	0.0027 J	ND(<0.0068)	ND(<0.0068)	--	--
TP-5017S	0.5-1.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-6001D	4.5-5.5	2/12/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	--
TP-6001S	0.5-1.5	2/12/1999	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	--
TP-6003D	4.5-5.5	2/12/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	--
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	--
TP-6003S	0.5-1.5	2/12/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-7002D	4.5-5.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-7002S	0.5-1.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	--
TP-7004D	4.5-5.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	--
TP-7004S	0.5-1.5	2/11/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	--
TP-8001D	5.5-6.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	--

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	2-Methyl-phenol (mg/kg)	2-Nitroaniline (mg/kg)	2-Nitrophenol (mg/kg)	3,3'-Dichloro-benzidine (mg/kg)	3-Nitroaniline (mg/kg)	4,6-Dinitro-2-methyl-phenol (mg/kg)	4-Bromophenyl-phenylether (mg/kg)	4-Chloro-3-methylphenol (mg/kg)	4-Chloroaniline (mg/kg)	4-Chlorophenyl phenylether (mg/kg)	4-Methyl-phenol (mg/kg)	4-Nitroaniline (mg/kg)	4-Nitrophenol (mg/kg)	Aniline (mg/kg)	Azobenzene (mg/kg)
TP-8001S	0.5-1.5	2/11/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	--
TP-9001D	7-8	2/11/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	--
TP-9001S	0.5-1.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--
TP-10002D	4.5-5.5	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	--
TP-10002S	0.5-1.5	2/11/1999	0.0047 J	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	0.012	ND(<0.0055)	ND(<0.0055)	--	--
TP-5018D	6-7	7/14/1999	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	--	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	--	--
TP-5018S	1-2	7/14/1999	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	--	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	--	--
EPI-SP-3005	2	6/8/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-3006	2	6/8/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-3007	2	6/8/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-7006	2	6/13/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-7007	2	6/13/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-8002	2	6/13/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-8003	2	6/13/2001	ND(<0.1)	ND(<0.25)	ND(<0.25)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.25)	ND(<0.5)	ND(<0.1)	ND(<0.1)
MTCA Method A Soil Cleanup Levels[(a)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Benzoic Acid (mg/kg)	Benzl Alcohol (mg/kg)	Bis(2-chloroethloxy) methane (mg/kg)	Bis(2-chloroethyl) ether (mg/kg)	Bis(2-chloroisopropyl)ether (mg/kg)	Bis(2-ethylhexyl) phthalate (mg/kg)	Butylbenzylphthalate (mg/kg)	Carbazole (mg/kg)	Dibezofuran (mg/kg)	Diethylphthalate (mg/kg)	Dimethylphthalate (mg/kg)	Di-n-Butylphthalate (mg/kg)	Di-n-octylphthalate (mg/kg)	Hexachlorobenzene (mg/kg)	Hexachlorobutadiene (mg/kg)
SP-7001D	6.5-7.5	2/15/1999	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	0.031	--	--	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	0.0022 J B1	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)
SP-7001S	0.5-1.5	2/15/1999	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	0.012	--	--	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	0.003 J B1	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)
SP-7003D	6.5-7.5	2/15/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.016	--	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.002 J B1	ND(<0.005)	ND(<0.005)	ND(<0.005)
SP-7003S	0.5-1.5	2/15/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.043	--	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.0027J B1	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-1003D	5.5-7	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0037 J	--	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0016 J B1	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	0.0016 J	--	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	0.0015 J B1	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)
TP-1003S	1.5-3	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0015 J	--	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0015 J B1	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-3002D	5.5-7	2/10/1999	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	0.0041 J B1	--	--	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	0.0041 J B1	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)
TP-3002S	0.5-2	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0034 J B1	--	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0033 J B1	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-3003D	5.5-7	2/12/1999	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	0.0048 J	--	--	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	0.0042 J B1	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)
TP-3003S	0.5-2	2/12/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	0.0032 J B1	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-3004D	5.5-7	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	0.0016 J B1	--	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	0.0022 J B1	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)
TP-3004D (DUP)	5.5-7	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	0.0025 J B1	--	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	0.0029 J B1	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)
TP-3004S	0.5-2	2/11/1999	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	0.0033 J B1	--	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	0.0032 J B1	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)
TP-4001D	6.5-8	2/10/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	0.0025 J	--	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	0.0016 J B1	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)
TP-4001S	0.5-2	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0026 J	--	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.002 J B1	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-5002D	6.5-8	2/10/1999	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	--	0.0013 J	ND(<0.0047)	ND(<0.0047)	0.0036 J B1	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)
TP-5002S	0.5-2	2/10/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.01 B1	--	--	0.0025 J	ND(<0.0049)	ND(<0.0049)	0.0046 J B1	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-5003D	5.5-7	2/10/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	--	0.0031 J	ND(<0.0045)	ND(<0.0045)	0.0022 J B1	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-5003S	1.5-3	2/10/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0025 J	--	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0017 J B1	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-5007D	4.5-6	2/10/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0032 J B1	--	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0022 J B1	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-5007S	0.5-2	2/11/1999	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	0.0024 J B1	--	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	0.0028 J B1	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)
TP-5017D	6-7	2/11/1999	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	0.0075 B1	--	--	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	0.002 J B1	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)
TP-5017S	0.5-1.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0029 J B1	--	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.002 J B1	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-6001D	4.5-5.5	2/12/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.0038 J	--	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.025	ND(<0.005)	ND(<0.005)	ND(<0.005)
TP-6001S	0.5-1.5	2/12/1999	ND(<0.0047)	ND(<0.0047)	0.0059	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	--	0.047	ND(<0.0047)	ND(<0.0047)	0.0044 J B1	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)
TP-6003D	4.5-5.5	2/12/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.002 J B1	ND(<0.005)	ND(<0.005)	ND(<0.005)
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	0.0031 J	--	--	0.0012 J	ND(<0.0045)	ND(<0.0045)	0.0015 J B1	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-6003S	0.5-1.5	2/12/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--	0.0043 J	ND(<0.0046)	ND(<0.0046)	0.0022 J B1	0.0013 J	ND(<0.0046)	ND(<0.0046)
TP-7002D	4.5-5.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	0.0017 J B1	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-7002S	0.5-1.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.0058	--	--	0.0015 J	ND(<0.0049)	ND(<0.0049)	0.002 J B1	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-7004D	4.5-5.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.0029 J B1	--	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.0022 J B1	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)
TP-7004S	0.5-1.5	2/11/1999	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0027 J B1	--	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	0.0019 J B1	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)
TP-8001D	5.5-6.5	2/11/1999	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.0027 J B1	--	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	0.0019 J B1	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Benzoic Acid (mg/kg)	Benzl Alcohol (mg/kg)	Bis(2-chloro-ethloxy) methane (mg/kg)	Bis(2-chloroethyl) ether (mg/kg)	Bis(2-chloroiso-propyl)ether (mg/kg)	Bis(2-ethyl-hexyl) phthalate (mg/kg)	Butylbenzyl-phthalate (mg/kg)	Carbazole (mg/kg)	Dibezofuran (mg/kg)	Diethyl-phthalate (mg/kg)	Dimethyl-phthalate (mg/kg)	Di-n-Butylph-thalate (mg/kg)	Di-n-octylph-thalate (mg/kg)	Hexachloro-benzene (mg/kg)	Hexachloro-butadiene (mg/kg)
TP-8001S	0.5-1.5	2/11/1999	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	0.0024 J B1	--	--	ND(<0.0045)	ND(<0.0045)	0.0019 J	0.0029 J B1	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)
TP-9001D	7-8	2/11/1999	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	0.0022 J B1	ND(<0.005)	ND(<0.005)	ND(<0.005)
TP-9001S	0.5-1.5	2/11/1999	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)
TP-10002D	4.5-5.5	2/11/1999	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	0.0024 J	--	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	0.002 J B1	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)
TP-10002S	0.5-1.5	2/11/1999	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	--	0.013	ND(<0.0055)	0.0013 J	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)
TP-5018D	6-7	7/14/1999	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	--	--	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)
TP-5018S	1-2	7/14/1999	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	--	--	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)
EPI-SP-3005	2	6/8/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-3006	2	6/8/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.15)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-3007	2	6/8/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-7006	2	6/13/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-7007	2	6/13/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-8002	2	6/13/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-8003	2	6/13/2001	ND(<1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.13)	ND(<0.1)	ND(<0.1)	ND(<0.1)
MTCA Method A Soil Cleanup Levels[(a)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Hexachlorocyclopentadiene (mg/kg)	Hexachloroethane (mg/kg)	Isophrone (mg/kg)	Nitrobenzene (mg/kg)	N-Nitroso-di-n-propylamine (mg/kg)	N-Nitrosodimethylamine (mg/kg)	N-Nitrosodiphenylamine (mg/kg)	Pentachlorophenol (mg/kg)	Phenol (mg/kg)	Pyridine (mg/kg)
SP-7001D	6.5-7.5	2/15/1999	ND(<0.0059)	--	ND(<0.0059)	ND(<0.0059)	ND(<0.0059)	--	ND(<0.0059)	0.7	ND(<0.0059)	--
SP-7001S	0.5-1.5	2/15/1999	ND(<0.0054)	--	ND(<0.0054)	ND(<0.0054)	ND(<0.0054)	--	ND(<0.0054)	4.2	ND(<0.0054)	--
SP-7003D	6.5-7.5	2/15/1999	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--
SP-7003S	0.5-1.5	2/15/1999	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--
TP-1003D	5.5-7	2/10/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--
TP-1003S	1.5-3	2/10/1999	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--
TP-3002D	5.5-7	2/10/1999	ND(<0.0048)	--	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	--	ND(<0.0048)	ND(<0.0048)	ND(<0.0048)	--
TP-3002S	0.5-2	2/10/1999	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--
TP-3003D	5.5-7	2/12/1999	ND(<0.0074)	--	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	--	ND(<0.0074)	ND(<0.0074)	ND(<0.0074)	--
TP-3003S	0.5-2	2/12/1999	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--
TP-3004D	5.5-7	2/11/1999	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--
TP-3004D (DUP)	5.5-7	2/11/1999	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--
TP-3004S	0.5-2	2/11/1999	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--
TP-4001D	6.5-8	2/10/1999	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--
TP-4001S	0.5-2	2/10/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--
TP-5002D	6.5-8	2/10/1999	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--
TP-5002S	0.5-2	2/10/1999	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	0.013	ND(<0.0049)	--
TP-5003D	5.5-7	2/10/1999	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	0.0013 J	0.14	ND(<0.0045)	--
TP-5003S	1.5-3	2/10/1999	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--
TP-5007D	4.5-6	2/10/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--
TP-5007S	0.5-2	2/11/1999	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--	ND(<0.0043)	ND(<0.0043)	ND(<0.0043)	--
TP-5017D	6-7	2/11/1999	ND(<0.0068)	--	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	--	ND(<0.0068)	ND(<0.0068)	ND(<0.0068)	--
TP-5017S	0.5-1.5	2/11/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--
TP-6001D	4.5-5.5	2/12/1999	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--
TP-6001S	0.5-1.5	2/12/1999	ND(<0.0047)	--	ND(<0.0047)	0.0038 J	ND(<0.0047)	--	ND(<0.0047)	ND(<0.0047)	ND(<0.0047)	--
TP-6003D	4.5-5.5	2/12/1999	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--
TP-6003S	0.5-1.5	2/12/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--
TP-7002D	4.5-5.5	2/11/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	0.0088	ND(<0.0046)	--
TP-7002S	0.5-1.5	2/11/1999	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	0.027	ND(<0.0049)	--
TP-7004D	4.5-5.5	2/11/1999	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	0.23	ND(<0.0049)	--
TP-7004S	0.5-1.5	2/11/1999	ND(<0.0044)	--	ND(<0.0044)	ND(<0.0044)	ND(<0.0044)	--	ND(<0.0044)	0.054	ND(<0.0044)	--
TP-8001D	5.5-6.5	2/11/1999	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--	ND(<0.0049)	ND(<0.0049)	ND(<0.0049)	--

Table 3-7
SVOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Hexachloro-cyclo-pentadiene (mg/kg)	Hexachloro-ethane (mg/kg)	Isophrone (mg/kg)	Nitrobenzene (mg/kg)	N-Nitroso-di-n-propylamine (mg/kg)	N-Nitroso-dimethyl-amine (mg/kg)	N-Nitroso-diphenyl-amine (mg/kg)	Pentachloro-phenol (mg/kg)	Phenol (mg/kg)	Pyridine (mg/kg)
TP-8001S	0.5-1.5	2/11/1999	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--	ND(<0.0045)	ND(<0.0045)	ND(<0.0045)	--
TP-9001D	7-8	2/11/1999	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--	ND(<0.005)	ND(<0.005)	ND(<0.005)	--
TP-9001S	0.5-1.5	2/11/1999	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--	ND(<0.0046)	ND(<0.0046)	ND(<0.0046)	--
TP-10002D	4.5-5.5	2/11/1999	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--	ND(<0.0051)	ND(<0.0051)	ND(<0.0051)	--
TP-10002S	0.5-1.5	2/11/1999	ND(<0.0055)	--	ND(<0.0055)	ND(<0.0055)	ND(<0.0055)	--	ND(<0.0055)	0.0091	0.0086	--
TP-5018D	6-7	7/14/1999	ND(<0.098)	--	ND(<0.098)	ND(<0.098)	ND(<0.098)	--	ND(<0.098)	ND(<0.098)	ND(<0.098)	--
TP-5018S	1-2	7/14/1999	ND(<0.11)	--	ND(<0.11)	ND(<0.11)	ND(<0.11)	--	ND(<0.11)	ND(<0.11)	ND(<0.11)	--
EPI-SP-3005	2	6/8/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-3006	2	6/8/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-3007	2	6/8/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-7006	2	6/13/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-7007	2	6/13/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-8002	2	6/13/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
EPI-SP-8003	2	6/13/2001	ND(<0.5)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.5)	ND(<0.1)	ND(<0.1)
MTCA Method A Soil Cleanup Levels[(a)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample
mg/kg - milligrams per kilogram
J – Estimated concentration

Table 3-8
VOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	1,1,1,2-Tetrachloro-ethane (µg/kg)	1,1,1-Trichloro-ethane (µg/kg)	1,1,2,2-Tetrachloro-ethane (µg/kg)	1,1,2-Trichloro-ethane (µg/kg)	1,1-Dichloro-ethane (µg/kg)	1,1-Dichloro-ethene (µg/kg)	1,2,3-Trichloro-propane (µg/kg)	1,2,4-Trichloro-benzene (µg/kg)	1,2-Dibromo-ethane (µg/kg)	1,2-Dichloro-benzene (µg/kg)	1,2-Dichloro-propane (µg/kg)	1,4-Dichloro-benzene (µg/kg)	2-Butanone (µg/kg)	2-Hexanone (µg/kg)	4-Methyl-2-pentanone (µg/kg)	Acetone (µg/kg)	Acrolein (µg/kg)
SP-2003D	5.5-7	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-2003S	1.5-3	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-5008D	9.5-11	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-5009S	1-2.5	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-5010D	7.5-9	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-5012S	0.5-2	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-6005D	7.5-8.5	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SP-6005S	0.5-1.5	2/15/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-1003D	5.5-7	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<50)	ND(<50)	ND(<50)	ND(<50)	ND(<50)
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<48)	ND(<48)	ND(<48)	ND(<48)	ND(<48)
TP-1003S	1.5-3	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-4001D	6.5-8	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-4001S	0.5-2	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-5003D	5.5-7	2/10/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<55)	ND(<55)	ND(<55)	ND(<55)	ND(<55)
TP-5003S	1.5-3	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-5007D	4.5-6	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<50)	ND(<50)	ND(<50)	ND(<50)	ND(<50)
TP-5007S	0.5-2	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-5016S	0.5-1.5	2/11/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-5017D	6-7	2/11/1999	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<66)	ND(<66)	ND(<66)	7.7 J	ND(<66)
TP-5017S	0.5-1.5	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<52)	ND(<52)	ND(<52)	ND(<52)	ND(<52)
TP-6001D	4.5-5.5	2/12/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<54)	ND(<54)	ND(<54)	ND(<54)	ND(<54)
TP-6001S	0.5-1.5	2/12/1999	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-6001S	0.5-1.5	2/12/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-6003D	4.5-5.5	2/12/1999	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<59)	ND(<59)	ND(<59)	ND(<59)	ND(<59)
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<55)	ND(<55)	ND(<55)	ND(<55)	ND(<55)
TP-6003S	0.5-1.5	2/12/1999	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<47)	ND(<47)	ND(<47)	ND(<47)	ND(<47)
TP-7002D	4.5-5.5	2/12/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-7002S	0.5-1.5	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<55)	ND(<55)	ND(<55)	ND(<55)	ND(<55)
TP-8001D	5.5-6.5	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<54)	ND(<54)	ND(<54)	ND(<54)	ND(<54)
TP-8001S	0.5-1.5	2/11/1999	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<48)	ND(<48)	ND(<48)	ND(<48)	ND(<48)
TP-9001D	7-8	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<55)	ND(<55)	ND(<55)	ND(<55)	ND(<55)
TP-9001S	0.5-1.5	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<51)	ND(<51)	ND(<51)	ND(<51)	ND(<51)
TP-10002D	4.5-5.5	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<57)	ND(<57)	ND(<57)	ND(<57)	ND(<57)
TP-10002S	0.5-1.5	2/11/1999	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<65)	ND(<65)	ND(<65)	ND(<65)	ND(<65)
MTCA Method A Soil Cleanup Levels[(a)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-8
VOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Acrylonitrile (µg/kg)	Benzene (µg/kg)	Bromo-dichloro-methane (µg/kg)	Bromoform (µg/kg)	Bromo-methane (µg/kg)	Carbon Disulfide (µg/kg)	Carbon Tetra-chloride (µg/kg)	Chloro-benzene (µg/kg)	Chloro-ethane (µg/kg)	Chloroform (µg/kg)	Chloro-methane (µg/kg)	cis-1,2-Dichloro-ethene (µg/kg)	cis-1,2-Dichloro-propene (µg/kg)	Dibromo-chloro-methane (µg/kg)	Ethyl-benzene (µg/kg)	Hexachloro-butadiene (µg/kg)	m,p-Xylenes (µg/kg)
SP-2003D	5.5-7	2/15/1999	--	ND(<680)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<680)	--	ND(<1,400)
SP-2003S	1.5-3	2/15/1999	--	ND(<430)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<430)	--	ND(<860)
SP-5008D	9.5-11	2/15/1999	--	ND(<830)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<830)	--	ND(<1,700)
SP-5009S	1-2.5	2/15/1999	--	ND(<560)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<560)	--	ND(<1,100)
SP-5010D	7.5-9	2/15/1999	--	ND(<570)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<570)	--	ND(<1,100)
SP-5012S	0.5-2	2/15/1999	--	ND(<48)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<48)	--	3.4 J
SP-6005D	7.5-8.5	2/15/1999	--	ND(<400)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<400)	--	ND(<800)
SP-6005S	0.5-1.5	2/15/1999	--	ND(<450)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<450)	--	ND(<900)
TP-1003D	5.5-7	2/10/1999	ND(<50)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<48)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<19)
TP-1003S	1.5-3	2/10/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-4001D	6.5-8	2/10/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-4001S	0.5-2	2/10/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-5003D	5.5-7	2/10/1999	ND(<55)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<22)
TP-5003S	1.5-3	2/10/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-5007D	4.5-6	2/11/1999	ND(<50)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-5007S	0.5-2	2/11/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-5016S	0.5-1.5	2/11/1999	--	ND(<470)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<470)	--	ND(<950)
TP-5017D	6-7	2/11/1999	ND(<66)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<27)
TP-5017S	0.5-1.5	2/11/1999	ND(<52)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<21)
TP-6001D	4.5-5.5	2/12/1999	ND(<54)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<21)
TP-6001S	0.5-1.5	2/12/1999	--	ND(<400)	--	--	--	--	--	--	--	--	--	--	--	--	ND(<400)	--	ND(<800)
TP-6001S	0.5-1.5	2/12/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<21)
TP-6003D	4.5-5.5	2/12/1999	ND(<59)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<24)
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<55)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<22)
TP-6003S	0.5-1.5	2/12/1999	ND(<47)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<19)
TP-7002D	4.5-5.5	2/12/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<20)
TP-7002S	0.5-1.5	2/11/1999	ND(<55)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<22)
TP-8001D	5.5-6.5	2/11/1999	ND(<54)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<22)
TP-8001S	0.5-1.5	2/11/1999	ND(<48)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<19)
TP-9001D	7-8	2/11/1999	ND(<55)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<22)
TP-9001S	0.5-1.5	2/11/1999	ND(<51)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<21)
TP-10002D	4.5-5.5	2/11/1999	ND(<57)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<23)
TP-10002S	0.5-1.5	2/11/1999	ND(<65)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<26)
MTCA Method A Soil Cleanup Levels(a)			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)(b)			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-8
VOCs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Methylene Chloride (µg/kg)	Naph-thalene (µg/kg)	o-Xylene (µg/kg)	o-Chloro-toluene (µg/kg)	Styrene (µg/kg)	Tetrachloro-ethene (µg/kg)	Toluene (µg/kg)	trans-1,2-Dichloro-ethene (µg/kg)	trans-1,2-Dichloro-propene (µg/kg)	Trichloro-ethene (µg/kg)	Trichloro-fluoro-methane (µg/kg)	Vinyl Acetate (µg/kg)	Vinyl Chloride (µg/kg)
SP-2003D	5.5-7	2/15/1999	--	--	ND(<680)	--	--	--	ND(<680)	--	--	--	--	--	--
SP-2003S	1.5-3	2/15/1999	--	--	ND(<430)	--	--	--	ND(<430)	--	--	--	--	--	--
SP-5008D	9.5-11	2/15/1999	--	--	ND(<830)	--	--	--	ND(<830)	--	--	--	--	--	--
SP-5009S	1-2.5	2/15/1999	--	--	ND(<560)	--	--	--	ND(<560)	--	--	--	--	--	--
SP-5010D	7.5-9	2/15/1999	--	--	ND(<570)	--	--	--	ND(<570)	--	--	--	--	--	--
SP-5012S	0.5-2	2/15/1999	--	--	ND(<48)	--	--	--	ND(<48)	--	--	--	--	--	--
SP-6005D	7.5-8.5	2/15/1999	--	--	ND(<400)	--	--	--	ND(<400)	--	--	--	--	--	--
SP-6005S	0.5-1.5	2/15/1999	--	--	ND(<450)	--	--	--	ND(<450)	--	--	--	--	--	--
TP-1003D	5.5-7	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)
TP-1003S	1.5-3	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-4001D	6.5-8	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-4001S	0.5-2	2/10/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-5003D	5.5-7	2/10/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-5003S	1.5-3	2/10/1999	1.7 J	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-5007D	4.5-6	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-5007S	0.5-2	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-5016S	0.5-1.5	2/11/1999	--	--	ND(<470)	--	--	--	ND(<470)	--	--	--	--	--	--
TP-5017D	6-7	2/11/1999	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)
TP-5017S	0.5-1.5	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-6001D	4.5-5.5	2/12/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-6001S	0.5-1.5	2/12/1999	--	--	ND(<400)	--	--	--	ND(<400)	--	--	--	--	--	--
TP-6001S	0.5-1.5	2/12/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-6003D	4.5-5.5	2/12/1999	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)	ND(<12)
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-6003S	0.5-1.5	2/12/1999	N(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)	ND(<9.5)
TP-7002D	4.5-5.5	2/12/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-7002S	0.5-1.5	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-8001D	5.5-6.5	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-8001S	0.5-1.5	2/11/1999	1.6 J	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)	ND(<9.6)
TP-9001D	7-8	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-9001S	0.5-1.5	2/11/1999	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)	ND(<10)
TP-10002D	4.5-5.5	2/11/1999	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)	ND(<11)
TP-10002S	0.5-1.5	2/11/1999	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)	ND(<13)
MTCA Method A Soil Cleanup Levels(a)			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)(b)			**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

µg/kg – micrograms/kilogram

J – Estimated concentration

Table 3-9
PCBs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)
TP-1003D	5.5-7	2/10/1999	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-1003S	1.5-3	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-1005D	6-7.5	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-1005S	0.5-2	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-3001D	5.5-7	2/12/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-3001S	0.5-2	2/12/1999	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)
TP-4001D	6.5-8	2/10/1999	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)
TP-4001S	0.5-2	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-5001D	4.5-6	2/10/1999	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)
TP-5001S	0.5-2	2/10/1999	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)
TP-5002D	6.5-8	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-5002S	0.5-2	2/10/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-5003D	5.5-7	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-5003S	1.5-3	2/10/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-5004D	6-7.5	2/10/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-5004S	0.5-2	2/10/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-5007D	4.5-6	2/11/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-5007S	0.5-2	2/11/1999	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)	ND(<0.0099)
TP-5017D	6-7	2/11/1999	ND(<0.014)	ND(<0.014)	ND(<0.014)	ND(<0.014)	ND(<0.014)	ND(<0.014)	ND(<0.014)
TP-5017S	0.5-1.5	2/11/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-6001D	4.5-5.5	2/12/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-6001S	0.5-1.5	2/12/1999	ND(<0.0098)	ND(<0.0098)	ND(<0.0098)	ND(<0.0098)	ND(<0.0098)	ND(<0.0098)	***0.02***
TP-6003D	4.5-5.5	2/12/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)

Table 3-9
PCBs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)
TP-6003D (DUP)	4.5-5.5	2/12/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-6003S	0.5-1.5	2/12/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-6004D	4.5-5.5	2/12/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-6004S	0.5-1.5	2/12/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-7002D	4.5-5.5	2/12/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-7002S	0.5-1.5	2/12/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-7004D	4.5-5.5	2/11/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-7004S	0.5-1.5	2/11/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-8001D	5.5-6.5	2/11/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-8001S	0.5-1.5	2/11/1999	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)	ND(<0.01)
TP-9001D	7-8	2/11/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-9001S	0.5-1.5	2/11/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-10002D	4.5-5.5	2/11/1999	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)	ND(<0.011)
TP-10002S	0.5-1.5	2/11/1999	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	ND(<0.012)	***0.017***
TP-5018D	1-2	7/14/1999	ND(<0.13)	ND(<0.13)	ND(<0.13)	ND(<0.13)	ND(<0.13)	ND(<0.13)	ND(<0.13)
TP-5018S	6-7	7/14/1999	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)	ND(<0.11)
EPI-SP-5020	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5021	2.0	6/14/2001	ND(<0.1)	ND<(0.2)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5022	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5023	2.0	6/8/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5025	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5025	7.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5026	2.0	6/13/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5027	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)

Table 3-9
PCBs in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)
EPI-SP-5030	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5032	2.0	6/14/2001	ND(<0.1)	ND(<0.3)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5034	2.0	6/14/2001	ND(<0.1)	ND(<0.4)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5035	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5036	2.0	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5037	2.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5041	2.0	6/15/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
MTCA Method A Soil Cleanup Levels(a)			**1**(c)	**1**(c)	**1**(c)	**1**(c)	**1**(c)	**1**(c)	**1**(c)
MTCA Soil Cleanup Levels (Equation 747-1)(b)			**0.0028**(c)	**0.0028**(c)	**0.0028**(c)	**0.0028**(c)	**0.0028**(c)	**0.0028**(c)	**0.0028**(c)

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Allowable concentrations for total PCBs in a mixture

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

mg/kg – milligrams/kilogram

Table 3-10
Metals in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Antimony (mg/kg)	Arsenic (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Zinc (mg/kg)
TP-1003D	5.5-7	2/10/1999	ND(<0.59)	0.81	0.083 J	0.08 J	11	12	1.8	ND(<0.088)	16	ND(<0.59)	ND(<0.098)	ND(<0.2)	20
TP-1003D (DUP)	5.5-7	2/10/1999	ND(<0.53)	1.1	0.58 J	0.12 J	14	15	2	ND(<0.078)	18	ND(<0.53)	ND(<0.089)	ND(<0.18)	20
TP-1003S	1.5-3	2/10/1999	ND(<0.59)	1.2	0.098 J	0.08 J	16	17	2	ND(<0.089)	20	ND(<0.59)	ND(<0.098)	ND(<0.2)	23
TP-4001D	6.5-8	2/10/1999	ND(<0.57)	1.7	0.085 J	ND(<0.19)	15	7.9	3.1	ND(<0.085)	34	ND(<0.57)	ND(<0.095)	ND(<0.19)	28
TP-4001S	0.5-2	2/10/1999	ND(<0.6)	1.2	0.13 J	ND(<0.2)	17	14	3.3	ND(<0.09)	30	ND(<0.6)	ND(<0.1)	ND(<0.2)	24
TP-5003D	5.5-7	2/10/1999	ND(<0.59)	1.2	0.1 J	ND(<0.2)	15	11	6.9	***0.56***	30	0.35 J	ND(<0.098)	ND(<0.2)	19
TP-5003S	1.5-3	2/10/1999	ND(<0.56)	0.85	0.15 J	ND(<0.19)	17	15	2.3	0.068	27	ND(<0.56)	ND(<0.093)	ND(<0.19)	22
TP-5007D	4.5-6	2/11/1999	0.36 J	1.5	0.15	ND(<0.2)	***20***	19	2.8	ND(<0.082)	39	0.61	ND(<0.1)	ND(<0.1)	23
TP-5007S	0.5-2	2/11/1999	0.18 J	1.1	0.11	ND(<0.19)	15	9.2	2.4	ND(<0.097)	28	ND(<0.56)	ND(<0.094)	ND(<0.094)	18
TP-5017D	6-7	2/11/1999	5.3	4.3	0.14	0.17 J	***25***	110	110	ND(<0.11)	35	ND(<0.8)	0.3	ND(<0.13)	100
TP-5017S	0.5-1.5	2/11/1999	0.81	2.9	0.32	0.095 J	***31***	24	8.4	ND(<0.096)	84	ND(<0.55)	0.089 J	ND(<0.091)	33
TP-6001D	4.5-5.5	2/12/1999	0.11	0.79	0.1	0.095	15	11	7.1	ND(<0.038)	18	ND(<0.6)	ND(<0.1)	0.081	26
TP-6001S	0.5-1.5	2/12/1999	0.47	1.2	0.086	0.35	15	37	36	0.15	21	ND(<0.55)	ND(<0.091)	ND(<0.091)	44
TP-6003D	4.5-5.5	2/12/1999	0.29	1.4	0.1	0.093	17	17	9.6	0.067	22	ND(<0.63)	ND(<0.11)	ND(<0.11)	43
TP-6003D (DUP)	4.5-5.5	2/12/1999	0.37	1.3	0.089	0.084	16	15	12	0.058	20	ND(<0.56)	ND(<0.094)	ND(<0.094)	45
TP-6003S	0.5-1.5	2/12/1999	0.23	1.9	0.1	0.31	16	19	24	0.14	20	ND(<0.59)	ND(<0.098)	0.069	440
TP-7002D	4.5-5.5	2/12/1999	0.27	1.3	0.084	0.19	17	11	3.8	***0.17***	17	ND(<0.57)	ND(<0.095)	0.18	24
TP-7002S	0.5-1.5	2/12/1999	0.14	1.4	0.1	0.23	14	12	5.7	***0.79***	15	ND(<0.55)	ND(<0.091)	0.15	21
TP-8001D	5.5-6.5	2/11/1999	ND(<0.42)	2.3	ND(<0.1)	0.33	14	7.8	2.3	ND(<0.076)	14	ND(<0.62)	ND(<0.1)	0.22	18
TP-8001S	0.5-1.5	2/11/1999	0.25 J	1	0.12	ND(<0.2)	15	8.6	1.7	ND(<0.083)	29	ND(<0.59)	ND(<0.099)	ND(<0.099)	18
TP-9001D	7-8	2/11/1999	0.2 J	1.5	0.051 J	0.14 J	15	7.4	1.7	ND(<0.091)	17	ND(<0.59)	ND(<0.099)	ND(<0.099)	20
TP-9001S	0.5-1.5	2/11/1999	0.19 J	2	0.061 J	0.2	15	9.9	3.1	***0.17***	16	0.23 J	ND(<0.098)	ND(<0.098)	23
TP-10002D	4.5-5.5	2/11/1999	0.2	1.3	0.12	0.12	15	10	2.7	ND(<0.047)	16	ND(<0.59)	ND(<0.098)	0.16	23
TP-10002S	0.5-1.5	2/11/1999	2.6	1.9	0.14	0.3	***23***	38	74	***0.32***	23	ND(<0.66)	0.096	0.074	100
TP-5018D	6-7	7/14/1999	ND(<1.3)	5.7	ND(<0.63)	ND(<1.3)	***35***	35	72	***0.21***	57	ND(<3.8)	ND(<0.63)	ND(<0.63)	170
TP-5018S	1-2	7/14/1999	ND(<0.96)	3.8	ND(<0.48)	ND(<0.96)	***20***	46	32	***0.18***	34	ND(<2.9)	ND(<0.48)	ND(<0.48)	160
EPI-SP-1007	2.0	6/7/2001	ND(<18)	***22***	ND(<0.8)	ND(<2)	***28***	22	ND(<15)	ND(<0.02)	36	ND(<13)	ND(<2)	ND(<50)	41
EPI-SP-1007	7.0	6/7/2001	--	11	--	--	***30***	--	ND(<8)	--	--	--	--	--	--
EPI-SP-1008	2.0	6/7/2001	ND(<14)	***21***	ND(<0.6)	ND(<1)	***20***	44	140	ND(<.02)	24	ND(<10)	ND(<2)	ND(<40)	96
EPI-SP-1008	7.0	6/7/2001	--	14	--	--	***32***	--	12	--	--	--	--	--	--
EPI-SP-3005	2.0	6/8/2001	ND(<59)	ND(<26)	ND(<3)	ND(<5)	12	150	***870***	ND(<0.02)	ND(<17)	ND(<42)	ND(<6)	ND(<170)	140
EPI-SP-3005	7.0	6/8/2001	--	ND(<8)	--	--	***28***	--	27	--	--	--	--	--	--
EPI-SP-3006	2.0	6/8/2001	ND(<110)	ND(45)	ND(<5)	ND(<8)	ND(<15)	250	***360***	0.03	ND(<30)	ND(<74)	ND(<11)	ND(<300)	170
EPI-SP-3006	7.0	6/8/2001	--	5.9	--	--	4.9	--	42	--	--	--	--	--	--
EPI-SP-3007	2.0	6/8/2001	ND(<16)	***25***	ND(<0.7)	ND(<1)	***51***	47	ND(<13)	ND(<0.02)	76	ND(<11)	ND(<2)	ND(<43)	86
EPI-SP-3007	7.0	6/8/2001	--	ND(<46)	--	--	ND(<15)	--	120	--	--	--	--	--	--
EPI-SP-5021	2.0	6/14/2001	ND(<14)	ND(<6)	ND(<0.6)	ND(<1)	***31***	260	***1,700***	***0.57***	35	ND(<10)	ND(<2)	ND(<40)	330
EPI-SP-5021	7.0	6/14/2001	--	ND(<8)	--	--	***26***	--	ND(<16)	--	--	--	--	--	--
EPI-SP-5025	2.0	6/13/2001	ND(<16)	ND(<7)	ND(0.7)	ND(<1)	***23***	12	ND(<14)	0.02	44	ND(<11)	ND(<2)	ND(<45)	38
EPI-SP-5025	7.0	6/13/2001	--	ND(<8)	--	--	16	--	30	--	--	--	--	--	--
EPI-SP-5026	2.0	6/13/2001	ND(<7)	5.5	ND(<0.3)	ND(<0.5)	***25***	29	ND(<6)	0.02	40	ND(<5)	ND(<0.7)	ND(<20)	38

Table 3-10
Metals in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	Antimony (mg/kg)	Arsenic (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Zinc (mg/kg)
EPI-SP-5026	7.0	6/13/2001	--	13	--	--	***46***	--	33	--	--	--	--	--	--
EPI-SP-5029	2.0	6/14/2001	ND(<18)	ND(<8)	ND(<0.8)	ND(<2)	***38***	94	84	0.04	56	ND(<13)	ND(<2)	ND(<50)	130
EPI-SP-5030	2.0	6/14/2001	ND(<17)	ND(<7)	ND(<0.7)	ND(<2)	***23***	74	43	0.02	44	ND(<12)	ND(<2)	ND(<47)	730
EPI-SP-5030	7.0	6/14/2001	--	ND(<9)	--	--	17	--	46	--	--	--	--	--	--
EPI-SP-5037	2.0	6/15/2007	ND(<18)	18	ND(<0.8)	ND(<2)	18	20	ND(<16)	0.02	30	ND(<13)	MD(<2)	ND(<51)	190
EPI-SP-5038	2.0	6/15/2007	ND(<9)	10	ND(<0.4)	ND(<0.7)	***26***	20	35	0.05	44	ND(<7)	ND(<0.9)	ND(<26)	63
EPI-SP-7005	2.0	6/13/2007	ND(<8)	5	ND(<0.3)	ND(<0.6)	11	ND(<0.7)	ND(<7)	***0.61***	12	ND(<6)	ND(<0.8)	ND(<21)	31
EPI-SP-8002	2.0	6/13/2007	ND(<8)	5.1	ND(<0.3)	ND(<0.5)	14	ND(<0.7)	ND(<7)	ND(<0.02)	17	ND(<6)	ND(<8)	ND(<21)	27
EPI-SP-8003	2.0	6/13/2007	ND(<7)	7.1	ND(<0.3)	ND(<0.5)	17	1.2	ND(<6)	ND(<0.02)	20	ND(<5)	ND(<0.7)	ND(<19)	27
MTCA Method A Soil Cleanup Level(a)			**NV**	**20**	**NV**	**2**	**19(c)**	**NV**	**250**	**2**	**NV**	**NV**	**NV**	**NV**	**NV**
MTCA Soil Cleanup Levels (Equation 747-1)(b)			**25.8**	**21**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.16**	**6,008**	**NV**	**NV**	**9**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Chromium VI value, Chromium III value is 2,000 mg/kg

NV – Indicates that no value was available for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

mg/kg – milligrams/kilogram

J – Estimated concentration

Table 3-11
Wood Treatment Compounds in Soil
1999-2001 Investigations

Location	Depth (feet)	Date	2-Mercapto-benzothiazole (mg/kg)	Dicecyldimethyl ammonium chloride (mg/kg)
SP-6005D	7.5-8.5	2/15/1999	ND(<0.2)	--
SP-6005S	0.5-1.5	2/15/1999	0.16 J	--
TP-4001D	6.5-8	2/10/1999	ND(<0.21)	--
TP-4001S	0.5-2	2/10/1999	ND(<0.21)	--
TP-8001D	5.5-6.5	2/11/1999	--	ND(<0.28)
TP-8001S	0.5-1.5	2/11/1999	--	ND(<0.27)
TP-9001D	7-8	2/11/1999	ND(<0.21)	--
TP-9001S	0.5-1.5	2/11/1999	ND(<0.2)	--
MTCA Method A Soil Cleanup Level[(a)]			**NC**	**NC**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]			**NC**	**NC**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

J – Estimated concentration

Table 3-12
Summary of Groundwater Sample Analyses
1999-2001 Investigations

Location	Date	TPH-Gx	TPH-Dx	VOCs	SVOCs	PAHs	PCBs	Metals - Total	Metals-Dissolved	Wood Treatment
Potential Source Area 1 - Diesel Storage/Train House										
MW-2	07/15/99		x	x	x		x		x	x
MW-2 DUP	07/15/99		x	x	x		x		x	x
MW-2	11/16/99								x2	
MW-2	06/15/01								x	
Potential Source Area 2 - Fueling Area										
EPI-SP-2004	6/7/2001		x			x				
Potential Source Area 3 - Wood Treatment										
EPI-SP-3006	6/8/2001		x		x	x		x		
Potential Source Area 5 - Maintenance Area/Boiler/Sawmill										
MW-4	07/15/99		x	x	x		x		x	x
MW-4	11/16/99								x2	
MW-4	06/15/01								x	
MW-5	07/15/99		x	x	x		x		x	x
MW-5	11/16/99									
MW-5	06/14/01								x	
EPI-SP-5020	6/8/2001		x			x	x	x		
EPI-SP-5021	6/14/2001		x				x	x		
EPI-SP-5025	6/13/2001		x			x			x	
EPI-SP-5030	6/14/2001							x		
EPI-SP-5039	6/15/2001		x			x			x	
Potential Source Area 6 - Bull Chain Area										
MW-6	07/15/99		x	x	x		x		x	x
MW-6	11/17/99								x2	
MW-6	06/14/01								x	
Potential Source Area 7 - Wood Treatment 2										
MW-7	07/15/99		x	x	x		x		x	x
MW-7	11/17/99									
MW-7	06/15/01								x	
Potential Source Area 8 - Wood Treatment 3										
EPI-SP-8002	6/13/2001				x	x			x	
Potential Source Area 10 - Locomotive Shed										
MW-8	07/15/99		x	x	x		x		x	x
MW-8	11/17/99									
MW-8	37057								x	
Potential Source Area 11 - Fuel Oil Storage										
MW-3	36356		x	x	x		x		x	x
MW-3	36480								x2	
MW-3	37056								x	
EPI-SP-11001	37049		x			x		x		
Northern Portion of Site										
MW-1	36356		x	x	x		x		x	x
MW-1	36480									
MW-1	37057								x	

Notes:

x2 – Indicates only arsenic was analyzed for this sample

Table 3-13
Petroleum Hydrocarbons in Groundwater
1999-2001 Investigations

Location	Date	Diesel-Range Petroleum Hydrocarbons (µg/L)	Oil-Range Petroleum Hydrocarbons (µg/L)
MW-1	07/15/99	150 J	360 J
MW-2	07/15/99	ND(<250)	270 J
MW-2 DUP	07/15/99	ND(<250)	ND(<490)
MW-3	07/15/99	140 J	370 J
MW-4	07/15/99	220 J	370 J
MW-5	07/15/99	280 J	270 J
MW-6	07/15/99	ND(<250)	360 J
MW-7	07/15/99	120 J	280 J
MW-8	07/15/99	ND(<250)	310 J
EPI-SP-2004	6/11/2001	ND(<500)	
EPI-SP-3006	6/11/2001	ND(<500)	
EPI-SP-5020	6/11/2001	ND(<500)	
EPI-SP-5021	6/14/2001	ND(<500)	
EPI-SP-5025	6/11/2001	ND(<500)	
EPI-SP-5039	6/15/2001	ND(<500)	
EPI-SP-11001	6/11/2001	ND(<500)	
MTCA Method A Ground Water Cleanup Level[(a)]		**500**	**500**
MTCA Marine Water Chronic Criteria[(b)]		**NV**	**NV**
EPA Surface Water Cleanup Levels[(c)]		**NV**	**NV**

Notes:

(a) MTCA Method A Ground Water Cleanup Level (WAC 173-340-900, Table 720-1)
(b) Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic
(c) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of
NV – Indicates that no value was available for this compound
ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample
µg/L – micrograms/liter
J – Estimated concentration

Table 3-14
PAHs in Groundwater
1999-2001 Investigations

		Non-Carcinogenic PAHs										Carcinogenic PAHs							
Location	Date	Acenaph-thene (µg/L)	Acenaph-thylene (µg/L)	Anthracene (µg/L)	Benzo(g,h,i)-perylene (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	2-methyl-naphthalene (µg/L)	Napthalene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)	Benzo(a) anthracene (µg/L)	Benzo(a) pyrene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a, h) anthracene (µg/L)	Indeno(1, 2, 3-cd)pyrene (µg/L)	Total cPAHs (TEF Modified) (µg/L)
MW-1	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
MW-2	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
MW-2 DUP	07/15/99	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND
MW-3	07/15/99	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND(<0.099)	ND
MW-4	07/15/99	0.35	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	0.17	0.42	0.18	0.11	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND
MW-5	07/15/99	2.8	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	0.46	1.2	13	0.23	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND(<0.097)	ND
MW-6	07/15/99	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND
MW-7	07/15/99	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND
MW-8	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
EPI-SP-2004	6/11/2001	0.1	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	--	0.02****	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
EPI-SP-3006	6/11/2001	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND
EPI-SP-5020	6/11/2001	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	--	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
EPI-SP-5025	6/11/2001	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	--	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
EPI-SP-5039	6/15/2001	0.08	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	--	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
EPI-SP-8002	6/11/2001	0.13	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	--	ND(<0.02)	ND(<0.02)	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
EPI-SP-11001	6/11/2001	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	--	ND(<0.02)	ND(<0.02)	0.13	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TEF[(a)]		0.001	0.001	0.01	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.1	1	0.1	0.1	0.01	0.4	0.1	NV
EPA Surface Water Cleanup Levels[(b)]		**NV**	**NV**	**110,000**	**NV**	**370**	**14,000**	**NV**	**NV**	**NV**	**11,000**	**0.031**	**0.031**	**0.031**	**0.031**	**0.031**	**0.031**	**0.031**	**NV**

Notes:

(a) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

(b) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

NV – Indicates that no value was available for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

TEF – Toxicity Equivalency Factor

µg/L – micrograms/Liter

Table 3-15
SVOCs in Groundwater
1999-2001 Investigations

Location	Date	1,2,4-Trichloro-benzene (µg/L)	1,2-Dichloro-benzene (µg/L)	1,3-Dichloro-benzene (µg/L)	1,4-Dichloro-benzene (µg/L)	2,4,5-Trichloro-phenol (µg/L)	2,4,6-Trichloro-phenol (µg/L)	2,4-Dichloro-phenol (µg/L)	2,4-Dimethyl-phenol (µg/L)	2,4-Dinitrophenol (µg/L)	2,4-Dinitro-toluene (µg/L)	2,6-Dinitro-toluene (µg/L)	2-Chloro-napththalene (µg/L)	2-Chlorophenol (µg/L)	2-Methyl-phenol (µg/L)
MW-1	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.2)	ND(<0.5)	ND(<0.5)
MW-2	07/15/99	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.2)	ND(<0.51)	ND(<0.51)
MW-2 DUP	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.2)	ND(<0.49)	ND(<0.49)
MW-3	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.2)	ND(<0.5)	ND(<0.5)
MW-4	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)
MW-5	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	0.17 J	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)
MW-6	07/15/99	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)
MW-7	07/15/99	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)
MW-8	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
EPI-SP-3006	6/11/2001	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<10)	ND(<5)	ND(<5)	ND(<2)	ND(<2)	ND(<2)
EPI-SP-8002	6/11/2001	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<10)	ND(<5)	ND(<5)	ND(<2)	ND(<2)	ND(<2)
EPA Surface Water Cleanup Levels(a)		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-15
SVOCs in Groundwater
1999-2001 Investigations

Location	Date	2-Nitroaniline (µg/L)	2-Nitrophenol (µg/L)	3-Nitroaniline (µg/L)	4,6-Dinitro-2-methylphenol (µg/L)	4-Bromophenyl phenylether (µg/L)	4-Chloro-3-methylphenol (µg/L)	4-Chlorophenyl phenylether (µg/L)	4-Chloroaniline (µg/L)	4-Nitroaniline (µg/L)	4-Nitrophenol (µg/L)	Bis(2-chloro-ethoxy) methane (µg/L)	Bis(2-chloroethyl) ether (µg/L)	Bis(2-chloroisopropyl) ether (µg/L)	Bis(2-ethylhexyl) phthalate (µg/L)
MW-1	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
MW-2	07/15/99	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<1)
MW-2 DUP	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.98)
MW-3	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.99)
MW-4	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.97)
MW-5	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.97)
MW-6	07/15/99	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.96)
MW-7	07/15/99	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.96)
MW-8	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<1)
EPI-SP-3006	6/11/2001	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<5)	ND(<10)	ND(<2)	ND(<2)	ND(<2)	4****
EPI-SP-8002	6/11/2001	ND(<5)	ND(<5)	ND(<5)	ND(<10)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<5)	ND(<10)	ND(<2)	ND(<2)	ND(<2)	3****
EPA Surface Water Cleanup Levels[(a)]		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NV**

Table 3-15
SVOCs in Groundwater
1999-2001 Investigations

Location	Date	Buytl benzyl phthalate (µg/L)	Di-n-butylph-thalate (µg/L)	Di-n-octylph-thalate (µg/L)	Dibenzo-furan (µg/L)	Diethylph-thalate (µg/L)	Dimethyl-phthalate (µg/L)	Hexachloro-benzene (µg/L)	Hexachloro-butadiene (µg/L)	Hexachloro-cyclopen-tadiene (µg/L)	Hexachloro-ethane (µg/L)	Isophorone (µg/L)	N-Nitroso-diphenyl-amine (µg/L)	Nitrobenzene (µg/L)	Pentachloro-phenol (µg/L)	Phenol (µg/L)
MW-1	07/15/99	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
MW-2	07/15/99	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)	ND(<0.51)
MW-2 DUP	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)
MW-3	07/15/99	ND(<0.5)	0.17 J	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
MW-4	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)
MW-5	07/15/99	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)	ND(<0.49)
MW-6	07/15/99	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)
MW-7	07/15/99	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)	ND(<0.48)
MW-8	07/15/99	ND(<0.5)	ND(<5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
EPI-SP-3006	6/11/2001	ND(<2)	6****	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<10)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<10)	ND(<2)
EPI-SP-8002	6/11/2001	ND(<2)	5****	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<10)	ND(<2)	ND(<2)	ND(<2)	ND(<2)	ND(<10)	ND(<2)
EPA Surface Water Cleanup Levels$^{(a)}$		**NC**	**NV**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Notes:

(a) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

µg/L – micrograms/Liter

**** – Result may be due to laboratory contamination

J – Estimated concentration

Table 3-16
VOCs in Groundwater
1999-2001 Investigations

Location	Date	1,1,1-Trichloro-ethane (µg/L)	1,1,1,2-Tetrachloro-ethane (µg/L)	1,1,2,2-Tetrachloro-ethane (µg/L)	1,1,2-Trichloro-ethane (µg/L)	1,1-Dichloro-ethane (µg/L)	1,2,3-Trichloro-propane (µg/L)	1,2,4-Trichloro-benzene (µg/L)	1,2-Dibromo-ethane (µg/L)
MW-1	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2 DUP	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-3	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-4	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-5	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	0.095 J	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-6	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-7	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-8	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
EPA Surface Water Cleanup Levels$^{(a)}$		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-16
VOCs in Groundwater
1999-2001 Investigations

Location	Date	1,2-Dichloro-benzene (µg/L)	1,2-Dichloro-ethane (total) (µg/L)	1,2-Dichloro-propane (µg/L)	1,4-Dichloro-benzene (µg/L)	Benzene (µg/L)	Bromo-dichloro-methane (µg/L)	Bromoform (µg/L)
MW-1	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2 DUP	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-3	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-4	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-5	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-6	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-7	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-8	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
EPA Surface Water Cleanup Levels[(a)]		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-16
VOCs in Groundwater
1999-2001 Investigations

Location	Date	Bromo-methane (µg/L)	Carbon Tetra-chloride (µg/L)	Chloro-benzene (µg/L)	Chloro-ethane (µg/L)	Chloroform (µg/L)	Chloro-methane (µg/L)	cis-1,2-Dichloro-ethene (µg/L)
MW-1	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	0.068 J	ND(<0.4)	ND(<0.4)
MW-2	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2 DUP	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-3	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-4	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-5	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-6	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-7	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-8	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
EPA Surface Water Cleanup Levels$^{(a)}$		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Table 3-16
VOCs in Groundwater
1999-2001 Investigations

Location	Date	cis-1,3-Dichloro-propene (µg/L)	Dibromo-chloro-methane (µg/L)	Ethylbenzene (µg/L)	Hexachloro-butadiene (µg/L)	m,p-Xylenes (µg/L)	Methylene Chloride (µg/L)	Naphthalene (µg/L)
MW-1	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2 DUP	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-3	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-4	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	0.14 J
MW-5	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	8.4 D
MW-6	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-7	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-8	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
EPA Surface Water Cleanup Levels$^{(a)}$		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NV**

Table 3-16
VOCs in Groundwater
1999-2001 Investigations

Location	Date	o-Xylene (µg/L)	Styrene (µg/L)	Toluene (µg/L)	trans-1,2-Dichloro-ethene (µg/L)	trans-1,3-Dichloro-propene (µg/L)	Trichloro-fluoro-methane (µg/L)	Vinyl Chloride (µg/L)
MW-1	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-2 DUP	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-3	07/15/99	ND(<0.4)	ND(<0.4)	0.11 J	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-4	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-5	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-6	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-7	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
MW-8	07/15/99	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)	ND(<0.4)
EPA Surface Water Cleanup Levels[(a)]		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Notes:

(a) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

NC – Indicates that cleanup levels were not calculated for this compound
ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample
NV – Indicates that no value was available for this compound
µg/L – micrograms/Liter

Table 3-17
PCBs in Groundwater
1999-2001 Investigations

Location	Date	Aroclor 1016 (µg/L)	Aroclor 1221 (µg/L)	Arochlor 1232 (µg/L)	Arochlor 1242 (µg/L)	Arochlor 1248 (µg/L)	Arochlor 1254 (µg/L)	Arochlor 1260 (µg/L)
MW-1	07/15/99	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)
MW-2	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
MW-2 DUP	07/15/99	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)
MW-3	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
MW-4	07/15/99	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)
MW-5	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
MW-6	07/15/99	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)	ND(<0.098)
MW-7	07/15/99	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)	ND(<0.096)
MW-8	07/15/99	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5020	6/11/2001	ND(<0.1)	ND<1	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
EPI-SP-5021	6/14/2001	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)
MTCA Method A Ground Water Cleanup Levels[b]		**1**[a]	**1**[a]	**1**[a]	**1**[a]	**1**[a]	**1**[a]	**1**[a]
MTCA Marine Water Chronic Criteria[c]		**0.03**[a]	**0.03**[a]	**0.03**[a]	**0.03**[a]	**0.03**[a]	**0.03**[a]	**0.03**[a]
EPA Surface Water Cleanup Levels[d]		**0.00017**[a]	**0.00017**[a]	**0.00017**[a]	**0.00017**[a]	**0.00017**[a]	**0.00017**[a]	**0.00017**[a]

Notes:

(a) Allowable concentrations for total PCBs in a mixture

(b) MTCA Method A Ground Water Cleanup Level (WAC 173-340-900, Table 720-1)

(c) Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms

(d) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

µg/L – micrograms/Liter

Table 3-18
Metals in Groundwater
1999-2001 Investigations

Location	Date	Antimony		Arsenic		Beryllium		Cadmium		Chromium		Copper		Lead	
		Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
MW-1	07/15/99	--	ND(<1)	--	ND(<1)	--	ND(<0.5)	--	ND(<1)	--	ND(<1)	--	ND(<1)	--	ND(<1)
	06/15/01	--	ND(<70)	--	ND(<5)	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
MW-2	07/15/99	--	ND(<1)	--	***87***	--	ND(<0.5)	--	ND(<1)	--	27	--	***5.1***	--	ND(<1)
	11/16/99	--	--	--	***31***	--	--	--	--	--	--	--	--	--	--
	06/15/01	--	ND(<140)	--	ND(<5)	--	ND(<6)	--	ND(<10)	--	ND(<20)	--	ND(<12)	--	ND(<4)
MW-2 DUP	07/15/99	--	ND(<1)	--	***92***	--	ND(<0.5)	--	ND(<1)	--	22	--	***5.5***	--	ND(<1)
	11/16/99	--	--	--	***39***	--	--	--	--	--	--	--	--	--	--
MW-3	07/15/99	--	ND(<1)	--	***3.3***	--	ND(<0.5)	--	ND(<1)	--	ND(<1)	--	ND(<1)	--	ND(<1)
	11/16/99	--	--	--	***3.24***	--	--	--	--	--	--	--	--	--	--
	06/14/01	--	ND(<70)	--	ND(<5)	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
MW-4	07/15/99	--	ND(<1)	--	***1.6***	--	ND(<0.5)	--	ND(<1)	--	12	--	ND(<1)	--	ND(<1)
	11/16/99	--	--	--	***0.977***	--	--	--	--	--	--	--	--	--	--
	06/15/01	--	ND(<70)	--	ND(<5)	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
MW-5	07/15/99	--	ND(<1)	--	***1.4***	--	ND(<0.5)	--	ND(<1)	--	8.4	--	ND(<1)	--	ND(<1)
	06/14/01	--	ND(<70)	--	ND(<5)	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
MW-6	07/15/99	--	ND(<1)	--	***5.6***	--	ND(<0.5)	--	ND(<1)	--	ND(<1)	--	ND(<1)	--	ND(<1)
	11/17/99	--	--	--	***5.74***	--	--	--	--	--	--	--	--	--	--
	06/14/01	--	ND(<70)	--	***5***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
MW-7	07/15/99	--	ND(<1)	--	***1.1***	--	ND(<0.5)	--	ND(<1)	--	ND(<1)	--	ND(<1)	--	ND(<1)
	06/15/01	--	ND(<70)	--	***13***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
MW-8	07/15/99	--	ND(<1)	--	***6.9***	--	ND(<0.5)	--	ND(<1)	--	ND(<1)	--	ND(<1)	--	ND(<1)
	06/15/01	--	ND(<70)	--	***16***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)
EPI-SP-3006	6/11/2001	ND(<60)	--	***21***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
EPI-SP-5020	6/11/2001	ND(<60)	--	***6***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
EPI-SP-5021	6/14/2001	ND(<70)	--	***14***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
EPI-SP-5025	6/11/2001	ND(<140)	--	ND(<5)	--	ND(<6)	--	ND(<10)	--	30	--	ND(<12)	--	ND(<4)	--
EPI-SP-5030	6/14/2001	ND(<70)	--	***23***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
EPI-SP-5039	6/15/2001	ND(<70)	--	***21***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
EPI-SP-8002	6/11/2001	ND(<70)	--	***10***	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
EPI-SP-11001	6/11/2001	ND(<60)	--	ND(<5)	--	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<4)	--
MTCA Marine Water Chronic Criteria[(a)]		**NV**		36		**NV**		9.3		50		3.1		8.1	
EPA Surface Water Cleanup Levels[(b)]		**4,300**		0.14		**NV**		**NV**		**NV**		**NV**		**NV**	

Table 3-18
Metals in Groundwater
1999-2001 Investigations

Location	Date	Mercury		Nickel		Selenium		Silver		Thallium		Zinc	
		Total	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**
MW-1	07/15/99	--	ND(<0.2)	--	2.2	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	40
	06/15/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
MW-2	07/15/99	--	ND(<0.2)	--	***23***	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	22
	11/16/99	--	--	--	--	--	--	--	--	--	--	--	--
	06/15/01	--	ND(<0.2)	--	ND(<40)	--	ND(<100)	--	ND(<14)	--	ND(<5)	--	ND(<14)
MW-2 DUP	07/15/99	--	ND(<0.2)	--	***24***	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	20
	11/16/99	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	07/15/99	--	ND(<0.2)	--	4.7	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	26
	11/16/99	--	--	--	--	--	--	--	--	--	--	--	--
	06/14/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
MW-4	07/15/99	--	ND(<0.2)	--	6.1	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	4.6
	11/16/99	--	--	--	--	--	--	--	--	--	--	--	--
	06/15/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
MW-5	07/15/99	--	***5.3***	--	5.3	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	6.2
	06/14/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
MW-6	07/15/99	--	ND(<0.2)	--	4.6	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	18
	11/17/99	--	--	--	--	--	--	--	--	--	--	--	--
	06/14/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
MW-7	07/15/99	--	ND(<0.2)	--	6.5	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	14
	06/15/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
MW-8	07/15/99	--	ND(<0.2)	--	2.2	--	ND(<10)	--	ND(<0.5)	--	ND(<0.5)	--	13
	06/15/01	--	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)
EPI-SP-3006	6/11/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)	--
EPI-SP-5020	6/11/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)	--
EPI-SP-5021	6/14/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	16	--
EPI-SP-5025	6/11/2001	ND(<0.2)	--	ND(<40)	--	ND(<100)	--	ND(<14)	--	ND(<5)	--	ND(<14)	--
EPI-SP-5030	6/14/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	14	--
EPI-SP-5039	6/15/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	81	--
EPI-SP-8002	6/11/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	ND(<7)	--
EPI-SP-11001	6/11/2001	ND(<0.2)	--	ND(<20)	--	ND(<50)	--	ND(<7)	--	ND(<5)	--	70	--
MTCA Marine Water Chronic Criteria(a)		**0.025**		**8.2**		**71**		**1.9**		**NV**		**81**	
EPA Surface Water Cleanup Levels(b)		**0.15**		**4,600**		**NV**		**NV**		**6.3**		**NV**	

Notes:

(a) Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms

(b) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

NV – Indicates that no value was available for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

Bold and Highlighted - Indicates detected concentration exceeds a MTCA soil cleanup level

Table 3-19
Wood Treatment Compounds in Groundwater
1999-2001 Investigations

Location	Date	2-Mercapto-benzothiazole (µg/L)	Didecyl dimethyl ammonium chloride (µg/L)
MW-1	07/15/99	ND(<1.6)	ND(<4)
MW-2	07/15/99	ND(<1.6)	ND(<4)
MW-2 DUP	07/15/99	ND(<1.6)	ND(<4)
MW-3	07/15/99	ND(<1.6)	ND(<4)
MW-4	07/15/99	ND(<1.6)	ND(<4)
MW-5	07/15/99	ND(<1.6)	ND(<4)
MW-6	07/15/99	ND(<1.6)	ND(<4)
MW-7	07/15/99	ND(<1.6)	ND(<4)
MW-8	07/15/99	ND(<1.6)	ND(<4)
EPA Surface Water Cleanup Levels[(a)]		**NC**	**NC**

Notes:

(a) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

NC – Indicates that cleanup levels were not calculated for this compound

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

µg/L – micrograms/liter

Table 3-20
Summary of Sediment Management Standards Chemical Criteria

Chemicals	Sediment Quality Standard	Cleanup Screening Level
Conventionals (%)		
Total organic carbon	--	--
Total volatile solids (%)	--	--
Porewater sulfide (mg/L)	--	--
Metals (mg/kg)		
Arsenic	57	93
Cadmium	5.1	6.7
Chromium	260	270
Copper	390	390
Lead	450	530
Mercury	0.41	0.59
Silver	6.1	6.1
Zinc	410	960
PCBs (mg/kg-OC)		
Total PCBs	12	65
LPAHs (mg/kg-OC)		
Naphthalene	99	170
Acenaphthylene	66	66
Acenaphthene	16	57
Fluorene	23	79
Phenanthrene	100	480
Anthracene	220	1,200
2-Methylnaphthalene	38	64
Total LPAH	370	780
HPAHs (mg/kg-OC)		
Fluoranthene	160	1,200
Pyrene	1,000	1,400
Benzo(a)anthracene	110	270
Chrysene	110	460
Total benzofluoranthenes	230	450
Benzo(a)pyrene	99	210
Indeno(1,2,3-cd)pyrene	34	88
Dibenzo(a,h)anthracene	12	33
Benzo(g,h,i)perylene	31	78
Total HPAH	960	5,300

Table 3-20
Summary of Sediment Management Standards Chemical Criteria

Chemicals	Sediment Quality Standard	Cleanup Screening Level
Misc. SVOCs (mg/kg-OC)		
1,2-Dichlorobenzene	2.3	2.3
1,4-Dichlorobenzene	3.1	9
1,2,4-Trichlorobenzene	0.81	1.8
Hexachlorobenzene	0.38	2.3
Dimethylphthalate	53	53
Diethylphthalate	61	110
Di-n-butylphthalate	220	1,700
Butylbenzylphthalate	4.9	64
bis(2-ethylhexyl)phthalate	47	78
Di-n-octylphthalate	58	4,500
Dibenzofuran	15	58
Hexachlorobutadiene	3.9	6.2
n-Nitroso-di-phenylamine	11	11
Misc. Ionizable SVOCs (µg/kg)		
Phenol	420	1,200
2-Methylphenol	63	63
4-Methylphenol	670	670
2,4-Dimethylphenol	29	29
Pentachlorophenol	360	690
Benzyl alcohol	57	73
Benzoic acid	650	650

Table 3-21
Summary of Sediment Management Standards Biological Effects Criteria

Biological Test	Test Performance Standards	Sediment Quality Standards	Sediment Cleanup Screening Levels, or Minimum Cleanup Levels
Amphipod	The control sediment shall have less than 10 percent mortality over the test period. The reference sediment shall have less than 25 percent mortality.	The test sediment has a significantly higher (t-test, P≤ 0.05) mean mortality than the reference sediment, and the test sediment mean mortality exceeds 25 percent on an absolute basis.	The test sediment has a significantly higher (t-test, P≤ 0.05) mean mortality than the reference sediment, and the test sediment mean mortality is more than 30 percent greater, on an absolute basis, than the reference sediment mean mortality.
Larval	The seawater control sample shall have less than 30 percent combined abnormality and mortality (i.e., a 70 percent normal survivorship at time final).	The test sediment has a mean survivorship of normal larvae that is significantly less (t-test, P≤ 0.05) than the mean normal survivorship in the reference sediment, and the combined abnormality and mortality in the test sediment is more than 15 percent greater, on an absolute basis, than the reference sediment.	The test sediment has a mean survivorship of normal larvae that is significantly less (t-test, P≤ 0.05) than the mean normal survivorship in the reference sediment, and the combined abnormality and mortality in the test sediment is more than 30 percent greater, on an absolute basis, than that in the reference sediment.
Juvenile polychaete	The control sediment shall have less than 10 percent mortality and mean individual growth (MIG) of ≥ 0.72 mg/ind/day per dry weight basis. The reference sediment shall have a MIG that is at least 80 percent of the MIG found in the control sediment.	The MIG of polychaetes in the test sediment is less than 70 percent of the MIG of the polychaetes in the reference sediment, and the test sediment MIG is significantly different (t-test, P≤ 0.05) from the reference sediment MIG	The MIG of polychaetes in the test sediment is less than 50 percent of the MIG of the polychaetes in the reference sediment, and the test sediment MIG is significantly different (t-test, P≤ 0.05) from the reference sediment MIG.
Benthic infauna	The reference benthic macroinvertebrate	The test sediment has less than 50 percent of	The test sediment has less than 50 percent of

Table 3-21
Summary of Sediment Management Standards Biological Effects Criteria

Biological Test	Test Performance Standards	Sediment Quality Standards	Sediment Cleanup Screening Levels, or Minimum Cleanup Levels
	assemblage shall be representative of areas of Puget Sound removed from significant sources of contaminants, and to the extent possible shall reflect seasonality and natural physical-chemical conditions and normally abundant species.	the reference sediment mean abundance of any one of the following major taxa: Class Crustacea, Phylum Mollusca, or Class Polychaeta, and the test sediment abundance is statistically different (t-test, P≤0.05) from the reference sediment abundance.	the reference sediment mean abundance of any two of the following major taxa: Class Crustacea, Phylum Mollusca, or Class Polychaeta, and the test sediment abundance is statistically different (t-test, P≤0.05) from the reference sediment abundances.

Source: Washington State Department of Ecology. 1995. Sediment Management Standards - Chapter 173-204 WAC

Table 3-22
Phase I Sediment Samples and Chemicals Initially Exceeding Screening Chemical Criteria

Sample Number	Parameter	Result (mg/kg)[a]	SQS	Result (µg/kg)[b]	LAET
SG-1011	Cadmium	14	5.1	NA	NA
SG-1011	Copper	2,900	390	NA	NA
SG-1011	Lead	1,300	450	NA	NA
SG-1011	Zinc	550	410	NA	NA
SG-1014	Total PCBs	20	12	420	130
SG-1020	Arsenic	85	57	NA	NA
SG-1027	Cadmium	6.5	5.1	NA	NA
SG-1027	Total PCBs	NA	NA	166	130

Note:
Phase II sampling did not confirm any areas exceeding SQS chemical criteria.
a Organic compound results are normalized to organic carbon; metals are dry weight.
b Organic compound results are in parts per billion (ppb) dry weight when compared to Lowest Apparent Effects Threshold (LAET).

Table 3-23
Summary of 2002 and 2006 Surface Sediment Bioassay Testing

Station ID	Sampling Date	Amphipod Average Percent Survival	Survival (% of matched reference)	PSEP Larval Percent Normal Survivorship	PSEP Larval Survivorship (% of matched reference)	Larval Percent Normal Survivorship	Larval Survivorship (% of matched reference)	Mean Individual Growth Rate (mg/ind/day	Growth Rate (% of matched reference)
Laboratory Controls									
Control	Jul-02	95%	--	81%	--	--	--	1.06	--
Control	Aug-06	93%	--	97%	--	85%	--	0.74	--
Reference Stations									
SG-R-20	Jul-02	92%	--	71%	--	--	--	1.01	--
SG-R-50	Jul-02	77%	--	75%	--	--	--	0.91	--
SG-R-80	Jul-02	85%	--	54%	--	--	--	1.06	--
AS-R1	Aug-06	87%	--	84%	--	100%	--	0.72	--
AS-R3	Aug-06	94%	--	50%	--	99%	--	0.61	--
Mill Site - Northern Embayment Stations									
B1	Jul-02	8%	9%	**26%**	36%	--	--	0.68	67%
B2	Jul-02	**6%**	7%	50%	70%	--	--	0.92	91%
AS-01	Aug-06	53%	61%	61%	72%	100%	100%	0.55	77%
AS-02	Aug-06	69%	79%	66%	79%	100%	100%	0.50	70%
AS-03	Aug-06	28%	32%	**52%**	61%	96%	96%	0.52	73%
Mill Site - Southern Embayment Stations									
B3	Jul-02	**9%**	12%	55%	73%	--	--	0.74	73%
B4	Jul-02	**0%**	0%	**41%**	55%	--	--	0.76	84%
B5	Jul-02	**15%**	16%	**47%**	67%	--	--	**0.48**	48%
B6	Jul-02	**18%**	24%	**48%**	63%	--	--	0.84	93%
B7	Jul-02	**54%**	71%	63%	83%	--	--	0.87	96%
B8	Jul-02	**16%**	21%	**43%**	57%	--	--	0.70	77%
B9	Jul-02	**61%**	66%	51%	72%	--	--	0.97	96%
B10	Jul-02	**29%**	38%	**50%**	66%	--	--	0.73	81%
B11	Jul-02	**33%**	43%	**38%**	50%	--	--	0.64	70%
B12	Jul-02	89%	97%	**43%**	60%	--	--	0.82	81%
B13	Jul-02	74%	80%	**39%**	54%	--	--	0.81	80%
B14	Jul-02	**31%**	41%	**42%**	55%	--	--	0.96	106%
B15	Jul-02	**29%**	32%	**38%**	53%	--	--	0.77	76%
B16	Jul-02	**46%**	50%	**43%**	61%	--	--	0.64	64%
B17	Jul-02	85%	92%	**41%**	58%	--	--	0.65	64%
AS-05	Aug-06	88%	94%	63%	126%	98%	98%	0.40	66%
AS-07	Aug-06	90%	96%	61%	121%	100%	101%	0.55	90%
AS-09	Aug-06	88%	101%	61%	72%	100%	100%	0.59	82%
AS-13	Aug-06	95%	109%	67%	80%	99%	99%	0.61	84%
AS-14	Aug-06	89%	102%	**58%**	69%	97%	97%	0.60	83%

Notes:

Yellow shaded data and samples denote exceedance of SQS biological criteria

Orange shaded and bolded data and samples denote exceedance of CSL biological criteria

Table 3-24
Port Gamble Water Column Profiling Data - October 28, 2006

Station	Time	Depth (ft)	Temp (^oC)	Salinity (ppt)	pH	DO (mg/L)
AS-3	1340	0.5	11.29	30.33	7.66	6.51
		5.0	11.24	30.37	7.66	6.36
		10.0	11.12	30.61	7.64	6.02
		15.0	11.07	30.75	7.64	5.53
		20.0	11.06	30.82	7.65	5.41
		22.0	11.06	30.86	7.69	5.35
		22.8	Bottom			
AS-7	1350	0.5	11.24	30.41	7.80	6.60
		5.0	11.25	30.44	7.80	6.56
		10.0	11.16	30.44	7.79	6.39
		15.0	11.15	30.44	7.78	6.32
		20.0	11.13	30.49	7.77	6.16
		22.0	11.14	30.49	7.76	6.07
		22.5	Bottom			
AS-12	1400	0.5	11.25	30.45	7.81	6.70
		5.0	11.24	30.44	7.81	6.67
		10.0	11.18	30.47	7.81	6.50
		15.0	11.12	30.57	7.78	6.17
		20.0	11.11	30.59	7.77	6.06
		25.0	11.11	30.57	7.77	6.00
		26.0	11.11	30.60	7.77	5.96
		26.5	Bottom			
PGA-001	1415	0.5	11.26	30.47	7.85	7.03
		5.0	11.16	30.49	7.83	6.77
		10.0	11.13	30.54	7.80	6.40
		15.0	11.13	30.56	7.80	6.39
		20.0	11.13	30.57	7.80	6.38
		25.0	11.13	30.60	7.80	6.38
		30.0	11.13	30.62	7.80	6.38
Hood Canal Bridge (Univ. of Wash.)	1814	0.5	11.02	30.79	--	5.13
		5.0	11.02	30.79	--	5.13
		10.0	11.02	30.79	--	5.13
		15.0	11.02	30.79	--	5.13
		20.0	11.02	30.86	--	5.13
		25.0	11.02	30.86	--	5.04
		30.0	11.02	30.86	--	5.04

Notes:

ppt - parts per thousand

mg/L - micrograms per liter

Table 4-1
Petroleum Hydrocarbons in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
CL-1S	2.0	ND(<20)	ND(<40)
CL-2S	2.0	ND(<20)	ND(<40)
CL-3S	2.0	ND(<20)	ND(<40)
CL-4B	4.0	ND(<20)	ND(<40)
CL-5B	4.0	ND(<20)	100
CL-6B	4.0	ND(<20)	***3,100***
CL-7S	2.0	ND(<20)	ND(<40)
CL-8B	4.0	ND(<20)	ND(<40)
CL-9S	2.0	ND(<20)	ND(<40)
CL-10B	4.0	ND(<20)	ND(<40)
CL-11B	7.5	ND(<20)	***2,300***
CL-12B	6.0	ND(<20)	***3,200***
CL-13B	7.5	ND(<20)	1,700
CL-14S	3.0	ND(<20)	650
CL-15S	2.0	ND(<20)	ND(<40)
CL-16B	6.0	ND(<20)	ND(<40)
CL-17S	2.0	ND(<20)	ND(<40)
CL-18S	2.0	ND(<20)	ND(<40)
CL-19B	4.0	ND(<20)	ND(<40)
CL-20S	2.0	ND(<20)	ND(<40)
CL-21S	2.0	ND(<20)	390
CL-22B	4.0	ND(<20)	ND(<40)
CL-23S	2.0	ND(<20)	660
CL-24S	2.0	ND(<20)	280
CL-25S	2.0	ND(<20)	ND(<40)
CL-26B	4.0	ND(<20)	ND(<40)
CL-27S	2.0	ND(<20)	ND(<40)
CL-28B	4.0	ND(<20)	ND(<40)
CL-29S	2.0	ND(<20)	ND(<40)
CL-30B	4.0	ND(<20)	ND(<40)
CL-31S	2.0	ND(<20)	58
CL-32B	5.0	ND(<20)	ND(<40)
CL-33S	2.0	ND(<20)	ND(<40)
CL-34B	5.0	ND(<20)	ND(<40)
CL-35S	2.0	ND(<20)	ND(<40)
CL-36B	5.0	ND(<20)	ND(<40)
CL-37S	2.0	ND(<20)	140
CL-38B	5.0	ND(<20)	ND(<40)
CL-39S	2.0	ND(<20)	ND(<40)
CL-40B	5.0	ND(<20)	ND(<40)
CL-41S	2.0	ND(<20)	ND(<40)
CL-42B	5.0	ND(<20)	ND(<40)
CL-43S	2.0	ND(<20)	ND(<40)
CL-44B	5.0	ND(<20)	ND(<40)

Table 4-1
Petroleum Hydrocarbons in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
CL-45S	2.0	ND(<20)	ND(<40)
CL-46B	5.0	ND(<20)	ND(<40)
CL-47S	2.0	ND(<20)	ND(<40)
CL-48B	5.0	ND(<20)	ND(<40)
CL-49S	2.0	ND(<20)	380
CL-50S	2.0	470	510
CL-51S	2.0	ND(<20)	ND(<40)
CL-52B	5.0	ND(<20)	ND(<40)
CL-53B	6.0	ND(<20)	ND(<40)
CL-54S	2.0	ND(<20)	***2,200***
CL-55B	5.0	ND(<20)	380
CL-56S	2.0	ND(<20)	ND(<40)
CL-57B	5.0	ND(<20)	***2,800***
CL-58S	2.0	ND(<20)	ND(<40)
CL-59B	5.0	ND(<20)	ND(<40)
CL-60S	2.0	ND(<20)	ND(<40)
CL-61B	5.0	ND(<20)	ND(<40)
CL-62S	2.0	ND(<20)	ND(<40)
CL-63B	5.0	ND(<20)	ND(<40)
CL-64S	2.0	ND(<20)	ND(<40)
CL-65B	5.0	ND(<20)	ND(<40)
CL-66S	2.0	ND(<20)	250
CL-67S	2.0	ND(<20)	ND(<40)
CL-68B	5.0	250	160
CL-69S	2.0	ND(<20)	ND(<40)
CL-70B	5.0	ND(<20)	580
CL-71S	2.0	ND(<20)	ND(<40)
CL-72B	5.0	ND(<20)	ND(<40)
CL-73S	2.0	ND(<20)	ND(<40)
CL-74B	5.0	ND(<20)	ND(<40)
CL-75S	2.0	ND(<20)	ND(<40)
CL-76B	5.0	ND(<20)	ND(<40)
CL-77S	2.0	ND(<20)	110
CL-78B	5.0	ND(<20)	ND(<40)
CL-79S	2.0	ND(<20)	ND(<40)
CL-80B	5.0	ND(<20)	***5,900***
CL-81S	2.0	ND(<20)	170
CL-82B	5.0	ND(<20)	***7,100***
CL-83S	2.0	ND(<20)	ND(<40)
CL-84B	5.0	ND(<20)	ND(<40)
CL-85S	2.0	ND(<20)	ND(<40)
CL-86B	5.0	ND(<20)	920
CL-87S	2.0	ND(<20)	ND(<40)
CL-88B	5.0	ND(<20)	***5,400***

Table 4-1
Petroleum Hydrocarbons in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
CL-89S	2.0	ND(<20)	ND(<40)
CL-90B	5.0	ND(<20)	280
CL-91S	3.0	ND(<20)	ND(<40)
CL-92B	6.0	***150,000***	
CL-93S	3.0	ND(<20)	ND(<40)
CL-94B	8.0	ND(<20)	ND(<40)
CL-95S	3.0	ND(<20)	ND(<40)
CL-96B	8.0	ND(<20)	ND(<40)
CL-97S	3.0	ND(<20)	ND(<40)
CL-98B	8.0	ND(<20)	ND(<40)
CL-99S	3.0	ND(<20)	ND(<40)
CL-100B	8.0	ND(<20)	ND(<40)
CL-101S	3.0	ND(<20)	230
CL-102B	8.0	ND(<20)	ND(<40)
CL-103S	3.0	ND(<20)	ND(<40)
CL-104B	8.0	ND(<20)	ND(<40)
CL-105S	3.0	ND(<20)	ND(<40)
CL-106B	8.0	ND(<20)	ND(<40)
CL-107S	3.0	ND(<20)	ND(<40)
CL-108B	8.0	ND(<20)	ND(<40)
CL-109S	3.0	ND(<20)	1,300
CL-110B	8.0	ND(<20)	ND(<40)
CL-111S	3.0	ND(<20)	ND(<40)
CL-112B	8.0	ND(<20)	ND(<40)
CL-114S	8.0	ND(<20)	ND(<40)
CL-115S	3.0	ND(<20)	ND(<40)
CL-115B	5.0	ND(<20)	62
CL-115B	8.0	ND(<20)	ND(<40)
CL-115B DUP	8.0	ND(<20)	ND(<40)
CL-116S	3.0	ND(<20)	380
CL-116B	5.0	ND(<20)	61
CL-116B	8.0	ND(<20)	ND(<40)
CL-117S	3.0	ND(<20)	ND(<40)
CL-117B	5.0	***2,500***	1,600
CL-117B	8.0	1,400	***6,200***
CL-118S	3.0	ND(<20)	ND(<40)
CL-118B	5.0	ND(<20)	ND(<40)
CL-118B	8.0	ND(<20)	ND(<40)
CL-119S	3.0	ND(<20)	ND(<40)
CL-119B	5.0	ND(<20)	ND(<40)
CL-119B	8.0	ND(<20)	ND(<40)
CL-120S	3.0	ND(<20)	ND(<40)
CL-121S	3.0	ND(<20)	510
CL-122S	3.0	ND(<20)	ND(<40)

Table 4-1
Petroleum Hydrocarbons in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
CL-123S	3.0	ND(<20)	ND(<40)
CL-124B	5.0	ND(<20)	48
CL-124B	7.0	ND(<20)	ND(<40)
CL-125S	3.0	ND(<20)	ND(<40)
CL-126B	8.0	ND(<20)	150
CL-127S	3.0	ND(<20)	ND(<40)
CL-128S	3.0	ND(<20)	ND(<40)
CL-129B	6.0	ND(<20)	***2,100***
CL-130S	3.0	ND(<20)	ND(<40)
CL-131B	8.0	ND(<20)	66
CL-132S	3.0	ND(<20)	ND(<40)
CL-133B	6.0	ND(<20)	ND(<40)
CL-134S	3.0	ND(<20)	ND(<40)
CL-135B	6.0	ND(<20)	ND(<40)
CL-136S	3.0	ND(<20)	ND(<40)
CL-137B	6.0	ND(<20)	ND(<40)
CL-138S	3.0	ND(<20)	ND(<40)
CL-139B	6.0	ND(<20)	ND(<40)
CL-140S	3.0	ND(<20)	ND(<40)
CL-140S DUP	3.0	ND(<20)	ND(<40)
CL-141B	6.0	ND(<20)	ND(<40)
CL-142S	3.0	ND(<20)	ND(<40)
CL-143B	8.0	ND(<20)	ND(<40)
CL-142B DUP	8.0	ND(<20)	ND(<40)
CL-144S	3.0	ND(<20)	ND(<40)
CL-145B	6.0	ND(<20)	350
CL-146S	3.0	ND(<20)	340
CL-147B	6.0	ND(<20)	ND(<40)
CL-148S	3.0	ND(<20)	ND(<40)
CL-149B	6.0	ND(<20)	ND(<40)
CL-149B DUP	6.0	ND(<20)	ND(<40)
CL-150S	3.0	ND(<20)	470
CL-151B	6.0	ND(<20)	ND(<40)
CL-152S	3.0	ND(<20)	***2,900***
CL-153B	6.0	ND(<20)	ND(<40)
CL-154S	3.0	ND(<20)	ND(<40)
CL-155B	6.0	ND(<20)	ND(<40)
CL-155B DUP	6.0	ND(<20)	ND(<40)
CL-156B	8.0	ND(<20)	***35,000***
CL-157S	3.0	ND(<20)	ND(<40)
CL-158B	8.0	ND(<20)	ND(<40)
CL-159S	3.0	ND(<20)	88
CL-160B	8.0	ND(<20)	ND(<40)
CL-161S	3.0	ND(<20)	ND(<40)

Table 4-1
Petroleum Hydrocarbons in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
CL-161S DUP	3.0	ND(<20)	ND(<40)
CL-162B	8.0	ND(<20)	ND(<40)
CL-163S	3.0	ND(<20)	ND(<40)
CL-163S DUP	3.0	ND(<20)	ND(<40)
CL-164B	8.0	ND(<20)	ND(<40)
CL-165S	3.0	ND(<20)	ND(<40)
CL-166B	8.0	ND(<20)	ND(<40)
CL-167S	3.0	ND(<20)	ND(<40)
CL-168B	8.0	ND(<20)	ND(<40)
CL-169S	3.0	ND(<20)	510
CL-170B	8.0	ND(<20)	ND(<40)
CL-170B DUP	8.0	ND(<20)	ND(<40)
CL-171S	3.0	ND(<20)	ND(<40)
CL-172B	8.0	ND(<20)	ND(<40)
CL-173S	3.0	ND(<20)	ND(<40)
CL-174B	8.0	ND(<20)	ND(<40)
CL-174B DUP	8.0	ND(<20)	ND(<40)
CL-175S	3.0	ND(<20)	210
CL-176B	8.0	ND(<20)	ND(<40)
CL-177S	3.0	ND(<20)	50
CL-178B	8.0	ND(<20)	ND(<40)
CL-179S	3.0	ND(<20)	230
CL-179S DUP	3.0	ND(<20)	230
CL-180B	8.0	ND(<20)	ND(<40)
CL-181S	3.0	***2,700***	***2,400***
CL-182B	8.0	ND(<20)	ND(<40)
CL-183S	3.0	ND(<20)	200
CL-184B	8.0	ND(<20)	ND(<40)
CL-184B DUP	8.0	ND(<20)	ND(<40)
CL-185S	3.0	ND(<20)	200
CL-186B	8.0	ND(<20)	ND(<40)
CL-187B	7.0	ND(<20)	ND(<40)
CL-188B	7.0	ND(<20)	260
CL-189S	5.0	ND(<20)	450
CL-190S	5.0	ND(<20)	490
CL-191S	5.0	ND(<20)	ND(<40)
CL-192S	5.0	ND(<20)	100
CL-193S	5.0	ND(<20)	ND(<40)
CL-194S	5.0	ND(<20)	ND(<40)
CL-195S	3.0	ND(<20)	ND(<40)
CL-196B	7.0	ND(<20)	ND(<40)
CL-197S	3.0	ND(<20)	ND(<40)
CL-198B	7.0	ND(<20)	ND(<40)
CL-199S	3.0	ND(<20)	ND(<40)

Table 4-1
Petroleum Hydrocarbons in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
CL-200B	8.0	ND(<20)	ND(<40)
CL-205S	3.0	ND(<20)	320
CL-206B	8.0	ND(<20)	ND(<40)
CL-207S	3.0	ND(<20)	ND(<40)
CL-207S DUP	3.0	ND(<20)	ND(<40)
CL-208B	8.0	ND(<20)	ND(<40)
CL-209S	3.0	ND(<20)	***8,000***
CL-210B	8.0	ND(<20)	ND(<40)
CL-211S	3.0	ND(<20)	***2,500***
CL-212B	8.0	ND(<20)	ND(<40)
CL-213S	3.0	ND(<20)	ND(<40)
CL-214B	8.0	ND(<20)	ND(<40)
CL-217S	3.0	ND(<20)	ND(<40)
CL-218B	8.0	ND(<20)	ND(<40)
CL-219S	3.0	ND(<20)	ND(<40)
CL-220B	8.0	ND(<20)	ND(<40)
CL-220B DUP	8.0	ND(<20)	ND(<40)
CL-221S	3.0	ND(<20)	ND(<40)
CL-222B	8.0	ND(<20)	ND(<40)
CL-223S	3.0	ND(<20)	140
CL-224B	8.0	ND(<20)	ND(<40)
CL-225S	3.0	ND(<20)	ND(<40)
CL-226B	8.0	ND(<20)	ND(<40)
CL-227S	3.0	ND(<20)	ND(<40)
CL-228B	8.0	ND(<20)	ND(<40)
CL-228B DUP	8.0	ND(<20)	ND(<40)
PS-229S	2.0	ND(<20)	ND(<50)
PS-230B	5.0	ND(<20)	ND(<50)
PS-231S	2.0	ND(<20)	ND(<50)
PS-232B	5.0	ND(<20)	ND(<50)
PS-233S	2.0	ND(<20)	ND(<50)
PS-234B	5.0	ND(<20)	ND(<50)
MTCA Method A Soil Cleanup Level[(a)]		**2,000**	**2,000**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

mg/kg – milligrams/kilogram

Table 4-2
PAHs in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Non-Carcinogenic PAHs by EPA Method 8100											Carcinogenic PAHs by EPA Method 8100							
		Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
CL-1S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.48	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-2S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-3S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-4B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-5B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.09	0.09	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.02
CL-6B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.46	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	0.2	1.6	ND(<0.1)	1.4	1.4	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.44***
CL-7S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-8B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-9S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-10B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-11B	7.5	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.16	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***3.6***	0.09	0.09	ND(<0.1)	0.06	ND(<0.1)	***3.64***
CL-12B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	1.3	ND(<0.1)	***0.14***	1.1	1.1	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.36***
CL-13B	7.5	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.1	ND(<0.1)	0.255	0.255	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.06
CL-14S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-15S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-16B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-17S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-18S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-19B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-20S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-21S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.3	***0.7***	0.1	0.1	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.75***
CL-22B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-23S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.3***	0.37	0.37	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.37***
CL-24S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	0.22	ND(<0.1)	ND(<0.1)	0.15	0.15	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.03
CL-25S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-26B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-27S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-28B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-29S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-30B	4.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-31S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-32B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-33S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-34B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-35S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-36B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-37S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-38B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-39S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-40B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-41S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-42B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-43S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-44B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-45S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-46B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-47S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-48B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND

Table 4-2
PAHs in Soil
2002 IRM Characterization Sampling

		Non-Carcinogenic PAHs by EPA Method 8100											Carcinogenic PAHs by EPA Method 8100							
Location	Depth (feet)	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	Fluoran-thene (mg/kg)	Fluorene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naph-thalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
CL-49S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.195	0.195	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.04
CL-50S	2.0	ND(<0.1)	0.62	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	0.1	ND(<0.1)	ND(<0.1)	0.16	ND(<0.1)	0.085	0.085	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.03
CL-51S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-52B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-53B	6.0	0.23	ND(<0.1)	0.62	ND(<0.1)	0.21	ND(<0.1)	--	--	ND(<0.1)	0.12	0.35	2.1	***6***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***6.21***
CL-54S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-55B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	3	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	3.6	***3.9***	***3.6***	1.8	1.8	ND(<0.1)	ND(<0.1)	ND(<0.1)	***4.35***
CL-56S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-57B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.15	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	0.35	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-58S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-59B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-60S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-61B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-62S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-63B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-64S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-65B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-66S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.14	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-67S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-68B	5.0	ND(<0.1)	ND(<0.1)	0.9	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	1.1	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-69S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-70B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.53	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.05
CL-71S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-72B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	0.61	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-73S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-74B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-75S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-76B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.37	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	0.35	0.43	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.04
CL-77S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-78B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-79S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-80B	5.0	ND(<0.1)	ND(<0.1)	2.9	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	0.13	0.81	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.08
CL-81S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-82B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.395	0.395	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.08
CL-83S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-84B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-85S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-86B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-87S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-88B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.91	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.9***	0.85	0.85	ND(<0.1)	1.8	ND(<0.1)	***2.79***
CL-89S	2.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-90B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-91S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-92S	6.0	5	ND(<2.3)	7.5	ND(<2.3)	ND(<2.3)	11	81	140	***26***	41	11	***2.5***	ND(<2.3)	ND(<2.3)	ND(<2.3)	6.9	ND(<2.3)	ND(<2.3)	***0.32***
CL-93S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-94B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-95S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-96B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND

Table 4-2
PAHs in Soil
2002 IRM Characterization Sampling

Location	Depth (feet)	Non-Carcinogenic PAHs by EPA Method 8100											Carcinogenic PAHs by EPA Method 8100							
		Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
CL-97S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-98B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-99S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-100B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-101S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-102B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-103S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-104B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-105S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-106B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-107S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-108B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-109S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.23	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.06***	0.22	0.22	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.10***
CL-110B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-111S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-112B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-114S	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-115S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-115B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-116S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	0.21	ND(<0.1)	ND(<0.1)	***0.28***	0.105	0.105	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.30***
CL-116B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-116B	8.0	ND(<0.1)	0.61	0.58	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-117S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-117B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	7.8	--	--	***7.2***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	1.6	1.6	0.73	ND(<0.1)	ND(<0.1)	***0.33***
CL-117B	8.0	ND(<0.1)	10	20	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	***8***	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.2***	ND(<0.1)	ND(<0.1)	4.7	ND(<0.1)	ND(<0.1)	***1.25***
CL-118S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-118B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-118B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-119S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-119B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-119B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-120S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-121S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.1	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-122S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-123S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-124B	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.17***	0.26	0.26	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.22***
CL-124B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-125S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-126B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-127S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-128S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-129B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.75	0.75	ND(<0.1)	1.7	ND(<0.1)	***0.83***
CL-130S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	1	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-131B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-132S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-133B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-134S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-135B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND

Table 4-2
PAHs in Soil
2002 IRM Characterization Sampling

		Non-Carcinogenic PAHs by EPA Method 8100											Carcinogenic PAHs by EPA Method 8100							
Location	Depth (feet)	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	Fluoran-thene (mg/kg)	Fluorene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naph-thalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
CL-136S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-137B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-138S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-139B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-140S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-140S DUP	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-141B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-142S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-143B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-144S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-145B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***2***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***2.00***
CL-146S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.21***	0.1	0.1	ND(<0.1)	0.73	ND(<0.1)	***0.52***
CL-147B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-148S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-149B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-149B DUP	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-150S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.48	0.48	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.10***
CL-151B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-152S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.45	0.45	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.09
CL-153B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-154S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-155B	6.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-156B[j]	8.0	0.13	0.05	0.4	0.49	0.83	0.14	0.02	ND(<0.02)	0.03	0.36	2.3	0.7	***0.62***	0.97	0.33	1.1	0.14	0.44	***0.93***
CL-157S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-158B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-159S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-160B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-161S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-162B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-163S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-163S DUP	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-164B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-165S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-166B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-167S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-168B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-169S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.16	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.185	0.185	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.04
CL-170B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-171S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-172B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-173S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-174B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-175S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.11	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***1.00***
CL-176B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-177S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-178B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-179S	3.0	ND(<0.1)	ND(<0.1)	0.3	ND(<0.1)	0.15	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.12	***0.2***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.21***
CL-180B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND

Table 4-2
PAHs in Soil
2002 IRM Characterization Sampling

		Non-Carcinogenic PAHs by EPA Method 8100											Carcinogenic PAHs by EPA Method 8100							
Location	Depth (feet)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i)perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
CL-181S	3.0	82	3.7	ND(<0.1)	ND(<0.1)	ND(<0.1)	84	--	--	***110***	ND(<0.1)	ND(<0.1)	ND(<0.1)	***4***	1.25	1.25	ND(<0.1)	ND(<0.1)	ND(<0.1)	***4.25***
CL-182B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.22***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.22***
CL-183S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	0.1	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-184B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-184B DUP	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-185S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.3***	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	***0.30***
CL-186B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-187B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-188B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.145	0.145	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.03
CL-189S	5.0	ND(<0.1)	0.98	1.5	1.6	13	0.16	--	--	ND(<0.1)	0.53	14	***9***	***1.4***	1.9	1.9	1.3	2.2	ND(<0.1)	***3.57***
CL-190S	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	2.1	0.21	--	--	ND(<0.1)	1.4	1.9	ND(<0.1)	ND(<0.1)	0.44	0.44	0.25	0.19	ND(<0.1)	***0.17***
CL-191S	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-192S	5.0	ND(<0.1)	ND(<0.1)	0.11	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-193S	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-194S	5.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-195S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-196B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-197S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-198B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.08	0.08	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.02
CL-199S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-200B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-205S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	0.5	0.19	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-206B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.13	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.06	0.06	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.01
CL-207S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-207S DUP	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-208B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-209S	3.0	9.7	14	ND(<0.1)	16	ND(<0.1)	ND(<0.1)	--	--	3.1	11	ND(<0.1)	***26***	ND(<0.1)	***10.5***	***10.5***	ND(<0.1)	ND(<0.1)	ND(<0.1)	***4.70***
CL-210B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	2.7	ND(<0.1)	ND
CL-211S	3.0	0.55	0.18	ND(<0.1)	0.35	1	ND(<0.1)	--	--	ND(<0.1)	1.8	ND(<0.1)	***2.9***	***0.26***	0.6	0.6	ND(<0.1)	0.1	ND(<0.1)	***0.71***
CL-212B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.1	0.1	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.02
CL-213S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-214B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-217S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-218B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-219S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-220B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-220B DUP	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-221S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-222B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-223S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-224B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-225S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-226B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-227S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-228B	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-228B DUP	8.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
PS-229S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	--	--	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-230B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	--	--	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND

Table 4-2
PAHs in Soil
2002 IRM Characterization Sampling

		Non-Carcinogenic PAHs by EPA Method 8100											Carcinogenic PAHs by EPA Method 8100							
Location	**Depth (feet)**	**Acenaph-thene (mg/kg)**	**Acenaph-thylene (mg/kg)**	**Anthracene (mg/kg)**	**Benzo(g,h,i)perylene (mg/kg)**	**Fluoran-thene (mg/kg)**	**Fluorene (mg/kg)**	**1-Methyl-naphthalene (mg/kg)**	**2-Methyl-naphthalene (mg/kg)**	**Naph-thalene (mg/kg)**	**Phenan-threne (mg/kg)**	**Pyrene (mg/kg)**	**Benzo(a) anthracene (mg/kg)**	**Benzo(a) pyrene (mg/kg)**	**Benzo(b) fluoranthene (mg/kg)**	**Benzo(k) fluoranthene (mg/kg)**	**Chrysene (mg/kg)**	**Dibenz(a, h) anthracene (mg/kg)**	**Indeno(1, 2, 3-cd)pyrene (mg/kg)**	**Total cPAHs (TEF Modified) (mg/kg)**
PS-231S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	--	--	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-232B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	--	--	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-233S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	--	--	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-234B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	--	--	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
TEF[c]		-	-	-	-	-	-	-	-	-	-	-	0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels[a]		**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**5**	**NV**	**NV**	**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.1**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**NV**	**NV**	**53,460**	**NV**	**365**	**NV**	**NV**	**NV**	**NV**	**NV**	**15,026**	**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

Table 4-3
Petroleum Hydrocarbons in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
PS-1S	3.0	ND(<20)	ND(<40)
PS-2S	3.0	ND(<20)	ND(<40)
PS-3S	3.0	ND(<20)	ND(<40)
PS-4S	3.0	ND(<20)	ND(<40)
PS-5S	3.0	ND(<20)	ND(<40)
PS-6B	6.0	ND(<20)	120
PS-7B	6.0	45	90
PS-8B	6.0	ND(<20)	ND(<40)
PS-9B	6.0	ND(<20)	ND(<40)
PS-11S	3.0	ND(<20)	ND(<40)
PS-12S	3.0	ND(<20)	ND(<40)
PS-13B	6.0	ND(<20)	ND(<40)
PS-14B	6.0	ND(<20)	ND(<40)
PS-15S	3.0	ND(<20)	1,800
PS-16S	3.0	ND(<20)	ND(<40)
PS-17B	6.0	ND(<20)	ND(<40)
PS-18B	6.0	ND(<20)	ND(<40)
PS-19B	6.0	ND(<20)	ND(<40)
PS-20S	3.0	ND(<20)	ND(<40)
PS-21S	3.0	ND(<20)	ND(<40)
PS-22S	3.0	ND(<20)	ND(<40)
PS-23B	6.0	ND(<20)	110
PS-24S	3.0	ND(<20)	ND(<40)
PS-25S	3.0	ND(<20)	ND(<40)
PS-26B	8.0	ND(<20)	120
PS-27S	3.0	ND(<20)	ND(<40)
PS-43S	3.0	ND(<20)	ND(<40)
PS-44B	8.0	ND(<20)	ND(<40)
PS-45S	3.0	ND(<20)	ND(<40)
PS-46B	8.0	ND(<20)	ND(<40)
PS-47S	3.0	ND(<20)	ND(<40)
PS-48B	8.0	ND(<20)	ND(<40)
PS-49S	3.0	ND(<20)	290
PS-50B	8.0	ND(<20)	ND(<40)
PS-51S	3.0	ND(<20)	ND(<40)
PS-52B	8.0	ND(<20)	ND(<40)
PS-53S	3.0	ND(<20)	ND(<40)
PS-54B	8.0	ND(<20)	ND(<40)
PS-55S	3.0	ND(<20)	44
PS-56B	8.0	ND(<20)	480
PS-57S	3.0	ND(<20)	ND(<40)
PS-58B	8.0	ND(<20)	ND(<40)
PS-59S	3.0	ND(<20)	ND(<40)

Table 4-3
Petroleum Hydrocarbons in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
PS-60B	8.0	ND(<20)	140
PS-61S	3.0	ND(<20)	ND(<40)
PS-62B	8.0	ND(<20)	100
PS-63S	3.0	ND(<20)	ND(<40)
PS-64B	8.0	ND(<20)	ND(<40)
PS-65S	3.0	ND(<20)	ND(<40)
PS-66B	8.0	ND(<20)	ND(<40)
PS-67B	8.0	ND(<20)	ND(<40)
PS-68B	8.0	ND(<20)	ND(<40)
PS-69B	8.0	ND(<20)	ND(<40)
PS-70B	8.0	ND(<20)	ND(<40)
PS-71B	8.0	ND(<20)	ND(<40)
PS-90S	3.0	ND(<20)	ND(<40)
PS-91B	8.0	ND(<20)	ND(<40)
PS-92S	3.0	ND(<20)	ND(<40)
PS-93B	8.0	ND(<20)	ND(<40)
PS-94S	3.0	ND(<20)	ND(<40)
PS-95B	8.0	ND(<20)	ND(<40)
PS-96S	3.0	ND(<20)	ND(<40)
PS-97B	8.0	ND(<20)	ND(<40)
PS-98S	3.0	ND(<20)	ND(<40)
PS-99B	8.0	ND(<20)	ND(<40)
PS-100B	8.0	ND(<20)	ND(<40)
PS-101B	8.0	ND(<20)	ND(<40)
PS-102B	8.0	ND(<20)	ND(<40)
PS-103B	8.0	ND(<20)	ND(<40)
PS-104B	8.0	ND(<20)	ND(<40)
PS-105B	8.0	ND(<20)	ND(<40)
PS-106B	8.0	ND(<20)	ND(<40)
PS-107B	8.0	ND(<20)	ND(<40)
PS-107B DUP	8.0	ND(<20)	ND(<40)
PS-115B	8.0	ND(<20)	ND(<40)
PS-116B	8.0	ND(<20)	ND(<40)
PS-117B	8.0	ND(<20)	ND(<40)
PS-118B	8.0	ND(<20)	ND(<40)
PS-119B	8.0	ND(<20)	ND(<40)
PS-120B	8.0	ND(<20)	ND(<40)
PS-121B	8.0	ND(<20)	ND(<40)
PS-135S	3.0	ND(<20)	ND(<40)
PS-136B	8.0	ND(<20)	ND(<40)
PS-141B	8.0	ND(<20)	ND(<40)
PS-142B	8.0	ND(<20)	ND(<40)
PS-143B	8.0	ND(<20)	ND(<40)

Table 4-3
Petroleum Hydrocarbons in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
PS-150S	3.0	ND(<20)	ND(<40)
PS-151S	3.0	ND(<20)	ND(<40)
PS-152S	3.0	ND(<20)	ND(<40)
PS-153B	8.0	ND(<20)	ND(<40)
PS-154S	3.0	ND(<20)	ND(<40)
PS-154S DUP	3.0	ND(<20)	ND(<40)
PS-155B	8.0	ND(<20)	ND(<40)
PS-168B	5.0	ND(<20)	ND(<40)
PS-169B	5.0	ND(<20)	ND(<40)
PS-169B DUP	5.0	ND(<20)	ND(<40)
PS-170B	9.0	ND(<20)	ND(<40)
PS-171S	3.0	ND(<20)	ND(<40)
PS-172S	3.0	ND(<20)	ND(<40)
PS-172S DUP	3.0	ND(<20)	ND(<40)
PS-173S	3.0	ND(<20)	ND(<40)
PS-174S	3.0	ND(<20)	ND(<40)
PS-175S	3.0	ND(<20)	ND(<40)
PS-176S	3.0	ND(<20)	ND(<40)
PS-177S	3.0	ND(<20)	ND(<40)
PS-178S	3.0	ND(<20)	ND(<40)
PS-181S	3.0	ND(<20)	ND(<40)
PS-182S	3.0	ND(<20)	ND(<40)
PS-183S	3.0	ND(<20)	ND(<40)
PS-184S	3.0	ND(<20)	ND(<40)
PS-184S DUP	3.0	ND(<20)	ND(<40)
PS-185S	3.0	ND(<20)	ND(<40)
PS-186S	3.0	ND(<20)	ND(<40)
PS-187S	3.0	ND(<20)	ND(<40)
PS-188S	4.0	ND(<20)	ND(<40)
PS-189S	4.0	ND(<20)	ND(<40)
PS-190B	4.0	ND(<20)	ND(<40)
PS-190B DUP	4.0	ND(<20)	ND(<40)
PS-213B	8.0	ND(<20)	ND(<40)
Soil Cleanup Level (1)		**2,000**	**2,000**

Notes:

(1) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

mg/kg – milligrams/kilogram

ND – Indicates that the compound was not detected at a concentration greater than the detection limit

Table 4-4
Non-Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoran-thene (mg/kg)	Fluorene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naph-thalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)
PS-1S	3.0	ND(<0.05)	0.4	0.19	0.07	0.92	ND(<0.05)	0.06	0.09	0.5	1	0.71
PS-2S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-3S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-4S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.06	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.04	0.05	0.05
PS-5S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.07	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	0.05	0.05
PS-6B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-7B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.04	0.07	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.06
PS-8B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-9B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-11S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-12S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-13B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-14B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-15S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-17B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-18B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	0.03
PS-19B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-20S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-21S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	0.03	0.04
PS-22S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.07	0.14	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.08	0.16
PS-23B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-24S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	0.02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02
PS-25S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-26B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-27S	3.0	ND(<0.02)	0.02	ND(<0.02)	0.08	0.2	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.05	0.14	0.24
PS-43S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-44B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-45S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-46B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-47S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)

Table 4-4
Non-Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
PS-48B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.05
PS-49S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-50B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-51S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-52B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-53S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-54B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-55S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-56B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-57S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-58B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-59S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-60B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-61S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-62B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	0.05
PS-63S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-64B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)
PS-65S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.08	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	0.04	0.11	0.14
PS-67B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-68B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-69B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-70B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-71B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-90S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-91B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-92S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-93B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-94S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-95B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-96S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)

Table 4-4
Non-Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoran-thene (mg/kg)	Fluorene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naph-thalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)
PS-97B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-98S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-99B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-100B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-101B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-102B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-103B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-104B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-105B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-106B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-107B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-107B LAB DUP	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-115B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-116B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-117B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-118B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-119B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
CL-120S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)
CL-121S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	0.1	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)
CL-122S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)
CL-123S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)
CL-124B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	--	--	ND(<0.1)	ND(<0.1)	ND(<0.1)
PS-120B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-121B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-124S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-125S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-126S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-127S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-128B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-129S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)

Table 4-4
Non-Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoran-thene (mg/kg)	Fluorene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naph-thalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)
PS-130S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-131S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-132S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-133B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-134B	8.0	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	ND(<0.02)	0.04	0.04
PS-135S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-136B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03
PS-137S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-138B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-139S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-140B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-141B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-142B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-143B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-145B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-146S	5.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-147S	5.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-148B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-149S	5.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-150S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-151S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-152S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-153B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-154S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-155B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-156S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-157S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-158S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-159S	3.0	ND(<0.05)	ND(<0.05)	0.11	ND(<0.05)	0.27	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.35
PS-160S	3.0	ND(<0.05)	ND(<0.05)	0.06	ND(<0.05)	0.31	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.33	0.29

Table 4-4
Non-Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Acenaph-thene (mg/kg)	Acenaph-thylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoran-thene (mg/kg)	Fluorene (mg/kg)	1-Methyl-naphthalene (mg/kg)	2-Methyl-naphthalene (mg/kg)	Naph-thalene (mg/kg)	Phenan-threne (mg/kg)	Pyrene (mg/kg)
PS-161S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-162S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.07	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.2
PS-165B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-166B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-167S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-168B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-169B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-170B	9.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-171S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-172S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-173S	3.0	ND(<0.05)	ND(<0.05)	0.09	ND(<0.05)	0.08	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.11
PS-174S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-175S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-176S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-177S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-178S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-179S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-180S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.07	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.19
PS-181S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-182S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-183S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-184S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-185S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-186S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-187S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-188B	4.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.12	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.15	0.08
PS-189B	4.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-190B	4.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-207B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-208B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)

Table 4-4
Non-Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
PS-209B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-210S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-211S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-212S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-213B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-214S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
Soil Cleanup Levels (1)		**NV**	**NV**	**51,040**	**NV**	**364**	**2,212**	**NV**	**NV**	**5 (2)**	**NV**	**15,004**

Notes:

(1) All soil cleanup levels based on MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36) unless noted.

(2) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

mg/kg – milligrams/kilogram

ND – Indicates that the compound was not detected at a concentration greater the detection limit

NV – Indicates that no value was available for this compound

-- - Indicates the sample was not analyzed for this compound

Table 4-5
Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs(3) (TEF Modified) (mg/kg)
PS-1S	3.0	0.09	0.06	0.15	ND(<0.05)	0.16	<0.05	ND(<0.05)	0.086
PS-2S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-3S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-4S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-5S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-6B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-7B	6.0	0.05	0.04	0.06	0.03	0.05	ND(<0.02)	0.03	0.058
PS-8B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-9B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-11S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-12S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-13B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-14B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-15S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-17B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-18B	6.0	ND(<0.02)	ND(<0.02)	0.03	0.03	0.02	ND(<0.02)	ND(<0.02)	0.006
PS-19B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-20S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-21S	3.0	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.002
PS-22S	3.0	0.05	0.07	0.1	0.05	0.07	ND(<0.02)	0.05	0.096
PS-23B	6.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-24S	3.0	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.003
PS-25S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-26B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-27S	3.0	0.05	0.07	0.09	0.04	0.08	ND(<0.02)	0.05	0.094
PS-43S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-44B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-45S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-46B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND

Table 4-5
Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs[(3)] (TEF Modified) (mg/kg)
PS-47S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-48B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.07	0.007
PS-49S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-50B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-51S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-52B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-53S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-54B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-55S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-56B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-57S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-58B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-59S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-60B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-61S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-62B	8.0	ND(<0.02)	0.02	0.03	ND(<0.02)	0.03	ND(<0.02)	0.02	0.025
PS-63S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-64B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-65S	3.0	0.05	0.07	0.08	0.04	0.07	ND(<0.02)	0.06	0.094
PS-67B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-68B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-69B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-70B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-71B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-90S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-91B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-92S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-93B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-94S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND

Table 4-5
Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs[3] (TEF Modified) (mg/kg)
PS-95B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-96S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-97B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-98S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-99B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-100B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-101B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-102B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-103B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-104B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-105B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-106B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-107B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
S-107B LAB DU	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-115B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-116B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-117B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-118B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-119B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
CL-120S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-121S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-122S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-123S	3.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
CL-124B	7.0	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND(<0.1)	ND
PS-120B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-121B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-124S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-125S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-126S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND

Table 4-5
Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs[(3)] (TEF Modified) (mg/kg)
PS-127S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-128B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-129S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-130S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-131S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-132S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-133B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-134B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	0.000
PS-135S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-136B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-137S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-138B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-139S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-140B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-141B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-142B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-143B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-145B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-146S	5.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-147S	5.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-148B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-149S	5.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-150S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-151S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-152S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-153B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-154S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-155B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-156S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND

Table 4-5
Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs[3] (TEF Modified) (mg/kg)
PS-157S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-158S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-159S	3.0	0.2	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.2	ND(<0.05)	ND(<0.05)	0.022
PS-160S	3.0	0.12	0.08	ND(<0.05)	ND(<0.05)	0.22	ND(<0.05)	ND(<0.05)	0.094
PS-161S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-162S	3.0	0.08	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.18	ND(<0.05)	0.11	0.021
PS-165B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-166B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-167S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-168B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-169B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-170B	9.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-171S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-172S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-173S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-174S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-175S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-176S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-177S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-178S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-179S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-180S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-181S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-182S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-183S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-184S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-185S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-186S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-187S	3.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND

Table 4-5
Carcinogenic PAHs in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs[3] (TEF Modified) (mg/kg)
PS-188B	4.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-189B	4.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-190B	4.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-207B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-208B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-209B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-210S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-211S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-212S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-213B	8.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-214S	3.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
Soil Cleanup Level (1)		**0.22**	**0.1(2)**	**0.74**	**0.74**	**0.25**	**1.1**	**2.2**	**0.1(2)**

Notes:

(1) All soil cleanup levels based on MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36) unless noted.

(2) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(3) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

mg/kg – milligrams/kilogram

ND – Indicates that the compound was not detected at a concentration greater than the detection limit

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

Table 4-6
Hexavalent Chromium, Lead, and Mercury in Soil - Area 1
2002 IRM Performance Sampling

Location	Depth (feet)	Hexavalent Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)
PS-43S	3.0	--	ND(<5)	ND(<0.5)
PS-49S	3.0	--	96	ND(<0.5)
PS-51S	3.0	--	ND(<5)	ND(<0.5)
PS-92S	3.0	--	ND(<5)	ND(<0.5)
PS-96S	3.0	--	14	ND(<0.5)
PS-98S	3.0	--	ND(<5)	ND(<0.5)
PS-98S DUP	3.0	--	ND(<5)	--
PS-116B	8.0	--	--	ND(<0.5)
PS-262S	2.0	ND(<5)	--	--
PS-263S	2.0	ND(<5)	--	--
PS-264S	2.0	ND(<5)	--	--
Soil Cleanup Level (1)		**19**	**220 (2)**	**0.16**

Notes:

(1) All soil cleanup levels based on MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36) unless noted.

(2) MTCA Simplified Terrestrial Ecological Evaluation Cleanup Level for Unrestricted Land Use (WAC 173-340-900, Table 749-2)

mg/kg – milligrams/kilogram

-- - Indicates the sample was not analyzed for this compound

ND – Indicates that the compound was not detected at a concentration greater than the detection limit

Table 4-7
Lead in Soil - Area 2
2002 IRM Final Performance Sampling

Location	Depth (feet)	Lead (mg/kg)
PS-31S	2.0	73
PS-33B	5.0	22
PS-35S	2.0	220
PS-36S	2.0	78
PS-37S	2.0	ND(<5.8)
PS-38B	5.0	130
PS-42S	2.0	ND(<37)
PS-72B	5.0	***270***
PS-73S	2.0	35
PS-74S	2.0	ND(<5)
PS-75S	2.0	160
PS-76S	2.0	ND(<5)
PS-78S	2.0	220
PS-79B	5.0	190
PS-80S	2.0	11
PS-81S	2.0	ND(<5)
PS-83S	2.0	ND(<5)
PS-84B	5.0	ND(<5)
PS-85S	2.0	180
PS-86B	5.0	37
PS-87B	5.0	25
PS-89B	5.0	74
PS-108B	7.0	ND(<5)
PS-109S	5.0	150
PS-111S	5.0	28
PS-112S	5.0	ND(<5)
PS-113B	7.0	ND(<5)
PS-114S	5.0	66
PS-122S	5.0	***230***
PS-123B	7.0	15
PS-334S	5.0	ND(<5.6)
Soil Cleanup Level(1)		**220**

Notes:

(1) MTCA Simplified Terrestrial Ecological Evaluation Cleanup Level for Unrestricted Land Use (WAC 173-340-900, Table 749-2)

Bold and Highlighted – Indicates detected concentration exceeds the soil cleanup level

mg/kg – milligrams/kilogram

ND – Indicates that the compound was not detected at a concentration greater than the detection limit

Table 4-8
PAHs in Soil - Area 3
2002 IRM Final Performance Sampling

		Non-Carcinogenic PAHs											Carcinogenic PAHs							
Location	**Depth (feet)**	**Acenaph-thene (mg/kg)**	**Acenaph-thylene (mg/kg)**	**Anthracene (mg/kg)**	**Benzo(g,h,i) perylene (mg/kg)**	**Fluoran-thene (mg/kg)**	**Fluorene (mg/kg)**	**1-Methyl-naphthalene (mg/kg)**	**2-Methyl-naphthalene (mg/kg)**	**Naph-thalene (mg/kg)**	**Phenan-threne (mg/kg)**	**Pyrene (mg/kg)**	**Benzo(a) anthracene (mg/kg)**	**Benzo(a) pyrene (mg/kg)**	**Benzo(b) fluoranthene (mg/kg)**	**Benzo(k) fluoranthene (mg/kg)**	**Chrysene (mg/kg)**	**Dibenz(a, h) anthracene (mg/kg)**	**Indeno(1, 2, 3-cd)pyrene (mg/kg)**	**Total cPAHs (TEF Modified) (mg/kg)**
PS-195S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-196S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-197S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-198S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-199S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.05	0.05	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.06	ND(<0.05)	ND(<0.05)	0.01
PS-200S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-201S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-202S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-203B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-204B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-205B	5.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-206S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
TEF[c]		-	-	-	-	-	-	-	-	-	-	-	0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels[a]		**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**5**	**NV**	**NV**	**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.1**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**NV**	**NV**	**53,460**	**NV**	**365**	**NV**	**NV**	**NV**	**NV**	**NV**	**15,026**	**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

Table 4-9
Arsenic in Soil - Area 3
2002 IRM Final Performance Sampling

Location	**Depth (feet)**	**Arsenic (mg/kg)**
PS-191S	2.0	ND(<5)
PS-192S	2.0	ND(<5)
PS-193S	2.0	ND(<5)
PS-194B	4.0	ND(<5)
PS-194B LAB DUP	4.0	ND(<5)
MTCA Method A Soil Cleanup Level[(a)]		**20**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-10
PAHs in Soil - Area 4
2002 IRM Final Performance Sampling

		Non-Carcinogenic PAHs											Carcinogenic PAHs							
Location	**Depth (feet)**	**Acenaph-thene (mg/kg)**	**Acenaph-thylene (mg/kg)**	**Anthracene (mg/kg)**	**Benzo(g,h,i)perylene (mg/kg)**	**Fluoran-thene (mg/kg)**	**Fluorene (mg/kg)**	**1-Methyl-naphthalene (mg/kg)**	**2-Methyl-naphthalene (mg/kg)**	**Naph-thalene (mg/kg)**	**Phenan-threne (mg/kg)**	**Pyrene (mg/kg)**	**Benzo(a) anthracene (mg/kg)**	**Benzo(a) pyrene (mg/kg)**	**Benzo(b) fluoranthene (mg/kg)**	**Benzo(k) fluoranthene (mg/kg)**	**Chrysene (mg/kg)**	**Dibenz(a, h) anthracene (mg/kg)**	**Indeno(1, 2, 3-cd)pyrene (mg/kg)**	**Total cPAHs (TEF Modified) (mg/kg)**
PS-215B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-216B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-217B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-218B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-219S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.06	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.06	ND(<0.05)	0.06	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.05	0.07
PS-220S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-221S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-222S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-223S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-224S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-225S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	0.06	0.01
PS-226B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-227S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-228S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
TEF[c]		-	-	-	-	-	-	-	-	-	-	-	0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels[a]		**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**5**	**NV**	**NV**	**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.1**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**NV**	**NV**	**53,460**	**NV**	**365**	**NV**	**NV**	**NV**	**NV**	**NV**	**15,026**	**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

Table 4-11
Petroleum Hydrocarbons in Soil - Area 5
2002 IRM Performance Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
PS-236B	9.0	ND(<20)	ND(<50)
PS-237S	3.0	ND(<20)	ND(<50)
PS-238B	9.0	ND(<20)	ND(<50)
PS-239S	3.0	ND(<20)	ND(<50)
PS-240B	9.0	ND(<20)	ND(<50)
PS-241S	3.0	ND(<20)	ND(<50)
PS-242B	9.0	ND(<20)	ND(<50)
PS-243S	3.0	ND(<20)	ND(<50)
PS-244B	9.0	ND(<20)	ND(<50)
PS-245S	3.0	ND(<20)	ND(<50)
PS-246B	9.0	ND(<20)	ND(<50)
PS-247S	3.0	ND(<20)	ND(<50)
PS-248B	9.0	ND(<20)	ND(<50)
PS-249S	3.0	ND(<20)	ND(<50)
PS-250B	9.0	ND(<20)	ND(<50)
PS-250B DUP	9.0	ND(<20)	ND(<50)
PS-251S	3.0	ND(<20)	ND(<50)
PS-252B	9.0	ND(<20)	ND(<50)
PS-253S	3.0	ND(<20)	1,800
PS-254B	9.0	ND(<20)	ND(<50)
PS-265B	4.0	200	
PS-266S	3.0	ND(<25)	ND(<50)
PS-267S	3.0	ND(<25)	ND(<50)
PS-268S	3.0	ND(<25)	ND(<50)
MTCA Method A Soil Cleanup Level (a)		**2,000**	**2,000**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

Table 4-12
PAHs in Soil - Area 6
2002 IRM Final Performance Sampling

Location	Depth (feet)	Non-Carcinogenic PAHs										
		Acenaphthene (mg/kg)	**Acenaphthylene (mg/kg)**	**Anthracene (mg/kg)**	**Benzo(g,h,i)perylene (mg/kg)**	**Fluoranthene (mg/kg)**	**Fluorene (mg/kg)**	**1-Methylnaphthalene (mg/kg)**	**2-Methylnaphthalene (mg/kg)**	**Naphthalene (mg/kg)**	**Phenanthrene (mg/kg)**	**Pyrene (mg/kg)**
PS-255S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-256S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-257S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-258S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-259B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
PS-260B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)
TEF[c]		-	-	-	-	-	-	-	-	-	-	-
MTCA Method A Soil Cleanup Levels[a]		**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**5**	**NV**	**NV**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**NV**	**NV**	**53,460**	**NV**	**365**	**NV**	**NV**	**NV**	**NV**	**NV**	**15,026**

Table 4-12
PAHs in Soil - Area 6
2002 IRM Final Performance Sampling

Location	Depth (feet)	Carcinogenic PAHs							
		Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a, h) anthracene (mg/kg)	Indeno(1, 2, 3-cd)pyrene (mg/kg)	Total cPAHs (TEF Modified) (mg/kg)
PS-255S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-256S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-257S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-258S	2.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-259B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
PS-260B	4.0	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND(<0.05)	ND
TEF(c)		0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels(a)		**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.1**
MTCA Soil Cleanup Levels (Equation 747-1)(b)		**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

mg/kg – milligrams/kilogram

Table 4-13
PAHs in Soil - Area 7
2002 IRM Final Performance Sampling

Location	Depth (feet)	Non-Carcinogenic PAHs										
		Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(g,h,i) perylene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1-Methylnaphthalene (mg/kg)	2-Methylnaphthalene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
PS-277S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-279S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.05	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.05	0.03
PS-281S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-283S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-285S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.14	0.13	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.09	0.12
PS-287S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-288S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-289B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-290B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-291B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-292B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
PS-293B	8.0	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.06	0.06
PS-294S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.09	0.05	0.08
TEF(c)		-	-	-	-	-	-	-	-	-	-	-
MTCA Method A Soil Cleanup Levels(a)		**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**5**	**NV**	**NV**
MTCA Soil Cleanup Levels (Equation 747-1)(b)		**NV**	**NV**	**53,460**	**NV**	**365**	**NV**	**NV**	**NV**	**NV**	**NV**	**15,026**

Table 4-13
PAHs in Soil - Area 7
2002 IRM Final Performance Sampling

Location	**Depth (feet)**	**Carcinogenic PAHs**							
		Benzo(a) anthracene (mg/kg)	**Benzo(a) pyrene (mg/kg)**	**Benzo(b) fluoranthene (mg/kg)**	**Benzo(k) fluoranthene (mg/kg)**	**Chrysene (mg/kg)**	**Dibenz(a, h) anthracene (mg/kg)**	**Indeno(1, 2, 3-cd)pyrene (mg/kg)**	**Total cPAHs (TEF Modified) (mg/kg)**
PS-277S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-279S	7.0	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.003
PS-281S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-283S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-285S	7.0	0.04	***0.12***	0.14	0.06	0.06	0.02	0.1	***0.16***
PS-287S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-288S	7.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-289B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-290B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-291B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-292B	8.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
PS-293B	8.0	0.03	0.04	0.03	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	0.05
PS-294S	7.0	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)	0.003
TEF[c]		0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels[a]		**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.1**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

Bold and Highlighted – Indicates detected concentration exceeds MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

mg/kg – milligrams/kilogram

Table 4-14
Mercury in Soil - Area 7
2002 IRM Final Performance Sampling

Location	Depth (feet)	Mercury (mg/kg)
PS-269S	2.0	ND(<0.02)
PS-270S	2.0	ND(<0.02)
PS-271S	2.0	0.05
PS-272S	2.0	0.04
PS-273S	2.0	ND(<0.02)
PS-274B	4.0	0.03
PS-275B	4.0	0.04
PS-276S	2.0	ND(<0.02)
PS-277S	7.0	ND(<0.02)
PS-278S	2.0	ND(<0.02)
PS-279S	7.0	ND(<0.02)
PS-280S	2.0	ND(<0.02)
PS-281S	7.0	ND(<0.02)
PS-282S	2.0	ND(<0.02)
PS-283S	7.0	0.03
PS-284S	2.0	ND(<0.02)
PS-285S	7.0	0.03
PS-286S	2.0	ND(<0.02)
PS-287S	7.0	ND(<0.02)
PS-288S	7.0	ND(<0.02)
PS-289B	8.0	0.03
PS-290B	8.0	0.04
PS-291B	8.0	0.07
PS-292B	8.0	0.04
PS-293B	8.0	0.08
PS-294S	7.0	0.03
MTCA Method A Soil Cleanup Level [(a)]		**2**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**0.16**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-15
Hexavalent Chromium and Mercury in Soil - Area 8
2002 IRM Final Performance Sampling

Location	Depth (feet)	Hexavalent Chromium (mg/kg)	Mercury (mg/kg)
PS-295S	2.0	--	0.03
PS-296S	2.0	--	0.07
PS-297S	2.0	--	0.11
PS-298S	2.0	--	0.02
PS-300S	2.0	--	0.08
PS-301B	4.0	--	ND(<0.02)
PS-302B	4.0	--	0.02
PS-321S	2.0	ND(<5)	--
PS-328S	2.0	--	ND(<0.02)
PS-329S	2.0	--	ND(<0.02)
PS-330S	2.0	--	ND(<0.02)
PS-331S	2.0	--	ND(<0.02)
PS-332B	4.0	--	0.03
PS-333B	4.0	--	ND(<0.02)
MTCA Method A Soil Cleanup Level[a]		**19**	**2**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**NV**	**0.16**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

mg/kg – milligrams/kilogram

Table 4-16
Mercury in Soil - Area 9
2002 IRM Final Performance Sampling

Location	Depth (feet)	Mercury (mg/kg)
PS-304S	2.0	ND(<0.02)
PS-305S	2.0	0.10
PS-306S	2.0	ND(<0.02)
PS-307S	2.0	ND(<0.02)
PS-308S	2.0	ND(<0.02)
PS-309B	4.0	0.04
PS-310B	4.0	0.05
PS-322S	2.0	ND(<0.02)
PS-323S	2.0	ND(<0.02)
PS-324S	2.0	ND(<0.02)
PS-325B	4.0	ND(<0.02)
MTCA Method A Soil Cleanup Level(a)		**2**
MTCA Soil Cleanup Levels (Equation 747-1)(b)		**0.16**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

Table 4-17
Hexavalent Chromium and Mercury in Soil - Area 10
2002 IRM

Location	Depth (feet)	Hexavalent Chromium (mg/kg)	Mercury (mg/kg)
PS-311S	2.0	NA	ND(<0.02)
PS-312S	2.0	NA	ND(<0.02)
PS-313S	2.0	NA	0.03
PS-314S	2.0	NA	0.06
PS-315S	2.0	NA	0.02
PS-316S	2.0	NA	ND(<0.02)
PS-317B	4.0	NA	ND(<0.02)
PS-318B	4.0	NA	0.03
PS-319S	2.0	NA	ND(<0.02)
PS-320S	2.0	ND(<5)	NA
MTCA Method A Soil Cleanup Level[(a)]		**19**	**2**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**NV**	**0.16**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

NA – Not Appicable

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

Table 4-18
Petroleum Hydrocarbons in Groundwater
Performance Monitoring

Location	Date	Diesel-Range Petroleum Hydrocarbons (µg/L)	Oil-Range Petroleum Hydrocarbons (µg/L)
MW-1	09/30/02	--	--
	01/28/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/30/03	ND(<130)	ND(<250)
	02/18/04	ND(<130)	ND(<250)
	06/02/04	--	--
MW-2	09/30/02	ND(<130)	ND(<250)
	01/28/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/30/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MW-4	09/30/02	ND(<130)	ND(<250)
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/29/03	190	
	02/18/04	--	--
	06/02/04	--	--
MW-6	09/30/02	ND(<130)	ND(<250)
	01/28/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/29/03	140	
	02/18/04	--	--
	06/01/04	--	--
MW-7	09/30/02	ND(<130)	ND(<250)
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/29/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MW-8	09/30/02	ND(<130)	ND(<250)
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/29/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MW-9	09/30/02	ND(<130)	ND(<250)
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/29/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--

Table 4-18
Petroleum Hydrocarbons in Groundwater
Performance Monitoring

Location	Date	Diesel-Range Petroleum Hydrocarbons (µg/L)	Oil-Range Petroleum Hydrocarbons (µg/L)
MW-10	09/30/02	280	
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/29/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MW-11	09/30/02	ND(<130)	ND(<250)
	01/28/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/30/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MW-12	09/30/02	ND(<130)	ND(<250)
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/30/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MW-13	09/30/02	ND(<130)	ND(<250)
	01/27/03	ND(<130)	ND(<250)
	04/30/03	ND(<130)	ND(<250)
	07/30/03	ND(<130)	ND(<250)
	02/18/04	--	--
	06/02/04	--	--
MTCA Method A Ground Water Cleanup Level[(a)]		**500**	**500**

Notes:

(a) MTCA Method A Ground Water Cleanup Level (WAC 173-340-900, Table 720-1)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

µg/L – micrograms/liter

Table 4-19
PAHs in Groundwater
Performance Monitoring

		Non-Carcinogenic PAHs										
Location	Date	Acenaphthene (µg/L)	Acenaphthylene (µg/L)	Anthracene (µg/L)	Benzo(g,h,I) perylene (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	1-methyl-naphthalene (µg/L)	2-methyl-naphthalene (µg/L)	Napthalene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-1	09/30/02	--	--	--	--	--	--	--	--	--	--	--
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	ND(<0.02)	ND(<0.02)
MW-2	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	0.04	ND(<0.02)	ND(<0.02)
MW-4	09/30/02	0.18	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.06	ND(<0.02)	0.05	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	0.31	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.11	0.17	0.03	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/29/03	0.24	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.09	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/19/04	0.44	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.2	0.13	0.04	0.03	ND(<0.02)	ND(<0.02)
MW-6	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
MW-7	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.11	ND(<0.02)	ND(<0.02)
MW-8	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
MW-9	09/30/02	0.07	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	0.08	ND(<0.02)	ND(<0.02)	0.05	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/29/03	0.05	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)

Table 4-19
PAHs in Groundwater
Performance Monitoring

Location	Date	Non-Carcinogenic PAHs										
		Acenaph-thene (µg/L)	Acenaph-thylene (µg/L)	Anthracene (µg/L)	Benzo(g,h,I) perylene (µg/L)	Fluoranthene (µg/L)	Fluorene (µg/L)	1-methyl-naphthalene (µg/L)	2-methyl-naphthalene (µg/L)	Napthalene (µg/L)	Phenanthrene (µg/L)	Pyrene (µg/L)
MW-10	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.06	ND(<0.02)	ND(<0.02)
MW-11	09/30/02	2.3	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.29	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)
	01/28/03	3.2	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.53	ND(<0.02)	ND(<0.02)	0.02	0.03	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/30/03	5.1	0.04	ND(<0.02)	ND(<0.02)	ND(<0.02)	1	ND(<0.02)	ND(<0.02)	0.06	0.07	ND(<0.02)
	02/18/04	5.9	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	1.4	ND(<0.02)	0.02	0.09	0.1	ND(<0.02)
MW-12	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/18/04	--	--	--	--	--	--	--	--	--	--	--
	06/02/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
MW-13	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	01/27/03	--	--	--	--	--	--	--	--	--	--	--
	04/30/03	--	--	--	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.02	ND(<0.02)	ND(<0.02)
TEF[(a)]		0.001	0.001	0.01	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001
EPA Surface Water Cleanup Levels[(b)]		**NV**	**NV**	**110,000**	**NV**	**370**	**14,000**	**NV**	**NV**	**NV**	**NV**	**11,000**

Table 4-19
PAHs in Groundwater
Performance Monitoring

Location	Date	Carcinogenic PAHs Benzo(a) anthracene (µg/L)	Benzo(a) pyrene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a, h) anthracene (µg/L)	Indeno(1, 2, 3-cd)pyrene (µg/L)	Total cPAHs (TEF Modified) (µg/L)
MW-1	09/30/02	--	--	--	--	--	--	--	--
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-2	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-4	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-6	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-7	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-8	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-9	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND

Table 4-19
PAHs in Groundwater
Performance Monitoring

Location	Date	Carcinogenic PAHs							
		Benzo(a) anthracene (µg/L)	Benzo(a) pyrene (µg/L)	Benzo(b) fluoranthene (µg/L)	Benzo(k) fluoranthene (µg/L)	Chrysene (µg/L)	Dibenz(a, h) anthracene (µg/L)	Indeno(1, 2, 3-cd)pyrene (µg/L)	Total cPAHs (TEF Modified) (µg/L)
MW-10	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/29/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/19/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-11	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/28/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-12	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	04/30/03	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/18/04	--	--	--	--	--	--	--	--
	06/02/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
MW-13	09/30/02	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	01/27/03	--	--	--	--	--	--	--	--
	04/30/03	--	--	--	--	--	--	--	--
	07/30/03	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
	02/18/04	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND(<0.02)	ND
TEF[(a)]		0.1	1	0.1	0.1	0.01	0.4	0.1	NV
EPA Surface Water Cleanup Levels[(b)]		**0.031**	**0.031**	**0.031**	**0.031**	**0.031**	**0.031**	**0.031**	**NV**

Notes:

(a) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

(b) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

µg/L – micrograms/Liter

Table 4-20
Metals in Groundwater
Performance Monitoring

Location	Date	Antimony		Arsenic		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel	
		Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)
MW-1	09/30/02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	01/28/03	ND(<560)	ND(<560)	ND(<5)	ND(<5)	ND(<240)	ND(<240)	ND(<40)	ND(<40)	ND(<80)	ND(<80)	ND(<48)	ND(<48)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<160)	ND(<160)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/30/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	12	15	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/18/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
MW-2	09/30/02	ND(<1,700)	--	ND(<5)	ND(<5)	ND(<72)	--	ND(<120)	--	ND(<240)	--	ND(<140)	--	8	6	ND(<0.2)	ND(<2)	ND(<480)	--
	01/28/03	ND(<560)	ND(<560)	ND(<5)	ND(<5)	ND(<240)	ND(<240)	ND(<40)	ND(<40)	ND(<80)	ND(<80)	ND(<48)	ND(<48)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<160)	ND(<160)
	04/30/03	ND(<280)	ND(<280)	ND(<5)	ND(<5)	ND(<12)	ND(<12)	ND(<20)	ND(<20)	ND(<40)	ND(<40)	ND(<240)	ND(<240)	5	5	ND(<0.2)	ND(<0.2)	ND(<80)	ND(<80)
	07/30/03	ND(<160)	ND(<160)	ND(<4)	ND(<4)	ND(<40)	ND(<40)	ND(<40)	ND(<40)	***100***	ND(<56)	ND(<40)	ND(<40)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<160)	ND(<160)
	02/18/04	ND(<80)	--	ND(<5)	--	ND(<20)	--	ND(<20)	--	ND(<28)	--	ND(<20)	--	ND(<3)	--	ND(<0.2)	--	ND(<60)	--
	06/02/04	ND(<160)	--	ND(<5)	--	ND(<40)	--	ND(<40)	--	ND(<56)	--	ND(<40)	--	ND(<3)	--	ND(<0.2)	--	ND(<160)	--
	09/22/04	ND(<80)	--	ND(<5)	--	ND(<20)	--	ND(<20)	--	ND(<28)	--	ND(<20)	--	ND(<3)	--	ND(<0.2)	--	***120***	--
	02/22/05	--	--	--	--	--	--	--	--	***88***	--	--	--	--	--	--	--	ND(<160)	--
	06/08/05	--	--	--	--	--	--	--	--	ND(<28)	--	--	--	--	--	--	--	***240***	--
	10/21/05	--	--	--	--	--	--	--	--	***56***	--	--	--	--	--	--	--	ND(<160)	--
	02/13/06	--	--	--	--	--	--	--	--	28	--	--	--	--	--	--	--	***190***	--
	06/12/06	--	--	--	--	--	--	--	--	ND(<7)	--	--	--	--	--	--	--	ND(<20)	--
	09/05/06	--	--	--	--	--	--	--	--	ND(<7)	--	--	--	--	--	--	--	ND(<20)	--
	12/19/06	--	--	--	--	--	--	--	--	39	--	--	--	--	--	--	--	ND(<20)	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<20)	--
MW-4	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	**7**	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/27/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/29/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	13	19	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/19/04	50	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	14	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	06/02/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	09/22/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	02/22/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.5***	--	--	--
	02/13/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***3***	--	--	--
	06/12/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	09/05/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	12/19/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
MW-6	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	**7**	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/28/03	ND(<560)	ND(<560)	***5***	ND(<5)	ND(<240)	ND(<240)	ND(<40)	ND(<40)	ND(<80)	ND(<80)	ND(<48)	ND(<48)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<160)	ND(<160)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/29/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	15	12	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/19/04	40	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	10	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	06/01/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
MW-7	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/27/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	***0.4***	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03		ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/29/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	11	14	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/19/04	100	--	ND(<5)	--	ND(<10)	--	24	--	ND(<14)	--	ND(<10)	--	ND(<3)	--	***0.4***	--	ND(<40)	--
	06/01/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	09/22/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--

Table 4-20
Metals in Groundwater
Performance Monitoring

		Antimony		Arsenic		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel	
Location	Date	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)
MW-7	02/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.4***	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***1.7***	--	--	--
	02/13/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.4***	--	--	--
	06/12/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	09/05/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	12/19/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.2***	--	--	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-8	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/27/03	ND(<70)	ND(<70)	***15***	***13***	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	***0.8***	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	***20***	***17***	ND(<3)	ND(<3)	ND(<5)	ND(<5)	10	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/29/03	ND(<70)	ND(<70)	***9***	***7***	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<7)	ND(<7)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/19/04	ND(<20)	--	***20***	--	ND(<5)	--	ND(<5)	--	9	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	06/01/04	ND(<20)	--	***16***	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	09/22/04	ND(<20)	--	***8***	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	***22***	--	ND(<0.2)	--	ND(<20)	--
	02/21/05	--	--	***18***	--	--	--	--	--	--	--	--	--	ND(<3)	--	--	--	--	--
	06/08/05	--	--	***17***	--	--	--	--	--	--	--	--	--	ND(<3)	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	02/13/06	--	--	ND(<5)	--	--	--	--	--	--	--	--	--	ND(<3)	--	--	--	--	--
	06/12/06	--	--	***28***	--	--	--	--	--	--	--	--	--	ND(<3)	--	--	--	--	--
	10/23/06	--	--	***12***	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/27/03	ND(<70)	ND(<70)	***10***	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/29/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<7)	ND(<7)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/19/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	***0.3***	--	ND(<20)	--
	06/01/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	09/22/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
	02/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.5***	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.3***	--	--	--
	02/13/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.8***	--	--	--
	06/12/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	09/05/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	12/19/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
MW-10/10R	09/30/02	ND(<56)	--	ND(<5)	ND(<5)	ND(<24)	--	ND(<40)	--	ND(<80)	--	ND(<48)	--	4	ND(<3)	***0.2***	***0.2***	ND(<160)	--
	01/27/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	***0.2***	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	10	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/29/03	ND(<160)	ND(<160)	ND(<4)	ND(<4)	ND(<40)	ND(<40)	ND(<40)	ND(<40)	ND(<56)	ND(<56)	ND(<40)	ND(<40)	ND(<3)	ND(<3)	***0.4***	ND(<0.2)	ND(<160)	ND(<160)
	02/19/04	ND(<40)	--	ND(<5)	--	ND(<10)	--	ND(<10)	--	ND(<14)	--	ND(<10)	--	ND(<3)	--	***0.6***	--	***70***	--
	06/02/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	11	--	ND(<5)	--	ND(<3)	--	***1.4***	--	ND(<20)	--
	09/22/04	ND(<80)	--	ND(<5)	--	ND(<5)	--	ND(<20)	--	ND(<28)	--	ND(<20)	--	5	--	ND(<0.2)	--	***140***	--
	02/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	ND(<20)	--
	06/08/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.3***	--	ND(<20)	--
	10/21/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.4***	--	ND(<20)	--

Table 4-20
Metals in Groundwater
Performance Monitoring

Location	Date	Antimony		Arsenic		Beryllium		Cadmium		Chromium		Copper		Lead		Mercury		Nickel	
		Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)
MW-10/10R	02/13/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	***0.6***	--	ND(<20)	--
	06/12/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	09/05/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	12/19/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	--	--
MW-11	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/28/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/30/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<7)	ND(<7)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/18/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	06/02/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
MW-12	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/27/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/30/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	13	ND(<7)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	02/18/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	06/02/04	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	ND(<3)	--	ND(<0.2)	--	ND(<20)	--
MW-13	09/30/02	ND(<70)	--	ND(<5)	ND(<5)	ND(<3)	--	ND(<5)	--	ND(<10)	--	ND(<6)	--	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	--
	01/27/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	04/30/03	ND(<70)	ND(<70)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<5)	ND(<5)	ND(<10)	ND(<10)	ND(<6)	ND(<6)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
	07/30/03	ND(<70)	ND(<70)	ND(<4)	ND(<4)	ND(<5)	ND(<5)	ND(<5)	ND(<5)	ND(<7)	ND(<7)	ND(<5)	ND(<5)	ND(<3)	ND(<3)	ND(<0.2)	ND(<0.2)	ND(<20)	ND(<20)
MW-14	02/21/05	ND(<160)	--	ND(<5)	--	ND(<40)	--	ND(<40)	--	ND(<56)	--	ND(<40)	--	7	--	ND(<0.2)	--	ND(<160)	--
	06/08/05	ND(<160)	--	ND(<5)	--	ND(<40)	--	ND(<40)	--	ND(<56)	--	ND(<40)	--	7	--	ND(<0.2)	--	ND(<160)	--
	10/21/05	ND(<20)	--	ND(<5)	--	ND(<5)	--	ND(<5)	--	ND(<7)	--	ND(<5)	--	8	--	***0.4***	--	***30***	--
	02/13/06	ND(<80)	--	ND(<5)	--	ND(<20)	--	ND(<20)	--	36	--	ND(<20)	--	4	--	***0.6***	--	***130***	--
	06/12/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	ND(<20)	--
	09/05/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	ND(<20)	--
	12/19/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	ND(<20)	--
	03/20/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND(<0.2)	--	ND(<20)	--
MTCA Marine Water Chronic Criteria[(a)]		**NV**		**36**		**NV**		**9.3**		**50**		**3.1**		**8.1**		**0.025**		**8.2**	
EPA Surface Water Cleanup Levels[(b)]		**4,300**		**0.14**		**NV**		**NV**		**NV**		**NV**		**NV**		**0.15**		**4,600**	

Table 4-20
Metals in Groundwater
Performance Monitoring

Location	Date	Selenium		Silver		Thallium		Zinc		Turbidity (NTU)
		Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	
MW-1	09/30/02	--	--	--	--	--	--	--	--	--
	01/28/03	ND(<400)	ND(<400)	ND(<56)	ND(<56)	ND(<2)	ND(<2)	100	ND(<56)	9.1
	04/30/03	ND(<50)	ND<(50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	5.8
	07/30/03	ND(<40)	ND<(40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	30	20	4
	02/18/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
MW-2	09/30/02	ND(<1,200)	--	ND(<170)	--	ND(<2)	ND(<2)	ND(<170)	--	2.4
	01/28/03	ND(<400)	ND(<400)	ND(<56)	ND(<56)	ND(<2)	ND(<2)	ND(<56)	ND(<56)	0.83
	04/30/03	ND(<200)	ND(<200)	ND(<28)	ND(<28)	2	ND(<2)	ND(<28)	ND(<28)	0.8
	07/30/03	ND(<320)	ND(<320)	ND(<240)	ND(<240)	ND(<2)	ND(<2)	ND(<80)	ND(<80)	2.1
	02/18/04	ND(<160)	--	ND(<120)	--	ND(<2)	--	ND(<40)	--	--
	06/02/04	ND(<320)	--	ND(<240)	--	ND(<2)	--	ND(<80)	--	--
	09/22/04	ND(<160)	--	ND(<120)	--	ND(<2)	--	ND(<40)	--	--
	02/22/05	--	--	--	--	--	--	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	2.1
	02/13/06	--	--	--	--	--	--	--	--	0.57
	06/12/06	--	--	--	--	--	--	--	--	3.74
	09/05/06	--	--	--	--	--	--	--	--	1.03
	12/19/06	--	--	--	--	--	--	--	--	3.01
	03/20/07	--	--	--	--	--	--	--	--	1.94
MW-4	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	8.5
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	16
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	16
	07/29/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	1
	02/19/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	20	--	--
	06/02/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
	09/22/04	--	--	--	--	--	--	--	--	--
	02/22/05	--	--	--	--	--	--	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	1.95
	02/13/06	--	--	--	--	--	--	--	--	4.54
	06/12/06	--	--	--	--	--	--	--	--	0.54
	09/05/06	--	--	--	--	--	--	--	--	0.97
	12/19/06	--	--	--	--	--	--	--	--	2.17
	03/20/07	--	--	--	--	--	--	--	--	1.04
MW-6	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	40
	01/28/03	ND(<400)	ND(<400)	ND(<56)	ND(<56)	ND(<2)	ND(<2)	ND(<56)	ND(<56)	11
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	14
	07/29/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	33
	02/19/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	20	--	--
	06/01/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
MW-7	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	4.2
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	0.57
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	0.2
	07/29/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	1.4
	02/19/04	ND(<80)	--	ND(<60)	--	ND(<2)	--	ND(<20)	--	--
	06/01/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
	09/22/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--

Table 4-20
Metals in Groundwater
Performance Monitoring

		Selenium		Silver		Thallium		Zinc		
Location	Date	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Turbidity (NTU)
MW-7	02/21/05	--	--	--	--	--	--	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	1.89
	02/13/06	--	--	--	--	--	--	--	--	0.32
	06/12/06	--	--	--	--	--	--	--	--	0.43
	09/05/06	--	--	--	--	--	--	--	--	0.53
	12/19/06	--	--	--	--	--	--	--	--	1.9
	03/20/07	--	--	--	--	--	--	--	--	--
MW-8	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	13
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	28
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	15
	07/29/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	7.6
	02/19/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	20	--	--
	06/01/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
	09/22/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	20	--	--
	02/21/05	--	--	--	--	--	--	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	--
	02/13/06	--	--	--	--	--	--	--	--	0.37
	06/12/06	--	--	--	--	--	--	--	--	0.36
	10/23/06	--	--	--	--	--	--	--	--	0
	12/19/06	--	--	--	--	--	--	--	--	--
	03/20/07	--	--	--	--	--	--	--	--	--
MW-9	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	50
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	110
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	22
	07/29/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	33
	02/19/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
	06/01/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
	09/22/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	20	--	--
	02/21/05	--	--	--	--	--	--	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	1.5
	02/13/06	--	--	--	--	--	--	--	--	17.5
	06/12/06	--	--	--	--	--	--	--	--	1.13
	09/05/06	--	--	--	--	--	--	--	--	2.54
	12/19/06	--	--	--	--	--	--	--	--	19.1
	03/20/07	--	--	--	--	--	--	--	--	4.41
MW-10/10R	09/30/02	ND(<400)	--	ND(<56)	--	ND(<2)	ND(<2)	ND(<56)	--	18
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	8.8
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	8.7
	07/29/03	ND(<320)	ND(<320)	ND(<240)	ND(<240)	ND(<2)	ND(<2)	ND(<8)	ND(<8)	1.2
	02/19/04	ND(<80)	--	ND(<60)	--	ND(<2)	--	ND(<20)	--	--
	06/02/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
	09/22/04	ND(<160)	--	ND(<120)	--	2	--	ND(<40)	--	--
	02/21/05	--	--	--	--	--	--	--	--	--
	06/08/05	--	--	--	--	--	--	--	--	--
	10/21/05	--	--	--	--	--	--	--	--	1.2

Table 4-20
Metals in Groundwater
Performance Monitoring

		Selenium		Silver		Thallium		Zinc		
Location	Date	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Total (µg/L)	Dissolved (µg/L)	Turbidity (NTU)
MW-10/10R	02/13/06	--	--	--	--	--	--	--	--	0.16
	06/12/06	--	--	--	--	--	--	--	--	1.62
	09/05/06	--	--	--	--	--	--	--	--	0.88
	12/19/06	--	--	--	--	--	--	--	--	1.06
	03/20/07	--	--	--	--	--	--	--	--	0.8
MW-11	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	11
	01/28/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	9.4
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	11
	07/30/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	11
	02/18/04	--	--	--	--	--	--	--	--	--
	06/02/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
MW-12	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	24
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	17
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	36
	07/30/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	38
	02/18/04	--	--	--	--	--	--	--	--	--
	06/02/04	ND(<40)	--	ND(<30)	--	ND(<2)	--	ND(<10)	--	--
MW-13	09/30/02	ND(<50)	--	ND(<7)	--	ND(<2)	ND(<2)	ND(<7)	--	12
	01/27/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	ND(<7)	ND(<7)	1.4
	04/30/03	ND(<50)	ND(<50)	ND(<7)	ND(<7)	ND(<2)	ND(<2)	22	ND(<7)	36
	07/30/03	ND(<40)	ND(<40)	ND(<30)	ND(<30)	ND(<2)	ND(<2)	ND(<10)	ND(<10)	3.2
MW-14	02/21/05	ND(<320)	--	ND(<240)	--	ND(<2)	--	ND(<80)	--	--
	06/08/05	ND(<320)	--	ND(<240)	--	ND(<2)	--	ND(<80)	--	--
	10/21/05	ND(<40)	--	ND(<30)	--	4	--	ND(<10)	--	1.41
	02/13/06	ND(<160)	--	ND(<30)	--	***8***	--	ND(<40)	--	0
	06/12/06	--	--	--	--	ND(<2)	--	--	--	3.27
	09/05/06	--	--	--	--	ND(<2)	--	--	--	12.8
	12/19/06	--	--	--	--	ND(<2)	--	--	--	2.69
	03/20/07	--	--	--	--	ND(<2)	--	--	--	0.32
MTCA Marine Water Chronic Criteria[(a)]		**71**		**1.9**		**NV**		**81**		**NV**
EPA Surface Water Cleanup Levels[(b)]		**NV**		**NV**		**6.3**		**NV**		**NV**

Notes:

(a) Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms

(b) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

Bold and Highlighted - Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

Table 4-21
Groundwater Field Parameters
Performance Monitoring

Location	Date	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Temperature (°C)
MW-1	1/27/1999	7.40	540	1.2	--	--	12.8
	4/29/1999	6.21	679	0.4	--	--	14.4
	7/29/1999	6.08	702	0.7	--	--	18.5
	2/17/2000	6.32	411	5.3	--	--	13.8
	6/1/2000	6.60	746	2.5	--	--	16.7
	2/21/2001	5.98	701	1.4	--	--	12.1
	6/11/2002	5.53	746	0	-137	5.9	13.6
MW-2	9/29/1998	7.01	>3,999	1.5	--	--	16.1
	1/27/1999	7.00	>3,999	0	--	--	11.9
	4/29/1999	6.77	>3,999	0.3	--	--	13.4
	7/29/1999	6.72	>3,999	0.2	--	--	19.1
	2/17/2000	6.69	>20,000	2.8	--	--	14.8
	6/1/2000	6.96	>19,000	1	--	--	14.5
	9/21/2000	6.97	>19,000	1.4	--	--	17.5
	2/21/2001	6.68	>20,000	0	--	--	12.2
	6/7/2001	6.93	>3,999	--	--	--	13.3
	10/20/2001	6.84	43,500	0.39	-310	4.96	15.2
	2/12/2002	7.25	36,100	1.92	-365	0.57	11.9
	6/11/2002	6.53	38,700	0	-269	3.74	12.4
	9/4/2002	6.96	39,800	2.29	-335	1.03	15.5
	12/18/2002	7.11	29,500	1.9	-360	3.01	13.0
	3/19/2003	7.11	38,100	0.96	-334	1.94	10.7
MW-4	9/29/1998	7.19	1,215	2.6	--	--	15.9
	1/27/1999	7.12	1,416	0.7	--	--	12.5
	4/29/1999	6.87	1,715	0.2	--	--	12.3
	7/29/1999	6.80	1,407	0.5	--	--	19.3
	2/17/2000	6.65	1,055	4.6	--	--	10.6
	6/1/2000	6.90	1,650	2.2	--	--	14.1
	2/21/2001	6.77	1,280	1.4	--	--	11.8
	6/7/2001	6.93	>3,999	--	--	--	13.8
	10/20/2001	6.72	7,010	0.43	-310	0.44	16.2
	2/12/2002	7.12	4,510	1.08	-290	4.54	11.1
	6/11/2002	5.93	5,040	0	-49	0.54	13.8
	9/4/2002	6.44	4,510	3.46	-335	0.97	18.8
	12/18/2002	6.73	4,220	2.08	-86	2.17	13.5
	3/19/2003	6.76	4,480	1.27	-236	1.04	10.9
MW-6	9/29/1998	6.90	790	2.8	--	--	16.2
	1/27/1999	7.11	1,470	1.9	--	--	10.5
	4/29/1999	6.93	1,230	0.7	--	--	12.0
	7/29/1999	6.91	1,128	0.4	--	--	18.1
	2/17/2000	6.73	790	1.3	--	--	10.8
	6/1/2000	6.74	1,320	2.5	--	--	15.7
	6/11/2002	6.01	1,330	0	-7	2.77	12.4

Table 4-21
Groundwater Field Parameters
Performance Monitoring

Location	Date	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Temperature (°C)
MW-7	9/29/1998	7.26	790	2.5	--	--	12.7
	1/27/1999	6.92	506	1.2	--	--	10.4
	4/29/1999	7.07	972	0.8	--	--	10.7
	7/29/1999	7.15	1,088	0.6	--	--	17.7
	2/17/2000	6.86	921	2.4	--	--	10.6
MW-7	5/31/2000	6.98	1,420	1	--	--	16.6
	9/21/2000	7.75	948	1.7	--	--	15.3
	2/21/2001	6.93	785	3.7	--	--	14.5
	6/7/2001	6.82	683	--	--	--	12.4
	10/20/2001	6.84	1,130	0.49	-75	0.64	13.0
	2/12/2002	6.58	1,160	1.11	-119	0.32	10.3
	6/11/2002	6.12	1,150	0	4	0.43	12.0
	9/4/2002	6.53	1,050	2.97	89	0.53	13.6
	12/18/2002	6.55	1,250	2.4	105	1.9	10.7
MW-8	9/29/1998	7.27	373	2.8	--	--	16.0
	1/27/1999	7.16	420	1.3	--	--	10.0
	4/29/1999	7.19	555	0.8	--	--	10.6
	7/29/1999	7.00	620	0.3	--	--	18.7
	2/17/2000	6.91	389	3.3	--	--	10.4
	5/31/2000	6.95	668	2.1	--	--	11.6
	9/21/2000	6.98	572	1.8	--	--	17.4
	2/20/2001	6.93	665	2.1	--	--	12.3
	6/7/2001	6.66	887	--	--	--	12.8
	2/12/2002	6.57	732	1.09	-113	0.37	8.9
	6/11/2002	6.04	689	0	-15	0.36	11.9
	10/22/2002	6.40	719	5.07	-98	0	15.4
MW-9	9/29/1998	6.79	>3,999	2.6	--	--	14.4
	1/27/1999	6.98	1,130	--	--	--	13.6
	4/29/1999	6.91	1,366	1	--	--	12.8
	7/29/1999	6.82	1,779	0.5	--	--	18.1
	2/17/2000	6.72	472	2.4	--	--	10.6
	5/31/2000	6.85	1,710	1.4	--	--	14.3
	9/21/2000	7.64	1,190	1.8	--	--	14.8
	2/21/2001	6.27	10,930	8.5	--	--	10.6
	6/7/2001	6.56	>3,999	--	--	--	12.2
	10/20/2001	6.83	11,200	0.47	-138	1.67	14.1
	2/12/2002	7.29	2,880	1.11	-193	17.5	11.1
	6/11/2002	6.19	4,200	0	-36	1.13	12.7
	9/4/2002	6.49	3,940	3.82	7	2.54	14.5
	12/18/2002	6.90	1,740	2.5	43	19.1	12.0
	3/19/2003	6.91	2,200	1.84	-127	4.41	11.0

Table 4-21
Groundwater Field Parameters
Performance Monitoring

Location	Date	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Temperature (°C)
MW-10	9/29/1998	6.70	>3,999	2.3	--	--	16.0
	1/27/1999	7.22	>3,999	0.3	--	--	15.2
	4/29/1999	7.19	3,984	0.2	--	--	14.6
	7/29/1999	6.81	>3,999	0.4	--	--	18.8
	2/17/2000	6.70	14,660	13.7	--	--	11.5
	6/1/2000	6.98	18,600	0.9	--	--	13.4
	9/21/2000	6.50	>19,999	1.1	--	--	15.8
MW-10R	2/20/2001	7.27	3,680	3.2	--	--	10.7
	6/7/2001	6.93	1,817	--	--	--	12.5
	10/20/2001	7.15	4,310	0.46	-284	0	14.9
	2/12/2002	7.21	1,980	1.12	-259	0.16	11.5
	6/11/2002	6.11	1,610	0	-36	1.62	12.9
MW-10R	9/4/2002	6.34	1,780	3.9	32	0.88	15.7
	12/18/2002	6.77	1,010	2.64	-44	1.06	12.9
	3/19/2003	6.80	1,210	2.06	-169	0.8	11.0
MW-11	9/29/1998	7.16	951	1.7	--	--	15.2
	1/26/1999	7.11	811	0.9	--	--	11.5
	4/29/1999	7.17	1,113	0.4	--	--	12.5
	7/29/1999	7.11	1,118	0.9	--	--	15.7
	2/17/2000	6.88	870	1.9	--	--	12.2
	6/1/2000	7.05	1,350	1.6	--	--	13.7
MW-12	9/29/1998	7.35	495	2.3	--	--	14.8
	1/27/1999	7.30	487	1.1	--	--	11.9
	4/29/1999	7.27	685	0.5	--	--	13.6
	7/29/1999	7.22	877	0.5	--	--	18.2
	6/1/2000	6.92	757	1.9	--	--	15.0
	9/21/2000	7.62	610	1.8	--	--	16.2
	2/21/2001	6.95	634	1.5	--	--	10.6
	6/11/2002	5.94	814	0	-52	0.25	13.5
MW-13	9/29/1998	7.53	553	4.1	--	--	14.6
	1/27/1999	7.34	382	0.8	--	--	10.3
	4/29/1999	7.05	469	0.7	--	--	13.3
	7/29/1999	7.10	553	0.8	--	--	16.7
	2/17/2000	6.55	358	5.3	--	--	13.8
	5/31/2000	6.84	670	1.8	--	--	14.2
	9/21/2000	7.52	486	1.1	--	--	15.6
	2/21/2001	6.53	379	1.1	--	--	11.4
	6/11/2002	5.80	672	0	-48	1.42	12.0

Table 4-21
Groundwater Field Parameters
Performance Monitoring

Location	Date	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Temperature (°C)
MW-14	2/20/2001	7.17	>20,000	9.1	--	--	8.9
	6/7/2001	6.82	>3,999	--	--	--	13.9
	10/20/2001	7.51	49,900	4.89	-184	0.64	13.5
	2/12/2002	7.90	48,700	7.75	-224	0	8.6
	6/11/2002	6.49	45,300	0.27	-23	3.27	14.4
	9/4/2002	6.94	45,500	4.14	38	12.8	17.3
	12/18/2002	7.31	44,700	7.39	82	2.69	9.0
	3/19/2003	7.33	4,740	8.47	65	0.32	9.0

Table 4-22
Petroleum Hydrocarbons in Soil
2004 Investigations

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
EPI-SP-38	2.0	360	410
	6.0	54	770
	10.0	ND(<25)	ND(<50)
EPI-SP-43	5.5-6.0	ND(<25)	61
EPI-SP-44	5.5-6.0	ND(<25)	ND(<50)
EPI-SP-45	5.5-6.0	110	680
EPI-SP-46	5.5-6.0	ND(<25)	ND(<50)
EPI-SP-47	5.5-6.0	ND(<25)	ND(<50)
EPI-SP-48	5.5-6.0	390	1,300
EPI-SP-49	5.5-6.0	ND(<25)	68
EPI-SP-50	5.5-6.0	ND(<25)	ND(<50)
EPI-SP-51	5.0-5.5	ND(<25)	51
EPI-SP-52	5.0-5.5	ND(<25)	ND(<50)
EPI-SP-53	5.5-6.0	39	59
EPI-SP-54	5.5-6.0	ND(<25)	ND(<50)
EPI-SP-55	4.5-5.0	ND(<25)	ND(<50)
EPI-SP-56	5.0-5.5	55	ND(<54)
EPI-SP-57	5.0-5.5	***2,700***	ND(<100)
EPI-SP-58	5.5-6.0	80	480
EPI-SP-59	5.5-6.0	100	320
EPI-SP-60	5.5-6.0	ND(<25)	ND(<50)
EPI-SP-61	6.5-7.0	ND(<25)	ND(<50)
EPI-SP-62	6.5-7.0	ND(<25)	ND(<50)
MTCA Method A Soil Cleanup Level [(a)]		**2,000**	
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**NV**	

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

mg/kg – milligrams/kilogram

Table 4-23
PAHs in Soil
2004 Investigations

		Non-Carcinogenic PAHs											Carcinogenic PAHs							
Location	**Depth (feet)**	**Acenaph-thene (mg/kg)**	**Acenaph-thylene (mg/kg)**	**Anthracene (mg/kg)**	**Benzo(g,h,i)perylene (mg/kg)**	**Fluoran-thene (mg/kg)**	**Fluorene (mg/kg)**	**1-Methyl-naphthalene (mg/kg)**	**2-Methyl-naphthalene (mg/kg)**	**Naph-thalene (mg/kg)**	**Phenan-threne (mg/kg)**	**Pyrene (mg/kg)**	**Benzo(a) anthracene (mg/kg)**	**Benzo(a) pyrene (mg/kg)**	**Benzo(b) fluoranthene (mg/kg)**	**Benzo(k) fluoranthene (mg/kg)**	**Chrysene (mg/kg)**	**Dibenz(a, h) anthracene (mg/kg)**	**Indeno(1, 2, 3-cd)pyrene (mg/kg)**	**Total cPAHs (TEF Modified) (mg/kg)**
EPI-SP-38	2.0	54	1.2	34	ND(<0.02)	72	54	16	31	***98***	150	34	***9***	***2.9***	3.6	4.6	10	ND(<0.02)	0.23	***3.84***
	6.0	0.18	ND(<0.02)	0.05	0.04	0.21	0.13	0.04	0.1	0.27	0.44	0.1	0.02	0.04	0.03	0.09	0.07	ND(<0.02)	0.02	0.05
	10.0	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.04	0.1	ND(<0.02)	ND(<0.02)	ND(<0.02)	0.03	0.09	0.09	0.03	0.04	0.03	0.06	0.07	ND(<0.02)	0.03	0.05
TEF[c]		-	-	-	-	-	-	-	-	-	-	-	0.1	1	0.1	0.1	0.01	0.4	0.1	NV
MTCA Method A Soil Cleanup Levels[a]		**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**NV**	**5**	**NV**	**NV**	**NV**	**0.1**	**NV**	**NV**	**NV**	**NV**	**NV**	**0.1**
MTCA Soil Cleanup Levels (Equation 747-1)[b]		**NV**	**NV**	**53,460**	**NV**	**365**	**NV**	**NV**	**NV**	**NV**	**NV**	**15,026**	**2.2**	**0.6**	**7.6**	**8**	**25**	**2.78**	**21.5**	**NV**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR

(c) Total cPAH concentrations modified using the protocol described in WAC 173-340-708(8)(e)(ii)

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

TEF – Toxicity Equivalency Factor

mg/kg – milligrams/kilogram

Table 4-24
PCBs in Soil
2004 Investigations

Location	Depth (feet)	Aroclor 1016 (mg/kg)	Aroclor 1221 (mg/kg)	Aroclor 1232 (mg/kg)	Aroclor 1242 (mg/kg)	Aroclor 1248 (mg/kg)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)
EPI-SP-38	2.0	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)	ND(<1)
MTCA Method A Soil Cleanup Levels[(a)]		**1[(c)]**	**1[(c)]**	**1[(c)]**	**1[(c)]**	**1[(c)]**	**1[(c)]**	**1(c)**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**0.0028[(c)]**	**0.0028[(c)]**	**0.0028[(c)]**	**0.0028[(c)]**	**0.0028[(c)]**	**0.0028[(c)]**	**0.0028[(c)]**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

(c) Allowable concentrations for total PCBs in a mixture

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-25
Arsenic in Soil
2004 Investigations

Location	Depth (feet)	Arsenic (mg/kg)
EPI-SP-43	5.5-6.0	ND(<3.6)
EPI-SP-44	5.5-6.0	ND(<3.5)
EPI-SP-45	5.5-6.0	ND(<3.8)
EPI-SP-46	5.5-6.0	ND(<3.7)
EPI-SP-47	5.5-6.0	ND(<3.7)
EPI-SP-48	5.5-6.0	ND(<5.2)
EPI-SP-49	5.5-6.0	ND(<3.3)
EPI-SP-50	5.5-6.0	ND(<3.1)
EPI-SP-51	5.0-5.5	ND(<3.3)
EPI-SP-52	5.0-5.5	ND(<3.1)
EPI-SP-53	5.5-6.0	ND(<6.3)
EPI-SP-54	5.5-6.0	ND(<4.7)
EPI-SP-55	4.5-5.0	ND(<4.4)
EPI-SP-56	5.0-5.5	ND(<7.2)
EPI-SP-57	5.0-5.5	ND(<4.3)
EPI-SP-58	5.5-6.0	ND(<5.0)
EPI-SP-59	5.5-6.0	ND(<5.1)
EPI-SP-60	5.5-6.0	ND(<4.2)
EPI-SP-61	6.5-7.0	5.5
EPI-SP-62	6.5-7.0	ND(<3.7)
MTCA Method A Soil Cleanup Level[(a)]		**20**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**21**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-26
Mercury in Soil
2004 Investigations

Location	Depth (feet)	Mercury (mg/kg)
EPI-SP-1	2.0	ND(<0.02)
	6.0	0.04
	10.0	ND(<0.02)
EPI-SP-2	2.0	ND(<0.02)
	6.0	0.02
	10.0	***0.54***
	11.0	***0.52***
	16.0	0.05
	17.0	0.06
	18.0	***0.17***
	19.0	0.02
	20.0	ND(<0.02)
EPI-SP-3	2.0	ND(<0.02)
	6.0	0.02
	10.0	0.09
EPI-SP-4	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	***6.0***
	14.0	ND(<0.02)
	15.0	ND(<0.02)
	16.0	ND(<0.02)
	17.0	ND(<0.02)
	18.0	ND(<0.02)
	19.0	ND(<0.02)
	20.0	ND(<0.02)
EPI-SP-5	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	0.15
EPI-SP-6	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	ND(<0.02)
EPI-SP-7	2.0	ND(<0.02)
	4.0	ND(<0.02)
	6.0	***1.7***
	8.0	***0.93***
	10.0	0.16
EPI-SP-8	2.0	ND(<0.02)
	6.0	0.03
	8.0	***0.33***
	10.0	***0.57***
	12.0	***0.42***
	14.0	0.12

Table 4-26
Mercury in Soil
2004 Investigations

Location	Depth (feet)	Mercury (mg/kg)
EPI-SP-9	2.0	ND(<0.02)
	4.5	***1.6***
	8.0	***3.3***
	9.0	***0.3***
	12.0	***5.5***
	14.0	0.04
EPI-SP-10	2.0	ND(<0.02)
	6.0	0.02
	8.0	***17***
	10.0	***0.18***
	12.0	0.03
	14.0	ND(<0.02)
EPI-SP-11	2.0	NA
	6.0	0.1
	10.0	ND(<0.02)
EPI-SP-12	2.0	ND(<0.02)
	6.0	0.03
	10.0	0.03
EPI-SP-13	2.0	ND(<0.02)
	6.0	0.06
	8.0	0.06
	10.0	0.14
	12.0	0.05
	14.0	0.03
EPI-SP-14	2.0	ND(<0.02)
	4.0	ND(<0.02)
	6.0	***0.44***
	8.0	***0.18***
	10.0	0.06
EPI-SP-15	2.0	0.06
	6.0	0.04
	8.0	ND(<0.02)
	10.0	***0.8***
	12.0	***0.22***
	14.0	ND(<0.02)
EPI-SP-16	2.0	0.15
	6.0	0.03
	8.0	***9.1***
	10.0	***3.9***
	12.0	ND(<0.02)
	14.0	ND(<0.02)

Table 4-26
Mercury in Soil
2004 Investigations

Location	Depth (feet)	Mercury (mg/kg)
EPI-SP-17	2.0	0.03
	4.0	ND(<0.02)
	6.0	***0.94***
	8.0	0.03
	10.0	0.03
EPI-SP-18	2.0	ND(<0.02)
	6.0	0.02
	10.0	ND(<0.02)
EPI-SP-19	2.0	ND(<0.02)
	6.0	0.06
	10.0	0.09
EPI-SP-20	2.0	***0.19***
	4.0	0.05
	6.0	0.05
	9.0	0.07
	10.0	***0.17***
	11.0	0.08
EPI-SP-21	2.0	ND(<0.02)
	6.0	0.03
	10.0	0.13
EPI-SP-22	2.0	ND(<0.02)
	6.0	0.03
	8.0	ND(<0.02)
	10.0	***0.33***
	12.0	ND(<0.02)
	13.0	ND(<0.02)
	14.0	ND(<0.02)
	20.0	ND(<0.02)
EPI-SP-23	2.0	ND(<0.02)
	6.0	0.02
	10.0	0.04
EPI-SP-24	2.0	0.03
	6.0	0.04
	10.0	0.1
EPI-SP-25	2.0	0.03
	6.0	0.03
	10.0	0.02
EPI-SP-26	2.0	ND(<0.02)
	6.0	0.03
	10.0	ND(<0.02)

Table 4-26
Mercury in Soil
2004 Investigations

Location	Depth (feet)	Mercury (mg/kg)
EPI-SP-27	2.0	0.02
	6.0	ND(<0.02)
	10.0	NS
EPI-SP-28	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	ND(<0.02)
EPI-SP-29	2.0	ND(<0.02)
	6.0	0.02
	10.0	0.03
EPI-SP-30	2.0	ND(<0.02)
	6.0	0.04
	10.0	ND(<0.02)
EPI-SP-31	2.0	ND(<0.02)
	6.0	0.02
	10.0	0.03
EPI-SP-32	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	0.02
EPI-SP-33	2.0	ND(<0.02)
	6.0	0.05
	10.0	0.02
EPI-SP-34	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	ND(<0.02)
EPI-SP-35	2.0	ND(<0.02)
	6.0	ND(<0.02)
	9.5	ND(<0.02)
EPI-SP-36	2.0	ND(<0.02)
	6.0	0.03
	10.0	ND(<0.02)
EPI-SP-37	2.0	ND(<0.02)
EPI-SP-38	2.0	ND(<0.02)
	4.0	ND(<0.02)
	6.0	***0.3***
	8.0	0.05
	10.0	0.08
EPI-SP-39	2.0	ND(<0.02)
	6.0	0.03
	8.0	0.02
	10.0	***0.18***
	12.0	0.04
	14.0	ND(<0.02)

Table 4-26
Mercury in Soil
2004 Investigations

Location	Depth (feet)	Mercury (mg/kg)
EPI-SP-40	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	0.02
EPI-SP-41	2.0	NA
	6.0	ND(<0.02)
	10.0	ND(<0.02)
EPI-SP-63	2.0	0.15
	6.0	ND(<0.02)
	10.0	0.05
	14.0	0.03
	18.0	ND(<0.02)
EPI-SP-64	2.0	0.13
	6.0	0.14
	10.0	0.1
	14.0	0.1
EPI-SP-65	2.0	ND(<0.02)
	6.0	ND(<0.02)
	8.0	***0.42***
	10.0	***1.0***
	12.0	0.06
EPI-SP-66	2.0	ND(<0.02)
	6.0	***0.37***
	8.0	0.13
	10.0	0.08
	12.0	***0.17***
	14.0	***0.2***
EPI-SP-67	2.0	ND(<0.02)
	6.0	0.12
	10.0	0.05
	14.0	0.02
EPI-SP-68	2.0	ND(<0.02)
	6.0	ND(<0.02)
	8.0	0.04
	10.0	***0.17***
	12.0	0.16
	16.0	ND(<0.02)
EPI-SP-69	2.0	ND(<0.02)
	6.0	0.07
	8.0	ND(<0.02)
	10.0	***0.23***
	12.0	***0.3***
	18.0	ND(<0.02)

Table 4-26
Mercury in Soil
2004 Investigations

Location	**Depth (feet)**	**Mercury (mg/kg)**
EPI-SP-73	2.0	ND(<0.02)
	6.0	ND(<0.02)
	10.0	ND(<0.02)
	12.0	ND(<0.02)
MTCA Method A Soil Cleanup Level[(a)]		**2**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**0.16**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-27
Petroleum Hydrocarbons in Soil
2004/2005 IRM Final Performance Sampling

Location	Depth (feet)	Diesel-Range Petroleum Hydrocarbons (mg/kg)	Higher-Range Petroleum Hydrocarbons (mg/kg)
PS-01S-04	5.0	57	ND(<54)
PS-02B-04	7.0	ND(<25)	ND(<50)
PS-03B-04	7.0	ND(<25)	ND(<50)
PS-04B-04	7.0	ND(<25)	ND(<50)
PS-05S-04	5.0	28	ND(<50)
PS-06S-04	5.0	ND(<26)	ND(<51)
PS-07S-04	5.0	590	ND(<50)
PS-08S-04	5.0	ND(<25)	ND(<50)
PS-09S-04	5.0	ND(<26)	ND(<53)
MTCA Method A Soil Cleanup Level [(a)]		**2,000**	
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**NV**	

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NV – Indicates that no value was available for this compound

mg/kg – milligrams/kilogram

Table 4-28
Mercury in Soil
2004/2005 IRM Final Performance Sampling

Location	Depth (feet)	Mercury (mg/kg)
PS-10S-04	1.5	0.03
PS-11S-04	1.5	0.04
	10.0	0.06
PS-12S-04	1.5	0.05
	10.0	0.11
PS-13S-04	1.5	ND(<0.02)
	10.0	0.02
PS-14S-04	10.0	ND(<0.02)
PS-16B-04	12.0	ND(<0.02)
PS-17B-04	12.0	ND(<0.02)
PS-18S-04	7.0	0.05
PS-19B-04	9.0	0.04
PS-22S-04	10.0	0.08
PS-23S-04	10.0	ND(<0.02)
PS-24S-04	10.0	ND(<0.02)
PS-25B-04	11.0	ND(<0.02)
PS-26B-04	11.0	ND(<0.02)
PS-29B-04	11.0	0.05
PS-30B-04	12.0	ND(<0.02)
PS-31S-04	10.0	ND(<0.02)
PS-32B-04	11.0	0.08
PS-33S-04	9.0	ND(<0.02)
PS-34S-04	9.0	ND(<0.02)
PS-35S-04	10.0	ND(<0.02)
PS-36S-04	6.0	0.03
PS-37S-04	6.0	0.03
PS-38S-04	6.0	ND(<0.02)
PS-39B-04	7.0	0.13
PS-40S-04	9.0	ND(<0.02)
PS-41B-04	11.0	ND(<0.02)
PS-42B-04	11.0	0.03
PS-43S-04	9.0	0.05
PS-44B-04	14.0	ND(<0.02)
PS-45B-04	13.0	ND(<0.02)
PS-46B-04	11.0	0.08
PS-47B-04	14.0	***0.21***
PS-48B-04	14.0	***0.22***
PS-50S-04	9.5	0.15
PS-52S-04	9.5	ND(<0.02)
PS-53B-04	12.0	ND(<0.02)
PS-54B-04	12.0	ND(<0.02)
PS-56S-04	8.0	0.05
PS-57S-04	10.0	0.15
PS-59S-04	10.0	0.13
PS-61B-04	12.0	0.08

Table 4-28
Mercury in Soil
2004/2005 IRM Final Performance Sampling

Location	Depth (feet)	Mercury (mg/kg)
PS-62B-04	12.0	0.06
PS-63B-04	10.0	0.02
PS-64B-04	12.0	0.06
PS-66S-04	7.5	ND(<0.02)
PS-67S-04	7.5	0.15
PS-68B-04	8.0	ND(<0.02)
PS-69B-04	8.0	ND(<0.02)
PS-70S-04	6.0	ND(<0.02)
PS-71S-04	6.0	ND(<0.02)
PS-72S-04	6.0	ND(<0.02)
PS-73S-04	6.0	0.02
PS-74B-04	13.0	ND(<0.02)
PS-75B-04	13.0	ND(<0.02)
PS-76S-04	2.0	0.03
	10.0	0.14
PS-77S-04	2.0	0.13
	10.0	0.11
PS-78S-04	2.0	0.04
	10.0	0.11
PS-79S-04	2.0	ND(<0.02)
PS-82S-04	10.0	0.08
PS-83S-04	10.0	0.03
PS-84B-04	8.0	0.04
PS-85B-04	11.0	0.12
PS-86B-04	11.0	0.08
PS-87S-04	9.5	0.06
PS-88S-04	9.5	0.06
PS-90S-04	9.5	0.02
PS-91S-04	7.5	0.16
PS-92B-04	14.0	ND(<0.02)
PS-93B-04	13.0	ND(<0.02)
PS-94B-04	13.0	ND(<0.02)
PS-96S-04	9.5	ND(<0.02)
PS-97S-04	11.0	ND(<0.02)
PS-98S-04	9.0	ND(<0.02)
PS-99B-04	14.0	0.09
PS-100B-04	14.0	0.12
PS-102S-04	11.0	0.06
PS-103S-04	11.0	0.05
PS-104S-04	11.0	0.03
PS-105S-04	11.0	ND(<0.02)
PS-106S-04	11.0	0.04
PS-107B-04	14.0	0.02
PS-108B-04	14.0	0.06
PS-109B-04	16.0	ND(<0.02)

Table 4-28
Mercury in Soil
2004/2005 IRM Final Performance Sampling

Location	Depth (feet)	Mercury (mg/kg)
PS-110B-04	16.0	ND(<0.02)
PS-111S-04	6.0	0.06
	14.0	ND(<0.02)
PS-112S-04	6.0	0.15
	14.0	ND(<0.02)
PS-113S-04	6.0	ND(<0.02)
	14.0	ND(<0.02)
PS-114S-04	14.0	ND(<0.02)
PS-115B-04	14.0	ND(<0.02)
PS-116S-04	9.5	0.03
PS-117B-04	11.0	0.02
PS-118B-04	11.0	0.03
PS-119S-04	10.0	0.02
PS-120S-04	10.0	ND(<0.02)
PS-121S-04	10.0	ND(<0.02)
PS-122S-04	10.0	ND(<0.02)
PS-123B-04	12.0	ND(<0.02)
PS-124B-04	12.0	ND(<0.02)
PS-125S-04	10.0	ND(<0.02)
PS-126S-04	10.0	ND(<0.02)
PS-127S-04	10.0	ND(<0.02)
PS-128S-04	10.0	ND(<0.02)
PS-129S-04	10.0	0.15
PS-130B-04	14.0	ND(<0.02)
PS-131B-04	14.0	ND(<0.02)
PS-132S-04	9.5	ND(<0.02)
PS-133S-04	9.5	ND(<0.02)
PS-134S-04	9.5	ND(<0.02)
PS-135S-04	9.5	ND(<0.02)
MTCA Method A Soil Cleanup Level[(a)]		**2**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**0.16**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-29
Arsenic in Groundwater
2005/2006 Investigations

Sample	Date	Total Arsenic (µg/L)	Dissolved Arsenic (µg/L)	Turbidity (NTU)
EPI-A-1	12/14/2005	ND (<5)	ND (<5)	54.9
EPI-A-2	12/14/2005	ND (<5)	ND (<5)	41.4
EPI-A-3	12/14/2005	ND (<5)	ND (<5)	0
EPI-A-4	12/14/2005	***11***	***9***	45.4
EPI-A-5	12/14/2005	***10***	***7***	48.3
EPI-A-6	12/14/2005	ND (<5)	ND (<5)	69.7
EPI-A-7	12/14/2005	ND (<5)	ND (<5)	28.7
EPI-A-8	12/14/2005	ND (<5)	ND (<5)	21.1
EPI-A-9	12/14/2005	***11***	***7***	33.7
EPI-A-10	12/14/2005	ND (<5)	ND (<5)	42.9
EPI-A-11	12/15/2005	ND (<5)	ND (<5)	293
EPI-A-12	12/15/2005	ND (<5)	ND (<5)	49.5
EPI-A-13	12/15/2005	ND (<5)	ND (<5)	49.6
EPI-A-14	12/15/2005	***8***	ND (<5)	144
EPI-A-15	12/15/2005	ND (<5)	ND (<5)	NA
EPI-A-16	12/15/2005	ND (<5)	ND (<5)	76.1
EPI-A-17	12/15/2005	***18***	***15***	64.9
EPI-A-18	12/15/2005	***26***	***14***	45.1
EPI-A-19	12/15/2005	***22***	***13***	17
EPI-A-20	12/15/2005	***7***	***6***	47.5
EPI-A-21	10/23/2006	***6***	ND(<5)	318
EPI-A-22	10/23/2006	***14***	ND(<5)	439
EPI-A-23	10/23/2006	ND (<5)	ND(<5)	109
EPI-A-24	10/23/2006	***7***	ND(<5)	66.5
EPI-A-25	10/23/2006	ND (<5)	ND(<5)	31
EPI-A-26	10/23/2006	ND (<5)	ND(<5)	35
EPI-A-27	10/23/2006	ND (<5)	ND(<5)	129
EPI-A-28	10/24/2006	***28***	***25***	21.1
EPI-A-29	10/23/2006	***17***	NA	33
EPI-A-30	10/24/2006	***13***	ND (<5)	71.9
EPI-A-31	10/23/2006	ND (<5)	ND (<5)	20.1
EPI-A-32	10/23/2006	***7***	***8***	30
EPI-A-33	10/24/2006	ND (<5)	ND (<5)	33.1
EPI-A-34	10/24/2006	***25***	***18***	150
EPI-A-35	10/24/2006	***7***	ND (<5)	28.9
MTCA Marine Water Chronic Criteria[(a)]		**36**		**NA**
EPA Surface Water Cleanup Levels[(b)]		**0.14**		**NA**

Notes:

(a) Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms

(b) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NTU - nephelometric turbidity unit

µg/L – micrograms/liter

Table 4-30
Arsenic in Soil
2005/2006 Investigations

Sample	Depth (feet)	Arsenic (mg/kg)
SP-A-4	2-2.5	ND(<6)
SP-A-4	10-10.5	ND(<6)
SP-A-5	2-2.5	ND(<6)
SP-A-5	10-10.5	ND(<6)
SP-A-9	2-2.5	ND(<6)
SP-A-9	10-10.5	ND(<6)
SP-A-14	2-2.5	ND(<6)
SP-A-14	10-10.5	ND(<6)
SP-A-17	2-2.5	ND(<6)
SP-A-17	10-10.5	ND(<6)
SP-A-18	2-2.5	ND(<6)
SP-A-18	10-10.5	ND(<6)
SP-A-19	2-2.5	ND(<6)
SP-A-19	10-10.5	ND(<6)
SP-A-20	2-2.5	ND(<6)
SP-A-20	10-10.5	ND(<6)
SP-A-21	2-2.5	12
SP-A-21	5.5-6	18
SP-A-21	10-10.5	***30***
SP-A-22	2-2.5	12
SP-A-22	5.5-6	ND(<5)
SP-A-22	10-10.5	***40***
SP-A-24	2-2.5	ND(<5)
SP-A-24	5.5-6	ND(<5)
SP-A-24	10-10.5	11
SP-A-28	5.5-6	ND(<5)
SP-A-28	5.5-6	ND(<5)
SP-A-28	10-10.5	ND(<5)
SP-A-29	2-2.5	ND(<5)
SP-A-29	5.5-6	ND(<5)
SP-A-29	10-10.5	ND(<5)
SP-A-30	2-2.5	ND(<5)
SP-A-30	5.5-6	5.6
SP-A-30	10-10.5	ND(<5)
SP-A-32	2-2.5	ND(<5)
SP-A-32	5.5-6	ND(<5)
SP-A-32	10-10.5	ND(<5)
SP-A-34	2-2.5	ND(<5)
SP-A-34	5.5-6	ND(<5)
SP-A-34	10-10.5	ND(<5)
SP-A-35	2-2.5	ND(<5)
SP-A-35	5.5-6	15
SP-A-35	10-10.5	ND(<5)
MTCA Method A Soil Cleanup Level[(a)]		**20**
MTCA Soil Cleanup Levels (Equation 747-1)[(b)]		**21**

Notes:

(a) MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

(b) MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36)

Bold and Highlighted – Indicates detected concentration exceeds a MTCA soil cleanup level

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

mg/kg – milligrams/kilogram

Table 4-31
Permatox Formulations
2006 Investigations

Name	Pentachlorophenol	Tetrachlorophenol	Trichlorophenol	Phenylmercuric Acid	Phenylmercuric Lactate	Tributyltin Oxide	3-iodo-2-propynyl butyl carbamate
Chapman Permatox 100		x		x	x		
Chapman Permatox 180	x	x					
Permatox 182	x	x					
Permatox 102	x	x		x			
Permatox 101	x			x			
Permatox 110a fungicide		x	x				
Permatox penta	x						
Permatox 10-s	x						
Permatox 10-s plus bazide	x						
Permatox dp-2	x						
Permatox sn-8ec						x	
Permatox sn-1 wood preservative						x	
Permatox ipb							x

Table 4-32
Tri-n-butyltin and Carbamates in Groundwater
2006 Investigations

Location	Date	Tri-n-butyltin (µg/L)	Carbamates									
			3-Hydroxy-carbofuran (µg/L)	Aldicarb (µg/L)	Aldicarb Sulfone (µg/L)	Aldicarb Sulfoxide (µg/L)	Carbaryl (µg/L)	Carbofuran (µg/L)	Methiocarb (µg/L)	Methomyl (µg/L)	Oxamyl (µg/L)	Propoxur (µg/L)
MW-1	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-2	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-4	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-6	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-7	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-8	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-9	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-10	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-12	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-13	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MW-14	6/12/2007	ND (<0.02)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)
MTCA Marine Water Chronic Criteria[(a)]		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**
EPA Surface Water Cleanup Levels[(b)]		**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**	**NC**

Notes:

(a) Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms

(b) National Toxics Rule (40 CFR 131.36), based on protection of human health for consumption of aquatic organisms

ND – Indicates that the compound was not detected at a concentration above the detection limit of the method used for the sample

NC – Indicates that cleanup levels were not calculated for this compound

µg/L – micrograms/liter

Table 6-1
Soil Cleanup Levels

Analyte	Unit	Simplified TEE Cleanup Levels	MTCA Method A or B Soil Cleanup Level	Selected Soil Cleanup Level	Basis
TPH Diesel Range Organics	mg/kg	15,000	2,000	460	MTCA Method A
Benzo(a)anthracene	mg/kg	No Value Available	0.22	0.22	Modified MTCA Method B
Benzo(b)pyrene	mg/kg	No Value Available	0.1	0.1	MTCA Method A
Benzo(b)fluoranthene	mg/kg	No Value Available	0.74	0.74	Modified MTCA Method B
Benzo(k)fluoranthene	mg/kg	No Value Available	0.74	0.74	Modified MTCA Method B
Chrysene	mg/kg	No Value Available	0.25	0.25	Modified MTCA Method B
Dibenz(a,h)anthracene	mg/kg	No Value Available	1.1	1.1	Modified MTCA Method B
Indeno(1,2,3-cd)pyrene	mg/kg	No Value Available	2.2	2.2	Modified MTCA Method B
Total cPAHs (a)	mg/kg	No Value Available	0.1 (a)	0.1 (a)	MTCA Method A
Chlorinated dibenzofurans (total)	mg/kg	3×10^{-6}	160	3×10^{-6}	Simplified TEE
Chlorinated dibenzo-p-dioxins (total)	mg/kg	5×10^{-6}	1.1×10^{-5} (b)	5×10^{-6}	Simplified TEE
Arsenic	mg/kg	20(c)	20	20	MTCA Method A
Chromium	mg/kg	135(d)	19 (f)	19 (f)	MTCA Method A
Lead	mg/kg	220	250	220	Simplified TEE
Mercury	mg/kg	0.7(e)	0.16	0.16	Modified MTCA Method B

Notes:

a The total cPAHs concentration for each sample was calculated using the Method B toxicity equivalency factor (TEF) methodology described in WAC 173-340-708(8)(e)(ii)

b Based on 2,3,7,8 tetrachlorodibenzo-p-dioxin

c Cleanup level for arsenic (III). Arsenic V cleanup level is 260 mg/kg.

d Cleanup level for total chromium

e Cleanup level for organic mercury. Inorganic mercury cleanup level is 9 mg/kg.

f Assumes all chromium is present as chromium VI, cleanup level for chromium III is 2,000 mg/kg

Simplified Terrestrial Ecological Evaluation Soil Cleanup Levels for Industrial or Commercial Sites (WAC 173-340-900, Table 749-2)

MTCA Method A – based on MTCA Method A Soil Cleanup Levels for Unrestricted Land Use (WAC 173-340-900, Table 740-1)

Modified MTCA Method B - based on MTCA Equation 747-1 Values, Soil Cleanup Level based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule (40 CFR 131.36).

Table 6-2
Groundwater Cleanup Levels

Analyte	Units	Groundwater Cleanup Level	Basis
TPH Diesel Range Organics	µg/L	500	MTCA Method A
Benzo(a)anthracene	µg/L	0.031	NTR Criteria
Benzo(b)pyrene	µg/L	0.031	NTR Criteria
Benzo(b)fluoranthene	µg/L	0.031	NTR Criteria
Benzo(k)fluoranthene	µg/L	0.031	NTR Criteria
Chrysene	µg/L	0.031	NTR Criteria
Dibenzo(a,h)anthracene	µg/L	0.031	NTR Criteria
Indeno(1,2,3-cd)pyrene	µg/L	0.031	NTR Criteria
Total cPAHs (a)	µg/L	0.1	MTCA Method A
Antimony	µg/L	4,300	NTR Criteria
Arsenic	µg/L	8	Natural Background
Beryllium	µg/L	No Value Available	
Cadmium	µg/L	9.3	WA Surface Water Quality
Chromium	µg/L	50	WA Surface Water Quality
Copper	µg/L	3.1	WA Surface Water Quality
Lead	µg/L	8.1	WA Surface Water Quality
Mercury	µg/L	0.025	WA Surface Water Quality
Nickel	µg/L	8.2	WA Surface Water Quality
Selenium	µg/L	71	WA Surface Water Quality
Silver	µg/L	1.9	WA Surface Water Quality
Thallium	µg/L	6.3	NTR Criteria
Zinc	µg/L	81	WA Surface Water Quality

Notes:

a The total cPAHs concentration for each sample was calculated using the TEF methodology described in WAC 173-340-708(8)(e)(ii)

MTCA Method A – MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-900, Table 720-1)

NTR Criteria - National Toxics Rule (40 CFR 131.36), protection of human health for consumption of aquatic organisms

WA Surface Water Quality - Washington Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms

Table 7-1
Direct-Push Probe Arsenic Analytical Results - Groundwater

Sample Location	Screened Interval (ft. bgs)	Total Arsenic (µg/L)	Dissolved Arsenic (µg/L)
Probes			
SP-A-36	8-12	**6**	**5**
SP-A-37	8-12	**37**	**35**
SP-A-38	8-12	**11**	**10**
SP-A-39	8-12	**33**	**33**
SP-A-40	8-12	**6**	**6**
SP-A-41	8-12	**13**	**12**
SP-A-42	8-12	**17**	**15**
SP-A-43	8-12	**6**	**6**
SP-A-44	8-12	**17**	**15**
SP-A-45	8-12	**35**	**39**
SP-A-46	8-12	ND (<5)	ND (<5)
SP-A-47	8-12	**30**	**32**
SP-A-48	8-12	ND (<5)	ND (<5)
SP-A-49	8-12	ND (<5)	ND (<5)
MTCA Marine Water Chronic Criteria[1]		36	
National Toxics Rule Criteria[2]		**0.14**	

Notes:

1 - MTCA Marine Water Chronic Criteria; WAC 173-201A-040, based on protection of aquatic organisms.

2 - National Toxics Rule Criteria (40 CFR 131.36) protection of human health for consumption of aquatic organisms.

NA = not analyzed

ND = not detected at the value indicated

µg/L = micrrograms per liter

Bold values indicate a detection

Yellow shaded values indicate a regulatory exceedence

Table 7-2
Monitoring Well Mercury, Cadmium, and Arsenic Analytical Results - Groundwater

Sample Location	Sample Date	Total Mercury (µg/L)	Dissolved Mercury (µg/L)	Total Cadmium (µg/L)
MW-7	02/04/09	ND (<0.2)	ND (<0.2)	NA
	05/14/09	ND (<0.2)	ND (<0.2)	NA
	08/05/09	ND (<0.2)	ND (<0.2)	NA
	11/04/09	ND (<0.2)	ND (<0.2)	NA
	06/16/10	NA	NA	ND (<0.4)
	09/15/10	NA	NA	ND (<0.4)
Marine Surface Water Criteria[1]		**0.025**		**9.3**

Sample Location	Sample Date	Total Arsenic by ICP/MS (µg/L)	Dissolved Arsenic by ICP/MS (µg/L)	Total Arsenic by Hydride (µg/L)	Dissolved Arsenic by Hydride (µg/L)
MW-8	02/04/09	**11**	**12**	NA	NA
	05/14/09	**10**	**15**	NA	**14**
	08/05/09	NA	NA	**14**	**11**
	11/04/09	NA	NA	**14**	**14**
MW-15	02/04/09	**32**	**26**	NA	NA
	05/05/09	**11**	**7.0**	NA	**0.2**
	08/05/09	NA	NA	**1.1**	**0.4**
	11/04/09	NA	NA	**1.4**	**0.1**
MW-16	02/04/09	**17**	**13**	NA	NA
	05/05/09	**48**	**32**	NA	**14**
	08/05/09	NA	NA	**23**	**4.9**
	11/04/09	NA	NA	**18**	**2.3**
Natural Background[2]		**8**			
Marine Surface Water Criteria[1]		**36**			

Notes:

[1] Ambient water quality criteria for protection of aquatic life (WAC 173-201A-040 and 40 C.F.R. Part 131)

[2] Natural background groundwater concentration in Washington State (from PTI 1989)

All wells are screened from 4 to 19 ft. bgs

NA = not analyzed

ND = not detected at the value indicated

µg/L = micrograms per liter

Bold values indicate a detection

Yellow shaded values indicate exceedence of marine surface water chronic criteria

Table 7-3
Summary of Final Groundwater Field Parameters

Probe or Well Identification Number	Date	Time Collected	Total Gallons Purged	pH	Conductivity (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mv)	Temperature (°C)
SP-A-36	1/15/2009	12:50 PM	1.1	7.80	3,254	9.97	0.34	-140.9	11.17
SP-A-37	1/15/2009	12:00 PM	1.2	8.18	5,637	5.18	0.50	-100.2	10.76
SP-A-38	1/15/2009	10:30 AM	1.1	8.15	6,310	5.18	0.37	-153.9	11.19
SP-A-39	1/15/2009	11:20 AM	1.4	8.22	8,085	9.92	0.35	-134.1	11.33
SP-A-40	1/15/2009	9:45 AM	1.2	8.61	3,780	5.85	0.46	-121.0	11.14
SP-A-41	1/14/2009	1:30 PM	1.6	7.33	8,641	8.78	0.35	-115.5	10.90
SP-A-42	1/14/2009	12:45 PM	1.3	8.04	5,429	5.24	0.56	-123.9	10.94
SP-A-43	1/14/2009	2:15 PM	1.5	7.77	3,200	9.36	0.41	-137.9	11.29
SP-A-44	1/14/2009	3:10 PM	3.1	7.17	5,570	9.01	0.47	-160.0	10.74
SP-A-45	1/14/2009	12:00 PM	1.2	7.61	2,588	8.81	0.45	-143.6	10.34
SP-A-46	1/15/2009	9:00 AM	1.0	8.64	1,056	7.71	0.91	-142.2	11.32
SP-A-47	1/14/2009	10:15 AM	1.2	8.06	4,533	7.61	0.46	-126.1	10.24
SP-A-48	1/14/2009	11:10 AM	1.3	7.38	5,111	9.60	0.40	-109.1	10.82
SP-A-49	1/14/2009	9:20 AM	2.0	7.77	7,812	9.46	0.45	-110.1	10.50
MW-7	2/4/2009	12:30 PM	2.5	7.33	2,286	6.96	0.43	-142.6	11.42
MW-8	2/4/2009	11:00 AM	2.0	7.66	2,365	4.93	0.39	-164.3	9.26
MW-15	2/4/2009	8:40 AM	1.8	7.63	31,510	3.79	1.24	-65.9	10.72
MW-16	2/4/2009	9:45 AM	2.0	7.39	8,466	5.09	0.57	-171.0	11.51
MW-7	5/5/2009	11:46 AM	2.0	6.74	2.175	2.94	0.70	-120.8	10.74
MW-7 (resample)*	5/14/2009	12:02 AM	2.6	6.83	2.304	1.82	0.55	-51.4	10.53
MW-8	5/5/2009	10:12 AM	2.0	6.96	1	2.41	0.77	-139.1	10.15
MW-15	5/5/2009	9:25 AM	2.5	6.91	9	7.87	1.01	-121.7	11.10
MW-16	5/5/2009	10:59 AM	2.0	6.51	6	8.00	1.04	-163.6	11.06
MW-7	8/5/2009	7:05 PM	1.8	7.77	2	3.25	0.19	-50.5	12.59
MW-8	8/5/2009	5:40 PM	1.8	7.8	2	3.06	0.19	-55.3	15.96
MW-15	8/5/2009	4:45 PM	2.1	7.71	9	5.91	0.42	-96.1	14.98
MW-16	8/5/2009	6:25 PM	2.2	7.78	6	8.37	0.15	-77.1	15.00

Table 7-3
Summary of Final Groundwater Field Parameters

Probe or Well Identification Number	Date	Time Collected	Total Gallons Purged	pH	Conductivity (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Oxidation/ Reduction Potential (mv)	Temperature (°C)
MW-7	11/4/2009	1:20 PM	2.0	6.95	1.833	0.16	1.09	-101.1	12.88
MW-8	11/4/2009	11:20 AM	1.8	7.47	1.453	0.36	1.09	-162.2	14.23
MW-15	11/4/2009	10:00 AM	2.0	7.11	22.530	2.50	0.88	-144.2	14.90
MW-16	11/4/2009	12:15 PM	2.0	6.93	6.739	2.26	1.17	-97.8	14.86

* May 2009 MW-7 was resampled due to visually high turbidity noted in the original sample container.

Table 7-4
Arsenic Analytical Results - Soil

Sample Location	Soil Interval (ft. bgs)	Arsenic (mg/kg)
Probes		
SP-A-36	0.0 to 0.5	ND (<5.0)
SP-A-36	2.0 to 2.5	ND (<5.0)
SP-A-36	5.5 to 6.0	ND (<5.0)
SP-A-36	10.0 to 10.5	ND (<5.0)
SP-A-37	2.0 to 2.5	ND (<5.0)
SP-A-37	5.5 to 6.0	ND (<5.0)
SP-A-37	10.0 to 10.5	ND (<5.0)
SP-A-38	0.0 to 0.5	ND (<5.0)
SP-A-38	2.0 to 2.5	ND (<5.0)
SP-A-38	5.5 to 6.0	ND (<5.0)
SP-A-38	10.0 to 10.5	ND (<5.0)
SP-A-39	2.0 to 2.5	ND (<5.0)
SP-A-39	5.5 to 6.0	ND (<5.0)
SP-A-39	10.0 to 10.5	ND (<5.0)
SP-A-40	2.0 to 2.5	ND (<5.0)
SP-A-40	5.5 to 6.0	ND (<5.0)
SP-A-40	10.0 to 10.5	**12**
SP-A-41	0.0 to 0.5	ND (<5.0)
SP-A-41	2.0 to 2.5	ND (<5.0)
SP-A-41	5.5 to 6.0	ND (<5.0)
SP-A-41	10.0 to 10.5	ND (<5.0)
SP-A-42	2.0 to 2.5	ND (<5.0)
SP-A-42	5.5 to 6.0	ND (<5.0)
SP-A-42	10.0 to 10.5	ND (<5.0)
SP-A-43	2.0 to 2.5	ND (<5.0)
SP-A-43	5.5 to 6.0	ND (<5.0)
SP-A-43	10.0 to 10.5	ND (<5.0)
SP-A-44	0.0 to 0.5	ND (<5.0)
SP-A-44	2.0 to 2.5	ND (<5.0)
SP-A-44	5.5 to 6.0	ND (<5.0)
SP-A-44	10.0 to 10.5	ND (<5.0)
SP-A-45	2.0 to 2.5	ND (<5.0)
SP-A-45	5.5 to 6.0	ND (<5.0)
SP-A-45	10.0 to 10.5	ND (<5.0)
SP-A-46	2.0 to 2.5	ND (<5.0)
SP-A-46	5.5 to 6.0	ND (<5.0)
SP-A-46	10.0 to 10.5	ND (<5.0)
SP-A-47	0.0 to 0.5	ND (<5.0)
SP-A-47	2.0 to 2.5	ND (<5.0)
SP-A-47	5.5 to 6.0	ND (<5.0)
SP-A-47	10.0 to 10.5	**5.5**
SP-A-48	2.0 to 2.5	ND (<5.0)
SP-A-48	5.5 to 6.0	ND (<5.0)
SP-A-48	10.0 to 10.5	ND (<5.0)
SP-A-49	2.0 to 2.5	ND (<5.0)
SP-A-49	5.5 to 6.0	ND (<5.0)
SP-A-49	10.0 to 10.5	ND (<5.0)

Table 7-4
Arsenic Analytical Results - Soil

Sample Location	Soil Interval (ft. bgs)	Arsenic (mg/kg)
Hand Auger		
SP-A-50	1.5 to 2.0	ND (<5.0)
SP-A-50	3.5 to 4.0	ND (<5.0)
SP-A-50	5.5 to 6.0	ND (<5.0)
SP-A-51	1.5 to 2.0	ND (<5.0)
SP-A-51	3.5 to 4.0	ND (<5.0)
SP-A-51	5.5 to 6.0	ND (<5.0)
Borings		
MW-15	2.0 to 2.5	ND (<5.0)
MW-15	5.5 to 6.0	**5.7**
MW-15	10.0 to 10.5	ND (<5.0)
MW-16	2.0 to 2.5	ND (<5.0)
MW-16	5.5 to 6.0	ND (<5.0)
MW-16	10.0 to 10.5	ND (<5.0)
MTCA Method A Cleanup Level		**20**

Notes:

Analytical Method: EPA 6010

ND = not detected at the value indicated

ft. bgs = feet below ground surface

mg/kg = milligrams per kilograms

Bold values indicate a detection

MTCA Method A Cleanup Level - MTCA Method A Soil Cleanup Level for Unrestricted Land Use (WAC 173-340-900, Table 740-1).

Results are in milligrams per kilogram (mg/kg)

Table 7-5
Dioxins and Furans in Surface Soils Analytical Results

Analyte	TEF Factor	Sample Locations and Identification Numbers				
		D-02 PG-D-02-S	D-04 PG-D-04-S	D-06 PG-D-06-S	D-08 PG-D-08-S	D-10 PG-D-10-S
2,3,7,8-TCDD	1	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)
1,2,3,7,8-PeCDD	1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,4,7,8-HxCDD	0.1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,6,7,8-HxCDD	0.1	**7.3**	ND (<5.4)	ND (<5.6)	**10**	ND (<5.7)
1,2,3,7,8,9-HxCDD	0.1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,4,6,7,8-HpCDD	0.01	**130**	ND (<5.4)	**63**	**220**	**43**
OCDD	0.0003	**1400**	ND (<11)	**580**	**1900**	**350**
2,3,7,8-TCDF	0.1	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)	ND (<1.1)
1,2,3,7,8-PeCDF	0.03	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
2,3,4,7,8-PeCDF	0.3	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,4,7,8-HxCDF	0.1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,6,7,8-HxCDF	0.1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
2,3,4,6,7,8-HxCDF	0.1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,7,8,9-HxCDF	0.1	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
1,2,3,4,6,7,8-HpCDF	0.01	**40**	ND (<5.4)	**9.6**	**37**	**6.3**
1,2,3,4,7,8,9-HpCDF	0.01	ND (<5.4)	ND (<5.4)	ND (<5.6)	ND (<5.6)	ND (<5.7)
OCDF	0.0003	**64**	ND (<11)	**26**	**86**	**13**
Total TEQ Concentration (dioxins)		**2.45**	**0**	**0.80**	**3.77**	**0.53**
Total TEQ Concentration (furans)		**0.42**	**0**	**0.10**	**0.40**	**0.07**
Simplified TEE (dioxins)	**5.0**					
Simplified TEE (furans)	**3.0**					

Notes:

Analytical Method: EPA 1613B

ND = not detected at the value indicated

TEF = Toxicity Equivalency Factor

TEQ = Toxicity Equivalent Concentration

Bold values indicate a detection

Simplified TEE - Simplified Terrestrial Ecological Evaluation Soil Cleanup Level for Industrial or Commercial Sites (WAC 173-340-900, Table 749-2)

Results are in picograms per gram (pg/g)

Table 7-6
Pesticides Analytical Results - Soil

		Sample Locations and Identification Numbers								Sample Locations and Identification Numbers						
		D-01	**D-02**	**D-03**	**D-04**	**D-05**	**D-06**	**D-07**	**D-08**	**D-09**	**D-10**					
Analyte	**CAS #**	**PG-D-01-S**	**PG-D-02-S**	**PG-D-03-S**	**PG-D-04-S**	**PG-D-05-S**	**PG-D-06-S**	**PG-D-07-S**	**PG-D-08-S**	**PG-D-09-S**	**PG-D-10-S**	**SP-A-36**	**SP-A-38**	**SP-A-41**	**SP-A-44**	**SP-A-47**
A-BHC	319-84-6	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
G-BHC	58-89-9	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
B-BHC	319-85-7	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Heptachlor	76-44-8	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
D-BHC	319-86-8	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Aldrin	309-00-2	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Heptachlor Epoxide	1024-57-3	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Chlordane	57-74-9	ND (<0.02)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.04)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)
Endosulfan I	959-98-8	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
4,4'-DDE	72-55-9	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Dieldrin	60-57-1	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Endrin	72-20-8	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
4,4'-DDD	72-54-8	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Endosulfan II	33213-65-9	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
4,4'-DDT	50-29-3	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Endrin Aldehyde	7421-93-4	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Endosulfan Sulfate	1031-07-8	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Methoxychlor	72-43-5	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.02)	ND (<0.02)	ND (<0.02)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)	ND (<0.01)
Toxaphene	8001-35-2	ND (<0.5)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<1.0)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)	ND (<0.5)

Notes:
Analytical Method: EPA 8081
ND = not detected at the concentation indicated
CAS # - Chemical Abstract Service number
Results are in milligrams per kilogram (mg/kg)

FIGURES

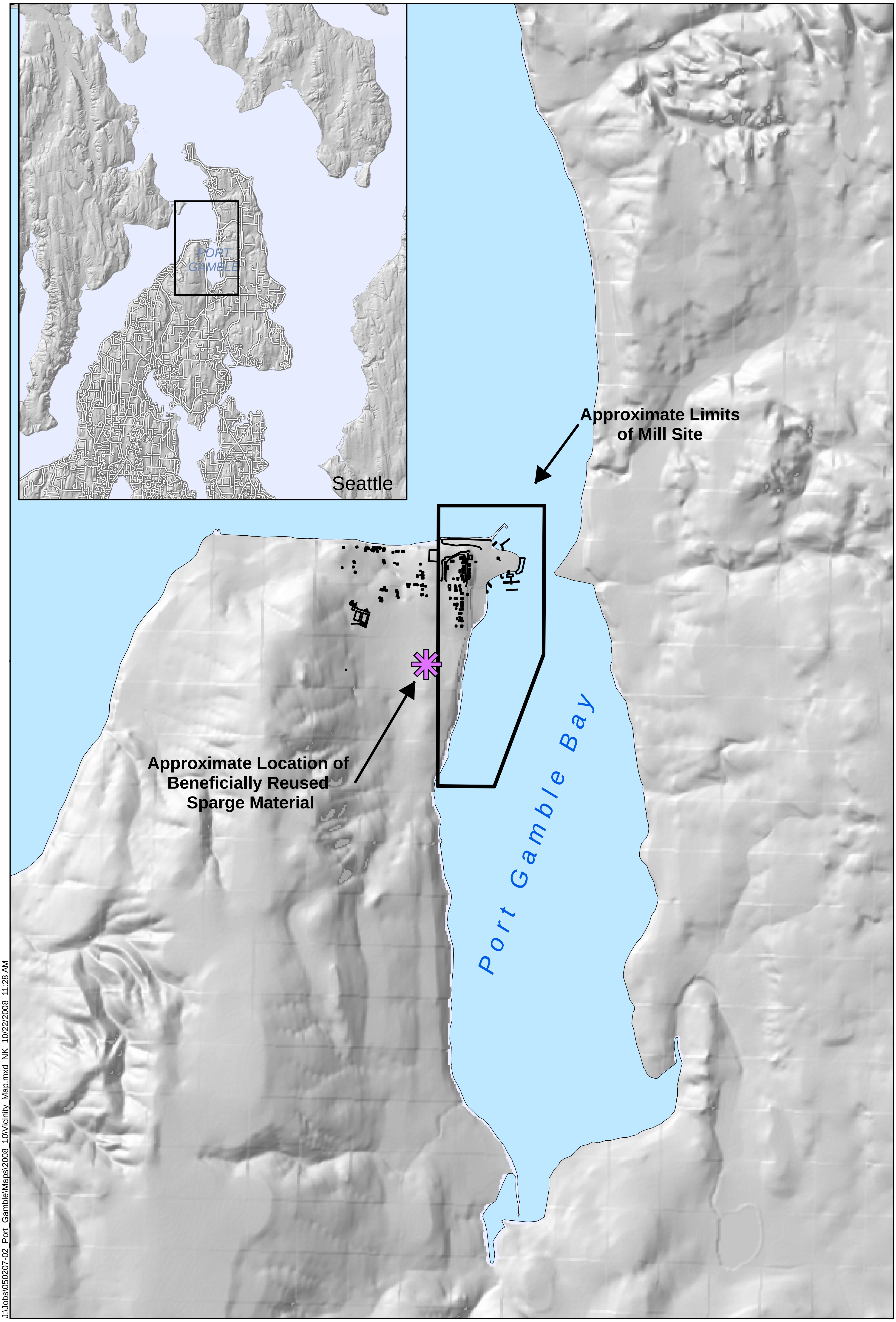


Figure 2-1
Site Vicinity Map
Port Gamble, Washington

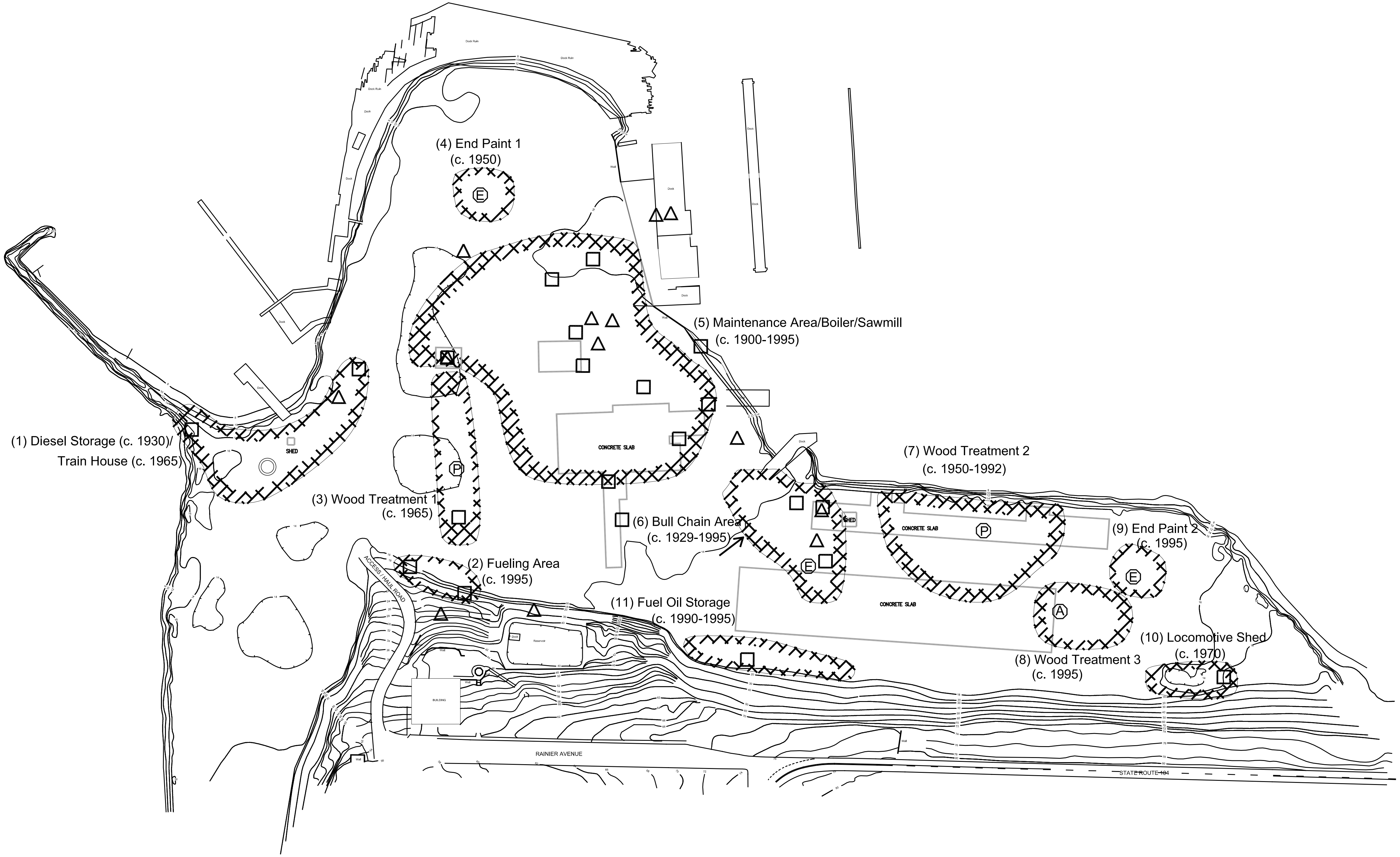
ANCHOR
ENVIRONMENTAL, L.L.C.

J:\Jobs\050207-02 Port Gamble\Maps\2008 10\Vicinity Map.mxd NK 10/22/2008 11:28 AM

J:\Jobs\050207-02 Port Gamble\Maps\2006 04\Historical Photo 29Mar06.mxd MJO 07/10/2007 9:24 AM

ANCHOR ENVIRONMENTAL, L.L.C.

Figure 2-2
Historical Site Operations (date unknown)
Port Gamble, Washington



KEY:

APPROXIMATE POTENTIAL SOURCE AREAS ADDED BY EPI
POTENTIAL SOURCE AREAS BASED ON INFORMATION
PROVIDED BY PARAMETRIX AND POPE & TALBOT, INC.
BASE SURVEY MAP PREPARED BY PARAMETRIX

0 100 200

SCALE: 1" = 200'

SOURCE AREA OPERATIONS

- ☐ PETROLEUM PRODUCT STORAGE AREA
- △ FORMER PCB TRANSFORMER LOCATION
- ○ WOOD TREATMENT / END PAINT AREA
  - P = PCP BASED WOODTREATMENT
  - A = OTHER WOOD TREATMENT
  - E = END SEAL
- ◎ DRUM STORAGE AREA

☐ FORMER BUILDINGS

▨ APPROXIMATE POTENTIAL SOURCE AREAS

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Issaquah, Washington 98027

FIGURE 3-1

SOURCE AREAS

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	MMH	SLG	04/25/07

KEY:

⌖ MONITORING WELL LOCATION (PARAMETRIX)

● SOIL PROBE LOCATION (PARAMETRIX / FOSTER WHEELER)

■ TEST PIT LOCATION (PARAMETRIX / FOSTER WHEELER)

⊕ EPI SAMPLING LOCATION

BASE SURVEY MAP PREPARED BY PARAMETRIX

0 75 150

SCALE: 1" = 150'

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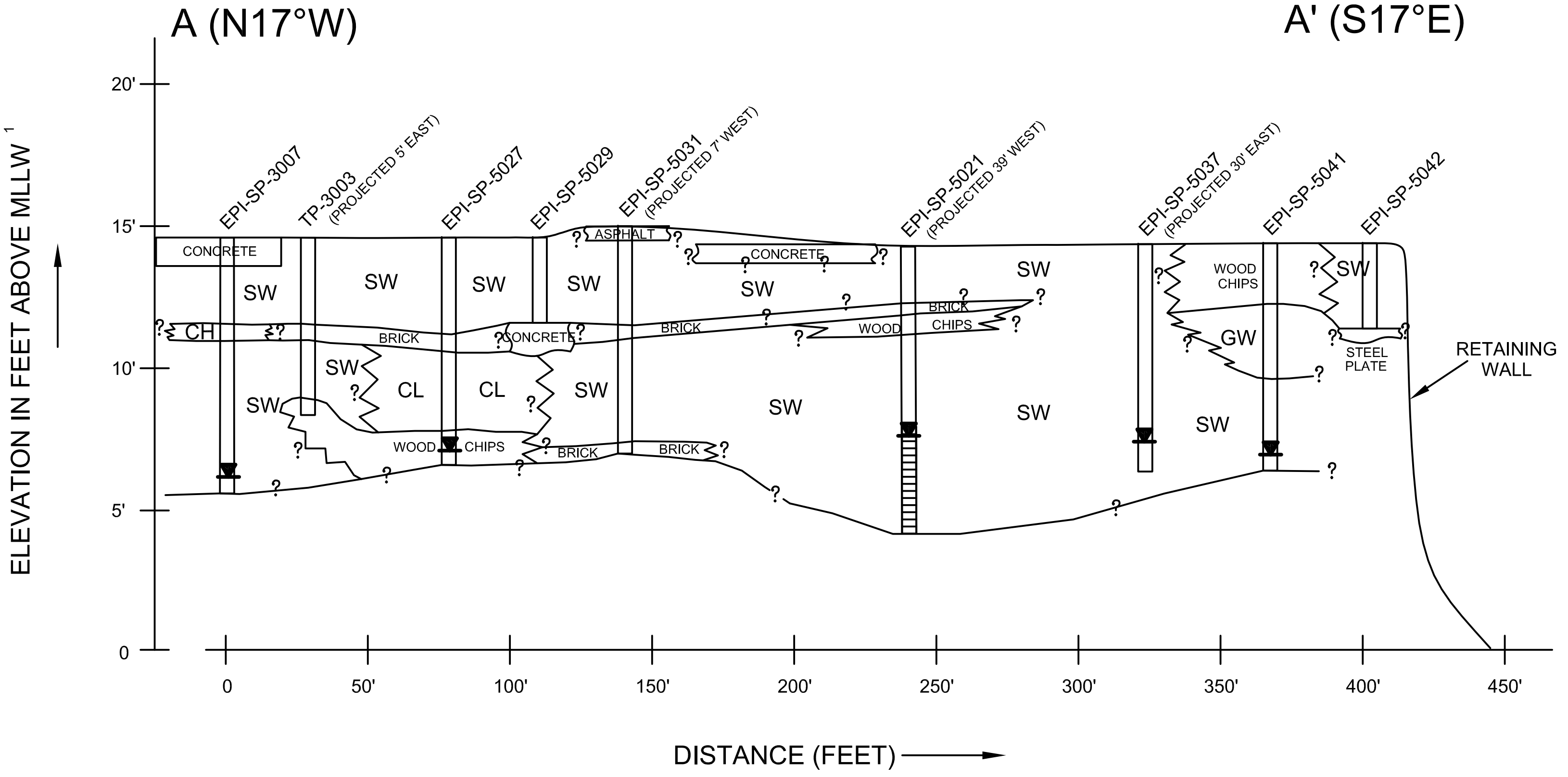
Issaquah, Washington 98027

FIGURE 3-2

CROSS-SECTION LOCATION MAP

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	MMH	SLG	10/10/07



SOURCE: REVISED REMEDIAL INVESTIGATION REPORT, FORMER POPE & TALBOT SAWMILL PROPERTY (MILL SITE), PORT GAMBLE, WASHINGTON. (SEPTEMBER 13, 2002; EPI 2002a)

KEY:

SW USCS SOIL TYPE CLASSIFICATION

INFERRED GRADATIONAL CONTACT

LITHOLOGIC FACIES CHANGE (ASSUMED. LOCATION APPROXIMATE)

EPI-SP-3007

SOIL PROBE

TEMPORARY SCREENED INTERVAL

WATER LEVEL ELEVATION AT TIME OF PROBING

LITHOLOGIC CONTACT (DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN)

[1] BASED ON ELEVATIONS FOR NEARBY SAMPLING LOCATIONS PERFORMED BY PARAMETRIX

SCALE: 10X HORIZONTAL EXAGGERATION

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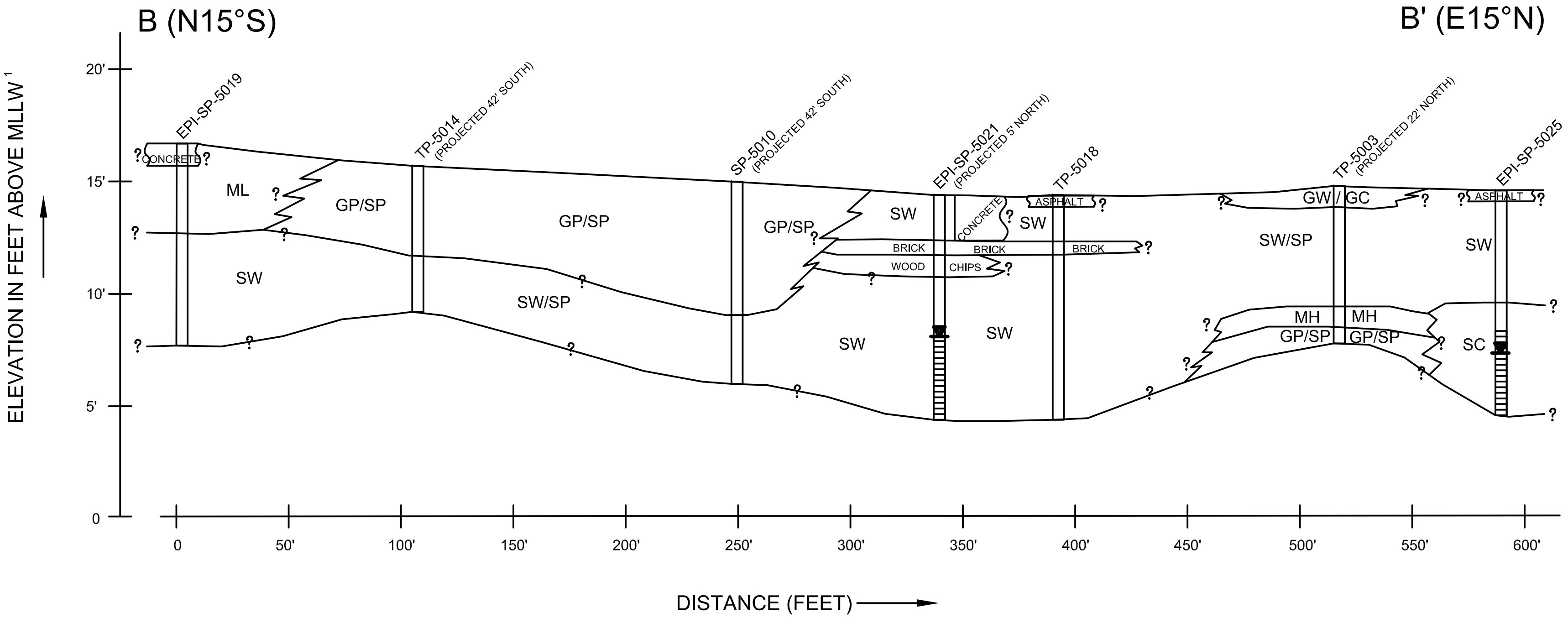
Issaquah, Washington 98027

FIGURE 3-3

CROSS SECTION A-A'

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*MMH*	*SLG*	*10/11/07*



SOURCE: REVISED REMEDIAL INVESTIGATION REPORT, FORMER POPE & TALBOT SAWMILL PROPERTY (MILL SITE), PORT GAMBLE, WASHINGTON. (SEPTEMBER 13, 2002; EPI 2002a)

KEY:

SW USCS SOIL TYPE CLASSIFICATION

INFERRED GRADATIONAL CONTACT

LITHOLOGIC FACIES CHANGE (ASSUMED. LOCATION APPROXIMATE)

EPI-SP-3007

SOIL PROBE

TEMPORARY SCREENED INTERVAL

WATER LEVEL ELEVATION AT TIME OF PROBING

LITHOLOGIC CONTACT (DASHED WHERE INFERRED, QUERIED WHERE UNCERTAIN)

[1] BASED ON ELEVATIONS FOR NEARBY SAMPLING LOCATIONS PERFORMED BY PARAMETRIX

SCALE: 10X HORIZONTAL EXAGGERATION

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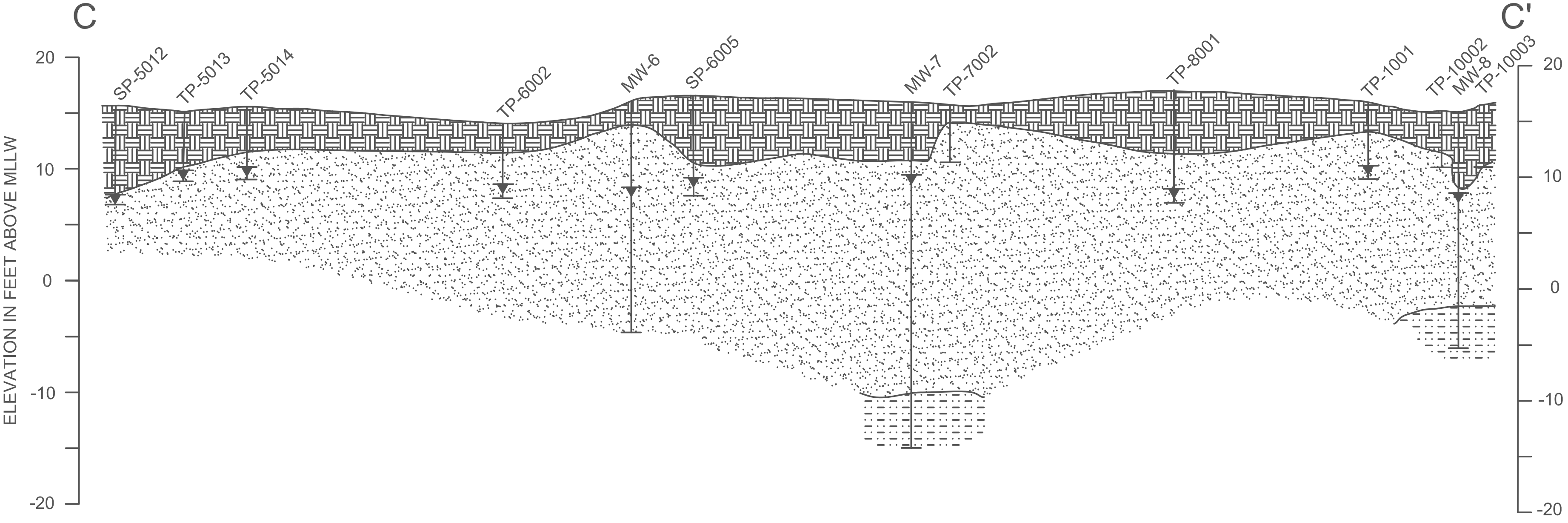
FIGURE 3-4

CROSS SECTION B-B'

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	MMH	SLG	10/11/07



SOURCE: INTERIM REPORT NO.2 - POPE & TALBOT, INC. PORT GAMBLE MILL SITE, RESULTS OF PHASE I GROUNDWATER AND SURFACE WATER INVESTIGATION (OCTOBER 10, 1990; PARAMETRIX 199d)

KEY:

▦ *FILL*

░ *SAND, NATIVE MATERIAL*

▤ *SILTY SAND OR CLAYEY SILT, NATIVE MATERIAL*

— *BOTTOM OF BORING*

▼ *WATER LEVEL AT TIME EXECUTION OR DRILLING*

NOTES:
-WATER LEVELS FOR TP-7002, TP-10002, AND TP-10003 ARE NOT RELIABLE
-BASE DRAWING BY PARAMETRIX
-SCALE: 10 HORIZONTAL EXAGGERATION

0 75 150

SCALE: 1" = 150'

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Issaquah, Washington 98027

FIGURE 3-5

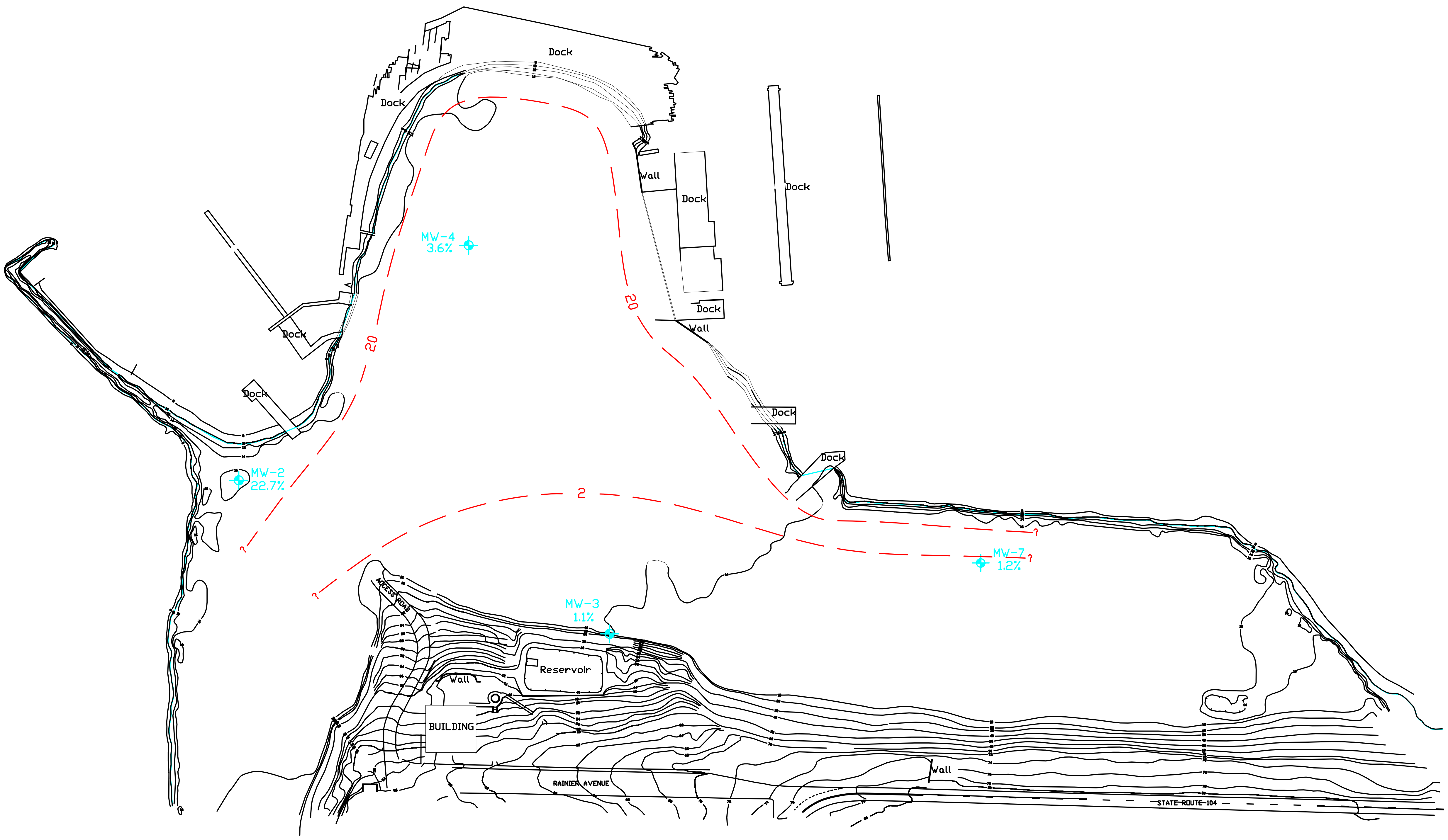
CROSS SECTION C-C'

PROJECT 17008.2

PREPARED FOR POPE RESOURCES

LOCATION PORT GAMBLE MILL SITE
PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*MMH*	*SLG*	*10/10/07*



KEY:

APPROXIMATE SCALE: 1" = 200'

MW-2 22.7% Monitoring Well Location Included in Tidal Study and Tidal Effiency.
(Due to limited historical data, the tidal efficiency was calculated using the highest and lowest observed water levels.)

Tidal Efficiency Contour Interval
Dashed Where Inferred,
Queried Where Uncertain

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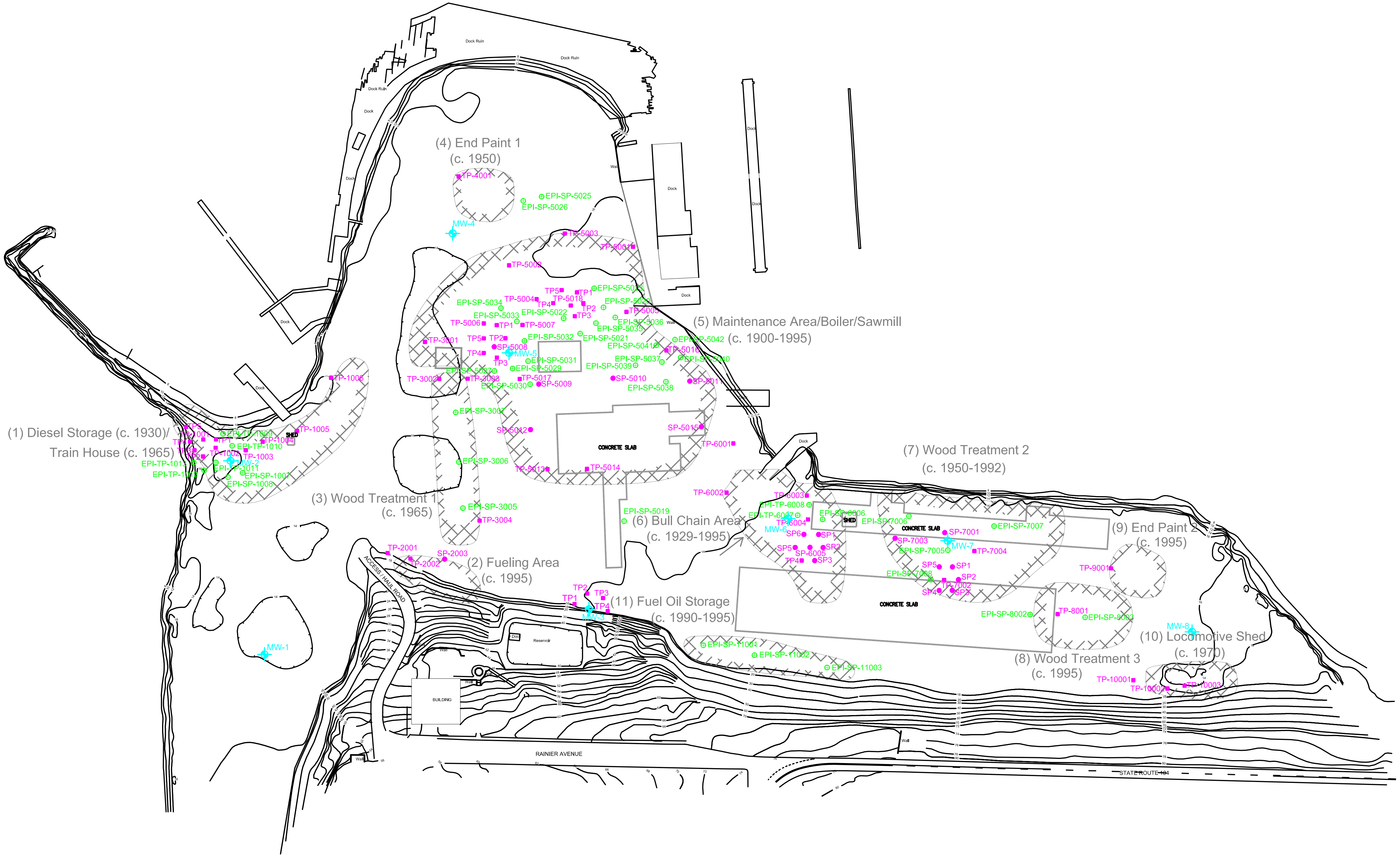
Issaquah, Washington 98027

FIGURE 3-6

TIDAL EFFICIENCY

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	SLG	DK	10/8/07



KEY:

APPROXIMATE POTENTIAL SOURCE AREAS ADDED BY EPI
POTENTIAL SOURCE AREAS BASED ON INFORMATION
PROVIDED BY PARAMETRIX AND POPE & TALBOT, INC.
BASE SURVEY MAP PREPARED BY PARAMETRIX

▨ APPROXIMATE POTENTIAL SOURCE AREAS

⊕ MONITORING WELL LOCATION (PARAMETRIX)
● SOIL PROBE LOCATION (PARAMETRIX / FOSTER WHEELER)
■ TEST PIT LOCATION (PARAMETRIX / FOSTER WHEELER)
⊕ EPI SAMPLING LOCATION

☐ FORMER BUILDINGS

0 100 200
SCALE: 1" = 200'

ENVIRONMENTAL PARTNERS INC
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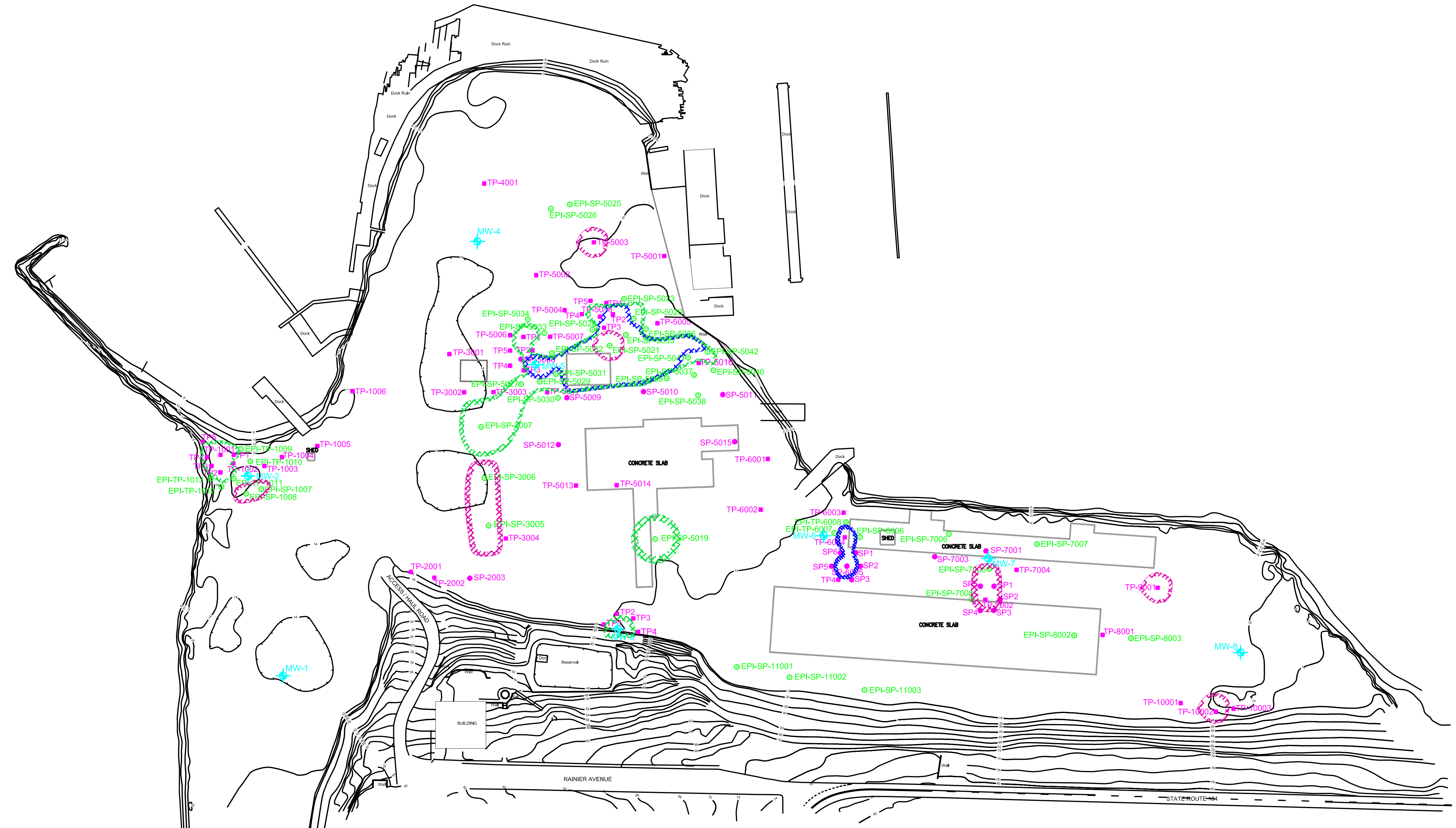
FIGURE 3-7

SOIL SAMPLING LOCATIONS
1999-2001 INVESTIGATIONS

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*10/16/07*



Estimated Extent of Soil for Excavation and Off-Site Disposal based on MTCA Method A Cleanup Level for Unrestricted Land Use and Calculated Soil Cleanup Levels based on Protection of Human Health for Consumption of Aquatic Organisms, National Toxics Rule, for Metals

Estimated Extent of Soil for Excavation and Off-Site Disposal based on MTCA Method A Cleanup Level for Unrestricted Land Use for Semivolatile-Range Petroleum Hydrocarbons

Estimated Extent of Soil for Excavation and Off-Site Disposal based on MTCA Method A Cleanup Levels for Unrestricted Land Use for Total Carcinogenic PAHs

KEY:

0 100 200

SCALE: 1" = 200'

APPROXIMATE POTENTIAL SOURCE AREAS ADDED BY EPI
POTENTIAL SOURCE AREAS BASED ON INFORMATION
PROVIDED BY PARAMETRIX AND POPE & TALBOT, INC.
BASE SURVEY MAP PREPARED BY PARAMETRIX

- ⌖ MONITORING WELL LOCATION (PARAMETRIX)
- ● SOIL PROBE LOCATION (PARAMETRIX / FOSTER WHEELER)
- ■ TEST PIT LOCATION (PARAMETRIX / FOSTER WHEELER)
- ⊕ EPI SAMPLING LOCATION
- ☐ FORMER BUILDINGS

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FIGURE 3-8

ESTIMATED EXTENT OF TPH, cPAHs AND
METALS CONTAMINATION IN SOIL
1999 - 2001 INVESTIGATIONS

PROJECT	17008.2		
PREPARED FOR	POPE RESOURCES		
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON		
SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	MMH	SLG	10/16/07

KEY:

0 100 200

SCALE: 1" = 200'

APPROXIMATE POTENTIAL SOURCE AREAS ADDED BY EPI
POTENTIAL SOURCE AREAS BASED ON INFORMATION
PROVIDED BY PARAMETRIX AND POPE & TALBOT, INC.
BASE SURVEY MAP PREPARED BY PARAMETRIX

▨ APPROXIMATE POTENTIAL SOURCE AREAS

⊕ MONITORING WELL LOCATION (PARAMETRIX)

■ TEST PIT LOCATION (PARAMETRIX / FOSTER WHEELER)

⊕ EPI SAMPLING LOCATION

☐ FORMER BUILDINGS

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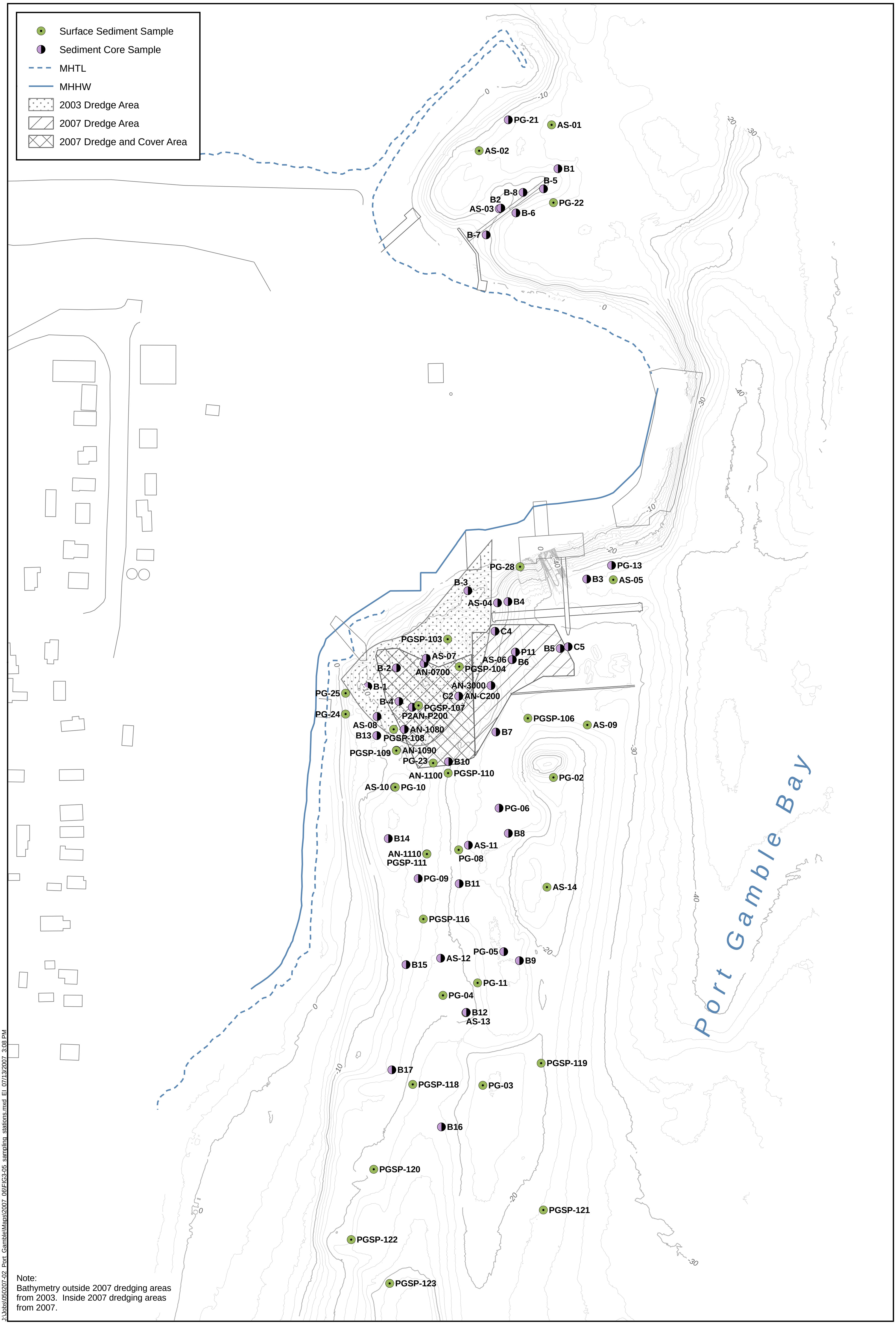
FIGURE 3-9

GROUND WATER SAMPLING LOCATIONS
1999 - 2001 INVESTIGATIONS

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*10/16/07*



Note:
Bathymetry outside 2007 dredging areas from 2003. Inside 2007 dredging areas from 2007.

J:\Jobs\050207-02 Port Gamble\Maps\2007 06\FIG3-05 sampling stations.mxd EI 07/13/2007 3:08 PM

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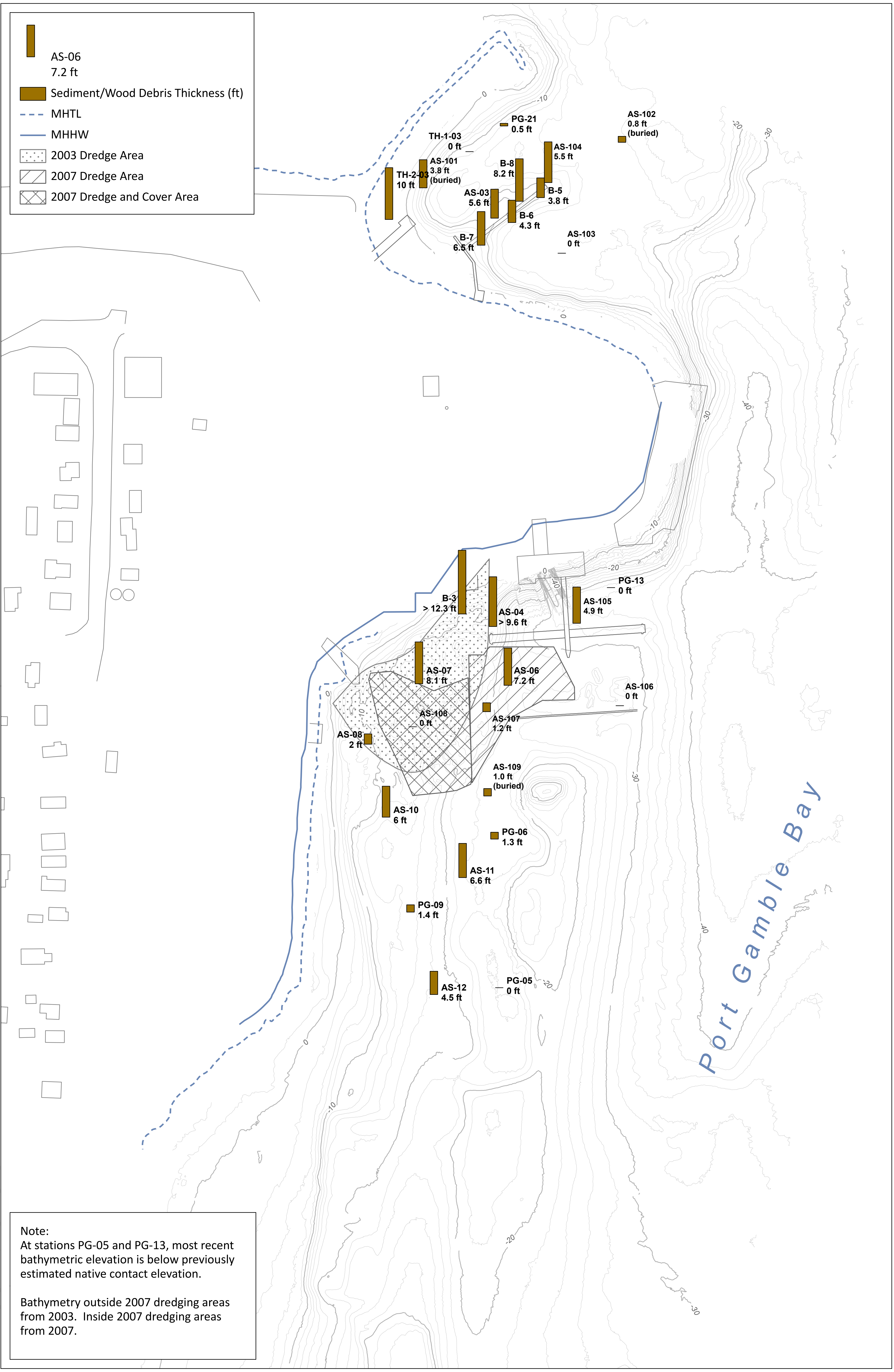
ENVIRONMENTAL, L.L.C.

Figure 3-10
Sediment Sampling Locations
Port Gamble, Washington



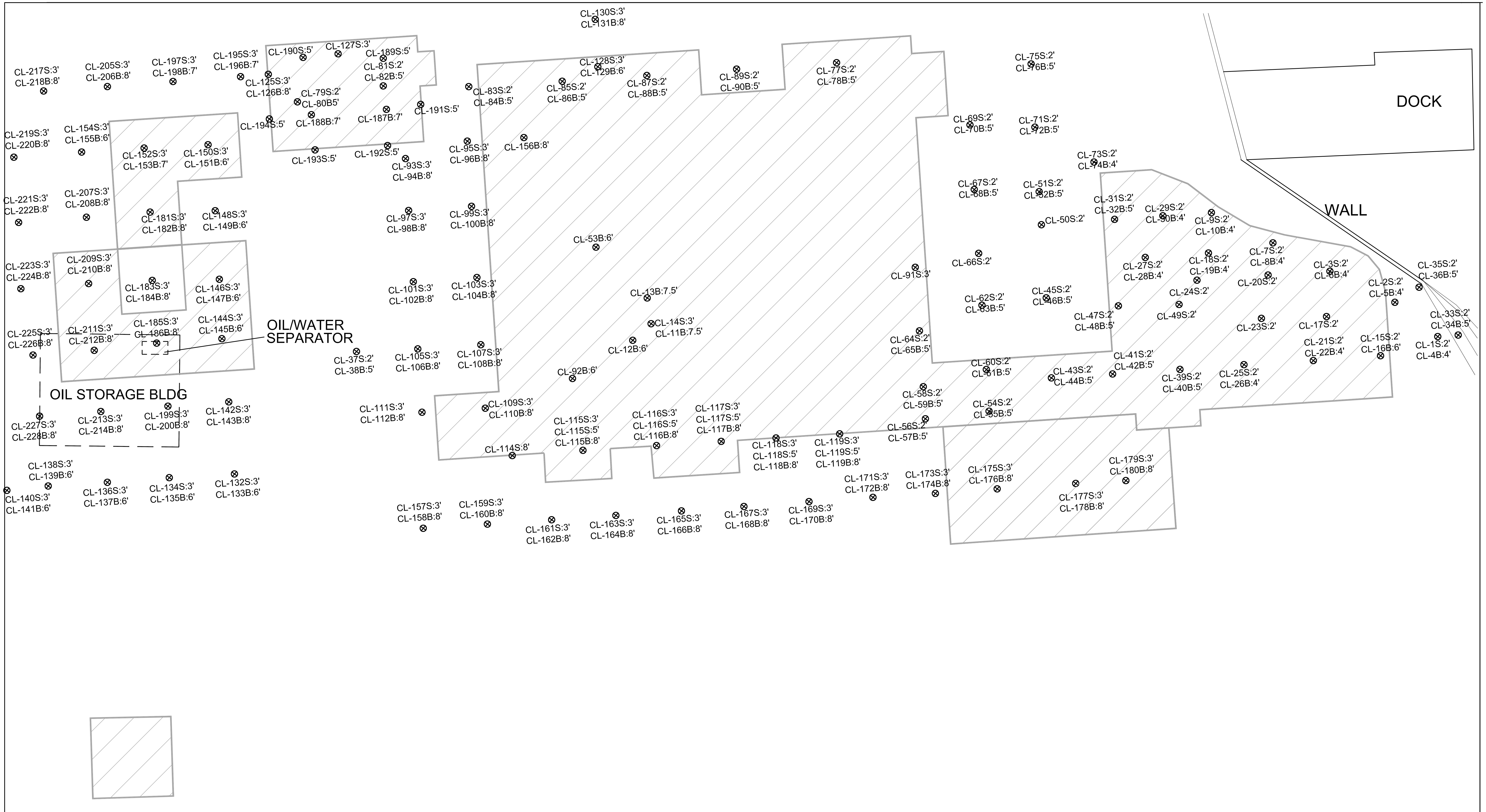
Note:
At stations PG-05 and PG-13, most recent bathymetric elevation is below previously estimated native contact elevation.

Bathymetry outside 2007 dredging areas from 2003. Inside 2007 dredging areas from 2007.

Q:\Jobs\050207-02_Port_Gamble\Maps\2009_07\Wood_debris_thickness.mxd nkochie 01/05/2010 12:42 PM

Feet
0 100 200

Figure 3-11
Estimated Wood Waste Thickness
Port Gamble, Washington



KEY:

CL-20S:2' ⊗ CHARACTERIZATION SAMPLES

▨ FINAL EXCAVATION LIMITS

⌜ ⌟ LOCATION OF FORMER OIL STORAGE BUILDING (REMOVED)

0 15 30

APPROXIMATE SCALE: 1" = 30'

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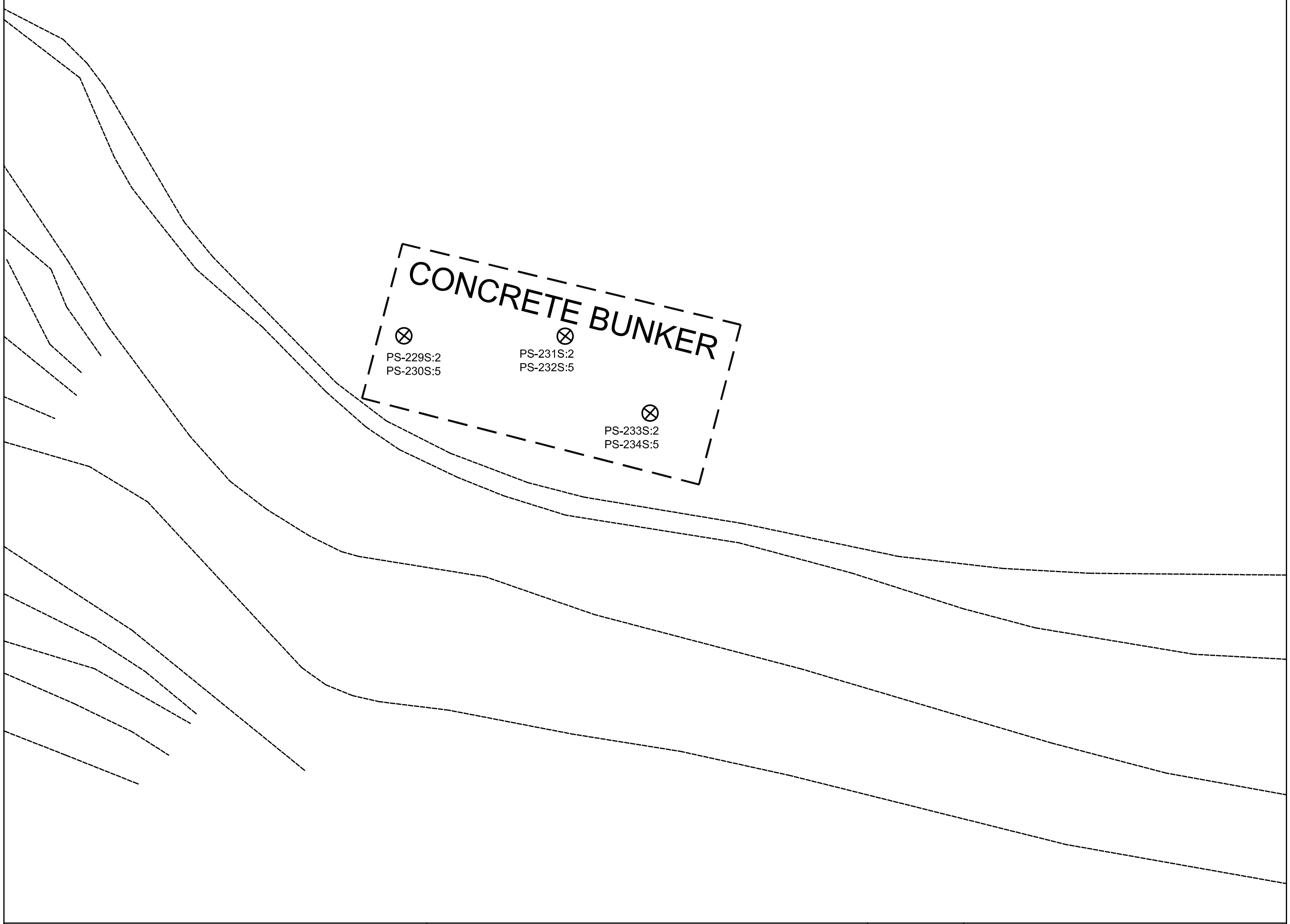
Issaquah, Washington 98027

FIGURE 4-1

CHARACTERIZATION SOIL SAMPLING LOCATIONS
AREA 1 AND FORMER OIL STORAGE BUILDING
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	MMH	SLG	04/26/07



KEY:

PS-229S ⊗ CHARACTERIZATION SAMPLES

LOCATION OF FORMER CONCRETE BUNKER (REMOVED)

0 5 10 20

SCALE: 1" = 20'

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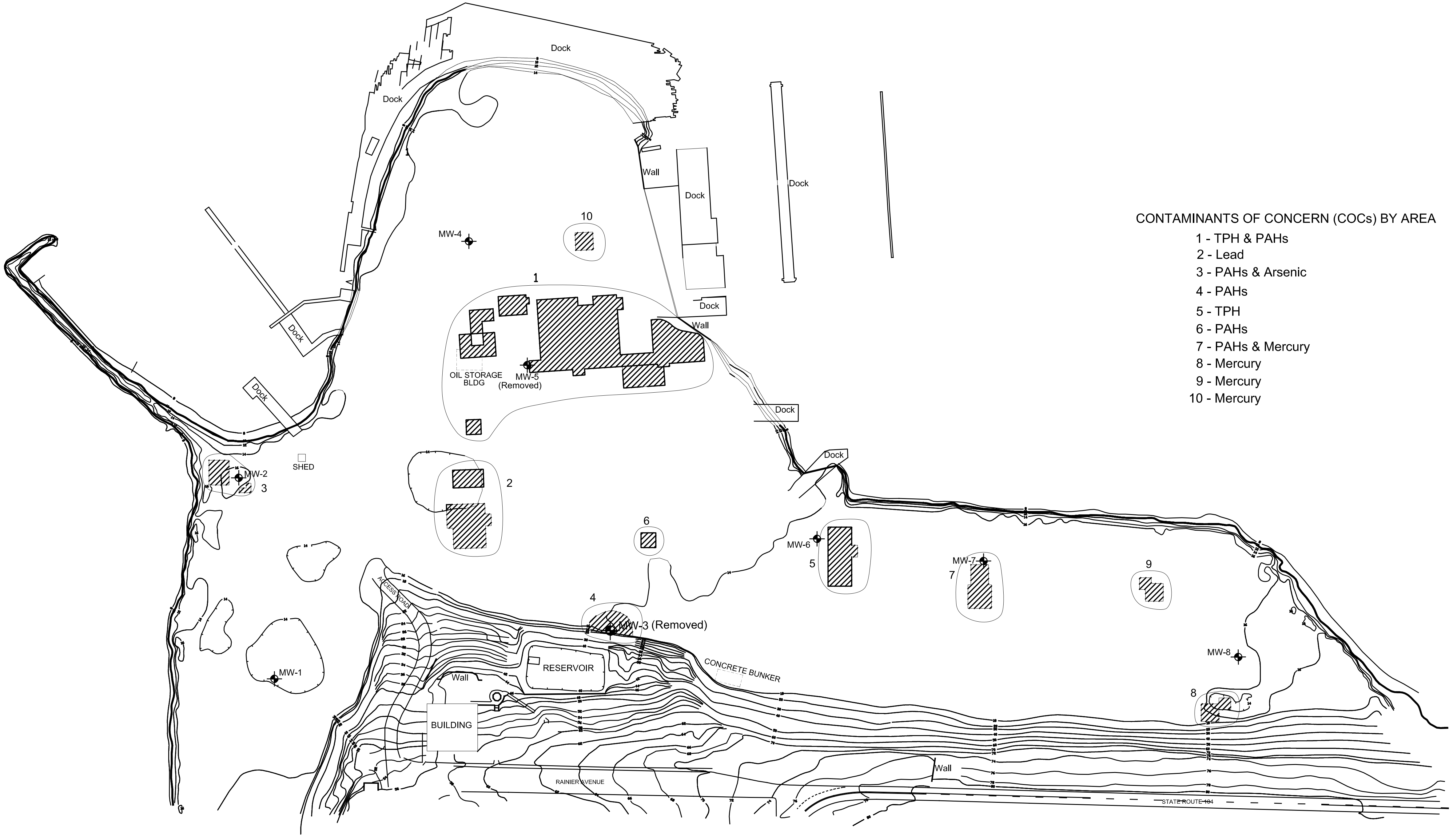
Issaquah, Washington 98027

FIGURE 4-2

CHARACTERIZATION SOIL SAMPLING LOCATIONS
CONCRETE BUNKER
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*



CONTAMINANTS OF CONCERN (COCs) BY AREA

1 - TPH & PAHs
2 - Lead
3 - PAHs & Arsenic
4 - PAHs
5 - TPH
6 - PAHs
7 - PAHs & Mercury
8 - Mercury
9 - Mercury
10 - Mercury

KEY:

0 100 200

APPROXIMATE SCALE: 1" = 200'

MW-1 ⌖ EXISTING MONITORING WELL LOCATION

72 — ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)

7 ▨ AREA DESIGNATIONS WITH APPROXIMATE FINAL EXCAVATION LIMITS

295 NE Gilman Boulevard, Suite 201
Issaquah, Washington 98027

FIGURE 4-3

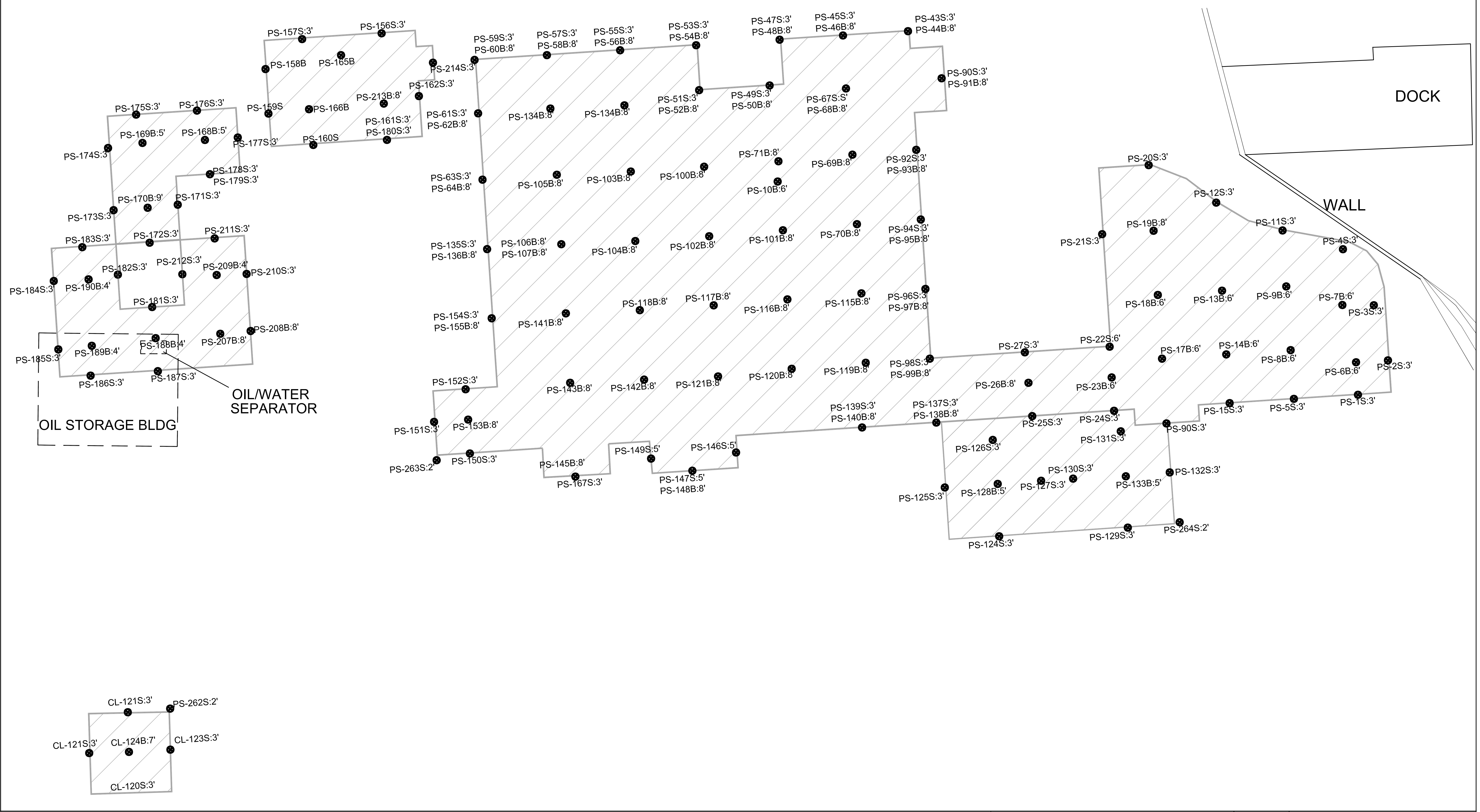
SITE REPRESENTATION AND
REMEDIAL EXCAVATION AREAS
2002 IRM

PROJECT 17008.2

PREPARED FOR POPE RESOURCES

LOCATION PORT GAMBLE MILL SITE
PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-9B:6' ● FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

LOCATION OF FORMER OIL STORAGE BUILDING (REMOVED)

0 15 30

APPROXIMATE SCALE: 1" = 30'

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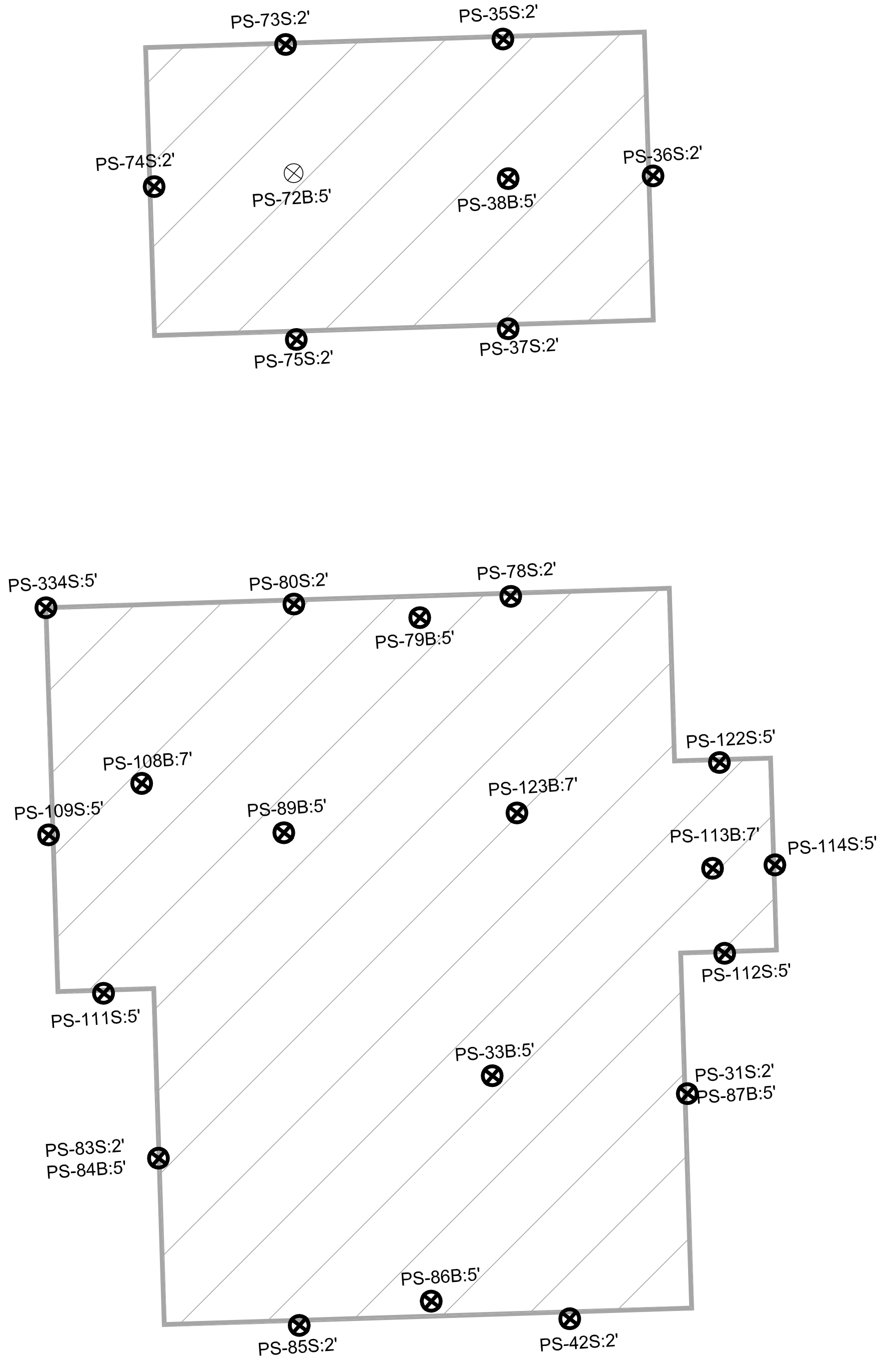
FIGURE 4-4

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 1
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	MMH	SLG	04/26/07



KEY:

PS-72B:5' ⊗ FINAL PERFORMANCESAMPLE (EXCEEDS MTCA METHOD A SOIL CLEANUP LEVEL FOR UNRESTRICTED LAND USE)

PS-9B:6' ⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 5 10 20

SCALE: 1" = 20'

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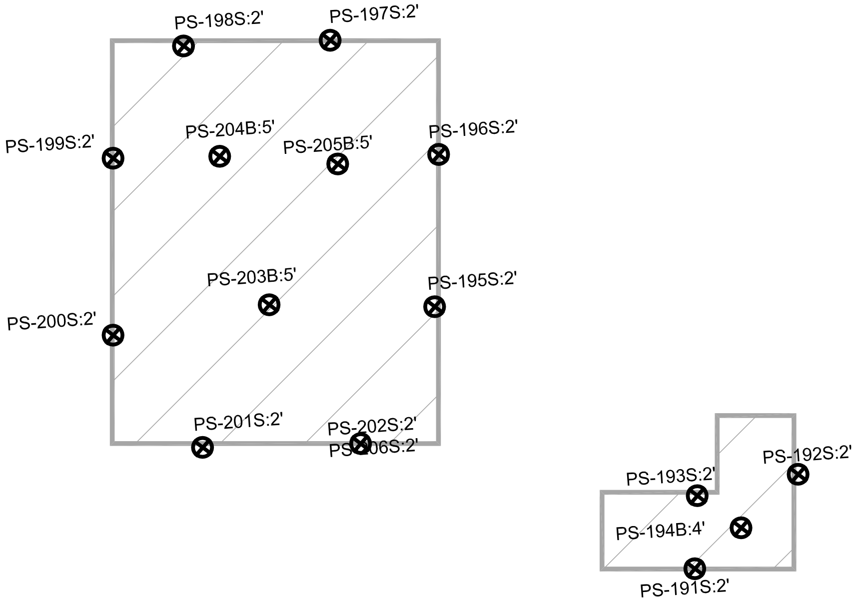
FIGURE 4-5

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 2
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-193S:2'
⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 5 10 20

SCALE: 1" = 20'

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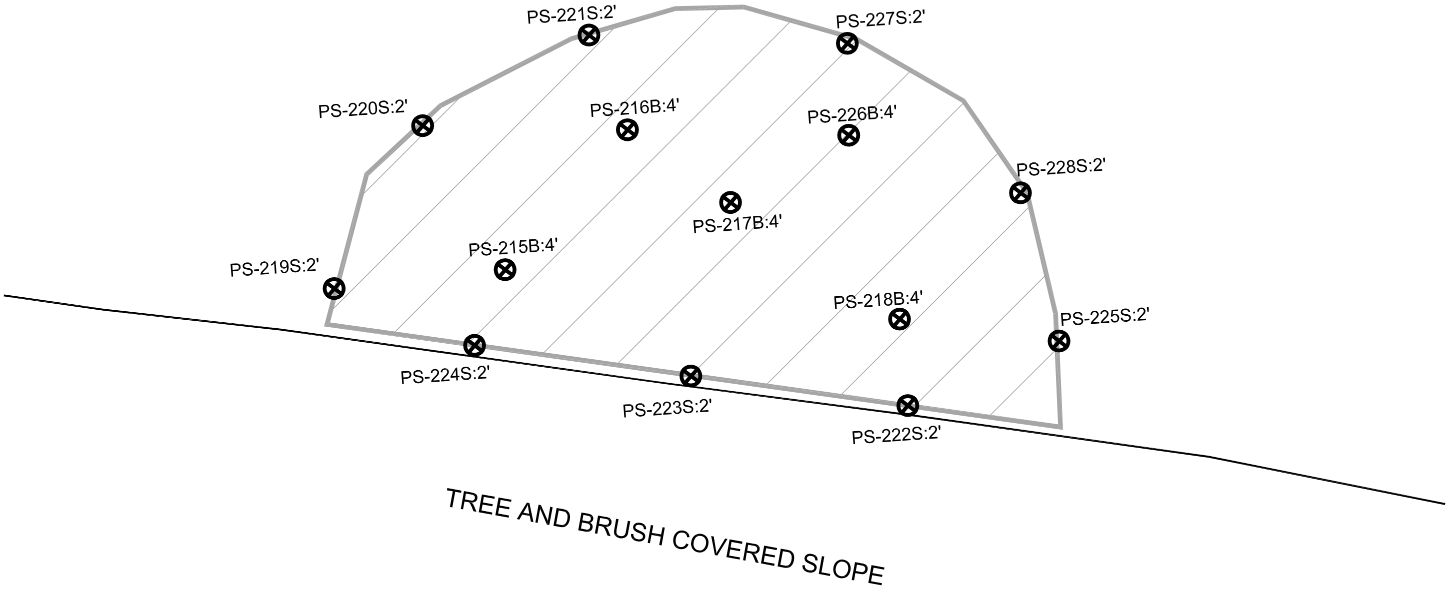
FIGURE 4-6

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 3
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-9B:6' ⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 5 10 20

SCALE: 1" = 20'

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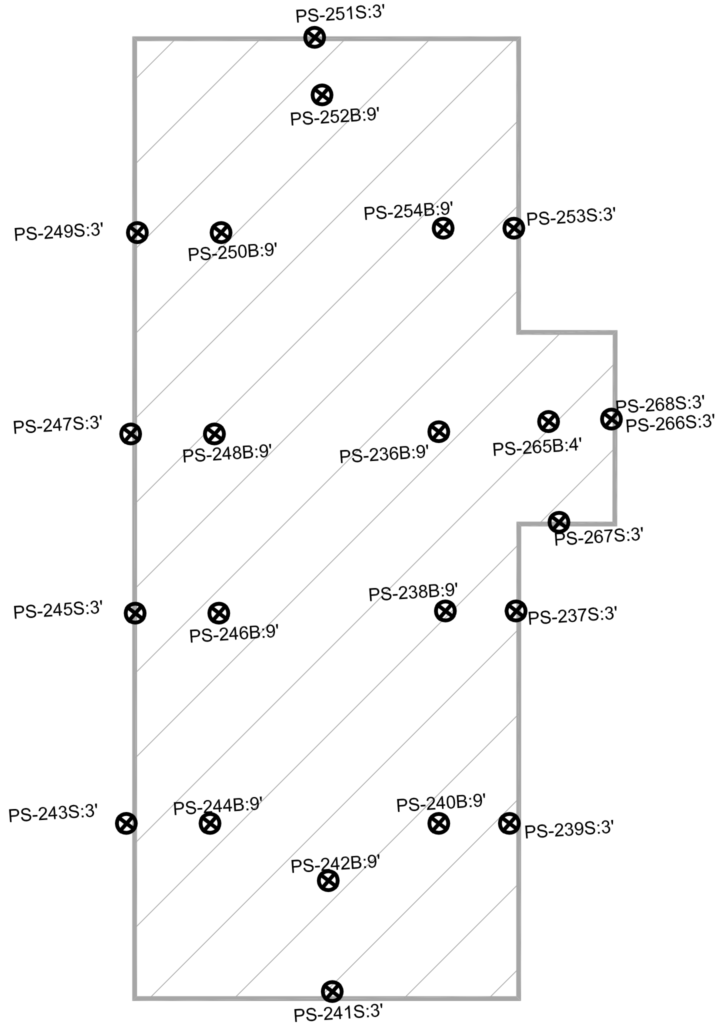
FIGURE 4-7

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 4
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-9B:6'
⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 5 10 20

SCALE: 1" = 20'

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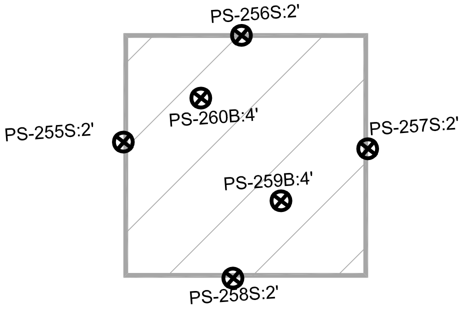
FIGURE 4-8

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 5
2002 IRM

PROJECT	17008.2		
PREPARED FOR	POPE RESOURCES		
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON		
SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-9B:6'
⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 5 10 20

SCALE: 1" = 20'

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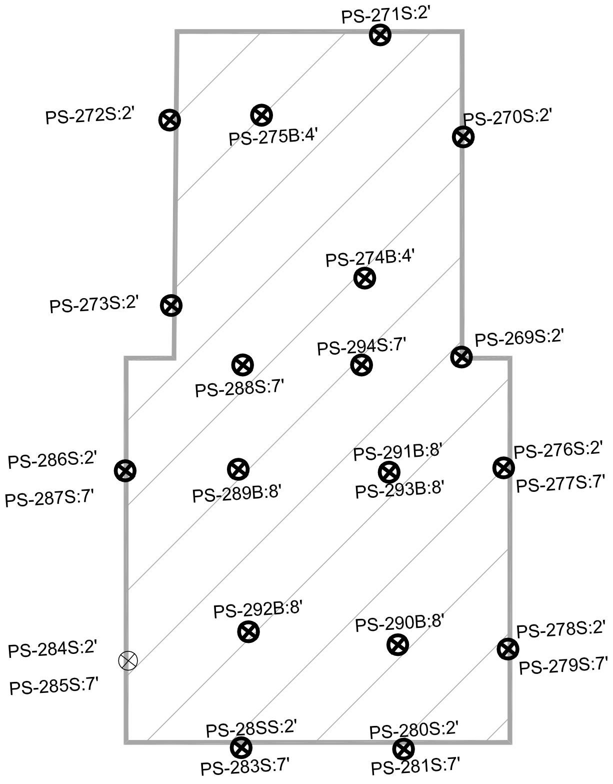
FIGURE 4-9

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 6
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-285S:7'⊗ FINAL PERFORMANCESAMPLE (EXCEEDS MTCA METHOD A SOIL CLEANUP LEVEL FOR UNRESTRICTED LAND USE)

PS-284S:2'⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 5 10 20

SCALE: 1" = 20'

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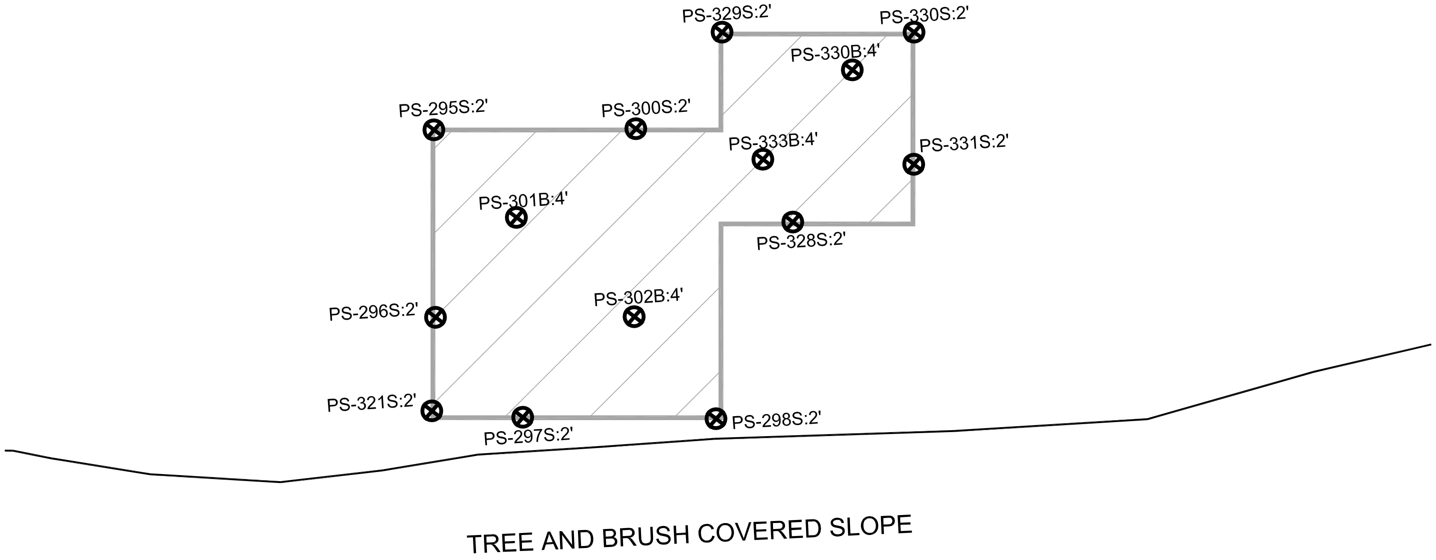
FIGURE 4-10

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 7
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-302B:4' ⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 10 20 40

APPROXIMATE SCALE: 1" = 40'

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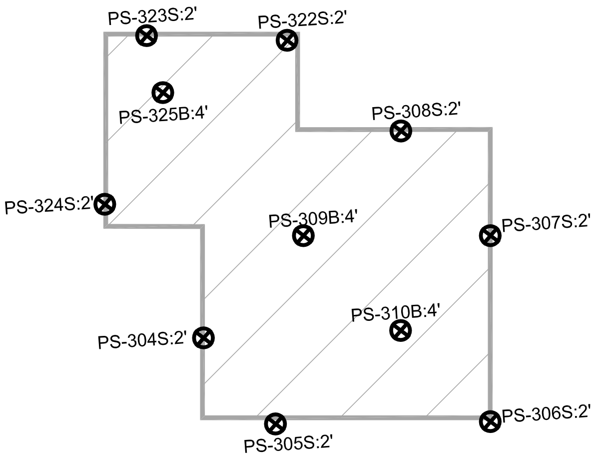
FIGURE 4-11

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 8
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

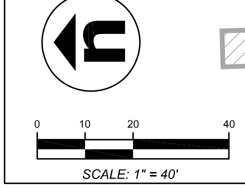
SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*



KEY:

PS-302B:4' ⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS



SCALE: 1" = 40'

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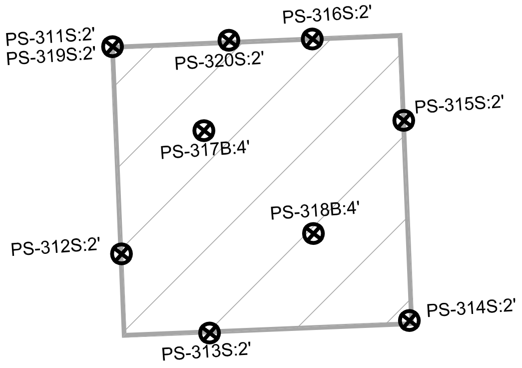
FIGURE 4-12

EXTENT OF EXCAVATION AND FINAL PERFORMANCE SOIL SAMPLING LOCATIONS - AREA 9
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	MMH	SLG	04/26/07



KEY:

PS-302B:4' ⊗ FINAL PERFORMANCE SAMPLES

▨ FINAL EXCAVATION LIMITS

0 10 20 40

APPROXIMATE SCALE: 1" = 40'

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FIGURE 4-13

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING
LOCATIONS - AREA 10
2002 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/26/07*

KEY:

0 100 200

APPROXIMATE SCALE: 1" = 200'

MW-1
⊕ Monitoring Well Location

MW-5
⊕ Monitoring Well Abandonded April 2002

MW-10
⊕ Monitoring Well Abandoned November 2004

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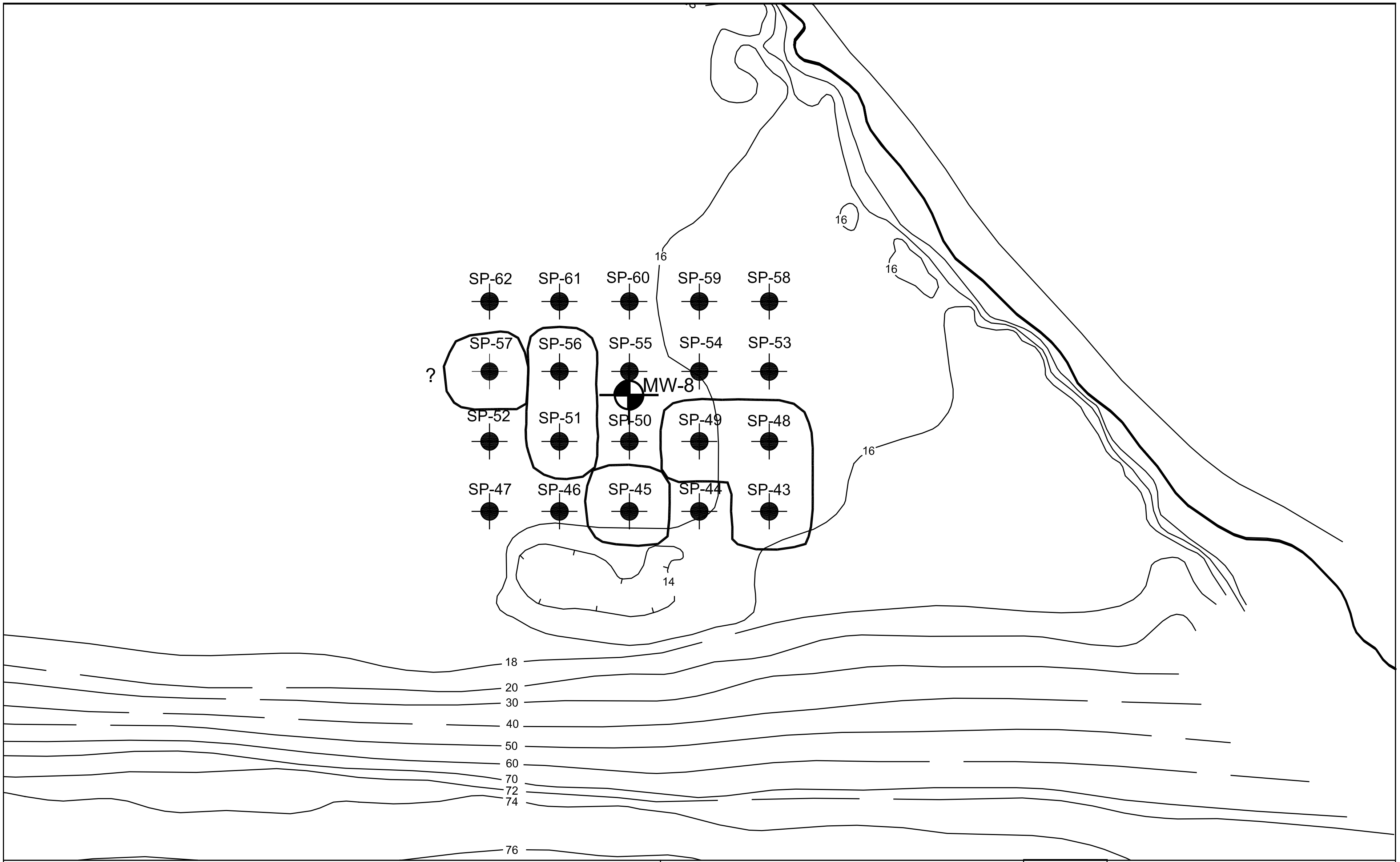
FIGURE 4-14

MONITORING WELL LOCATIONS
GROUND WATER PERFORMANCE SAMPLING

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*SLG*	*SLG*	*05/09/07*



KEY:

MW-1 - EXISTING MONITORING WELL LOCATION

- SOIL SAMPLING LOCATION FOR ARSENIC AND MERCURY (30 FOOT GRID SPACING)

- INDICATES SOIL CLEANUP LEVEL EXCEEDED AT THIS SAMPLING LOCATION

? ? - ESTIMATED EXTENT OF CONTAMINATED SOIL (QUERIED WHERE UNCERTAIN)

- ESTIMATED EXTENT OF OTHERWISE IMPACTED SOIL

0 15 30 60

SCALE: 1" = 60'

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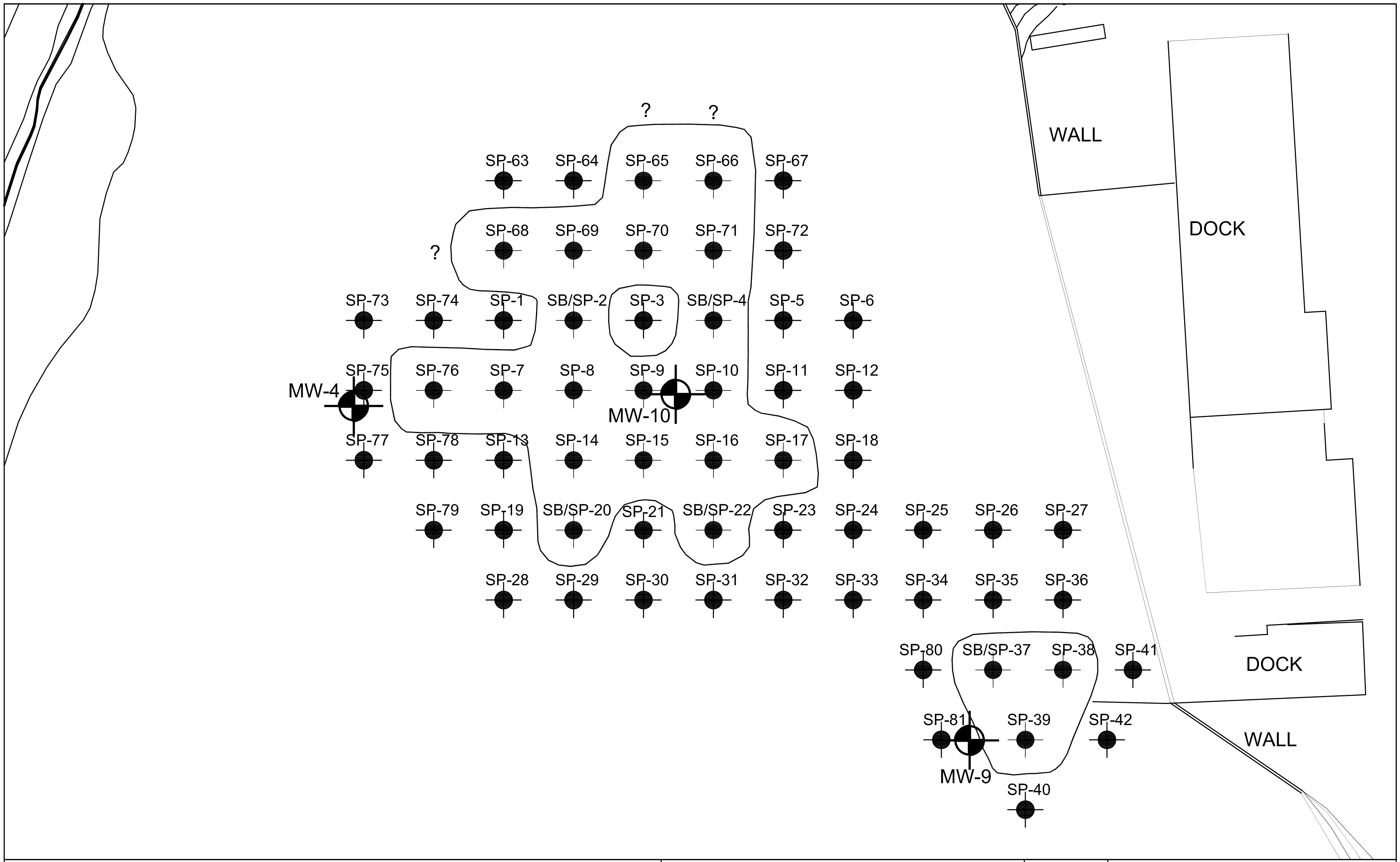
FIGURE 4-15

MW-8 AREA SAMPLING LOCATIONS
2004 INVESTIGATIONS

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*04/20/07*



KEY:

MW-1 - EXISTING MONITORING WELL LOCATION

- SOIL SAMPLING LOCATION FOR ARSENIC AND MERCURY (30 FOOT GRID SPACING)

- INDICATES SOIL CLEANUP LEVEL EXCEEDED AT THIS SAMPLING LOCATION

?◯? - ESTIMATED EXTENT OF CONTAMINATED SOIL (QUERIED WHERE UNCERTAIN)

0 15 30 60

SCALE: 1" = 60'

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FIGURE 4-16

MW-9 AND MW-10 AREA SAMPLING LOCATIONS
2004 INVESTIGATIONS

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	MMH	SLG	04/20/07

KEY:

MW-1 EXISTING MONITORING WELL LOCATION

▨ 2004/2005 EXCAVATION LIMITS

0 100 200

SCALE: 1" = 200'

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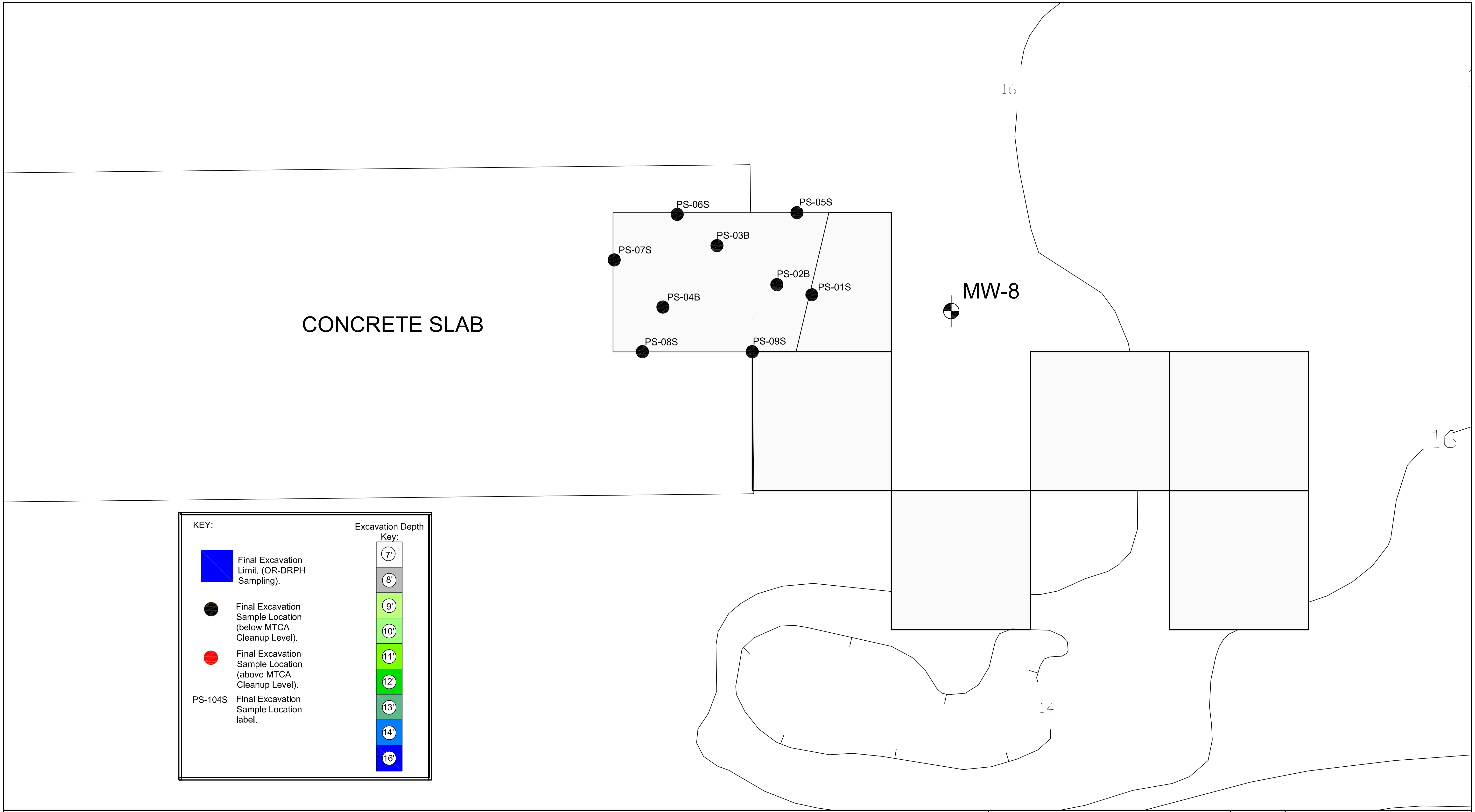
FIGURE 4-17

SITE REPRESENTATION AND
REMEDIAL EXCAVATION AREAS
2004/2005 IRM

PROJECT	17008.2 FORMER MILL SITE
PREPARED FOR	POPE RESOURCES
LOCATION	PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*SLG*	*SLG*	*05/08/07*



KEY:

0 10 20

APPROXIMATE SCALE: 1" = 20'

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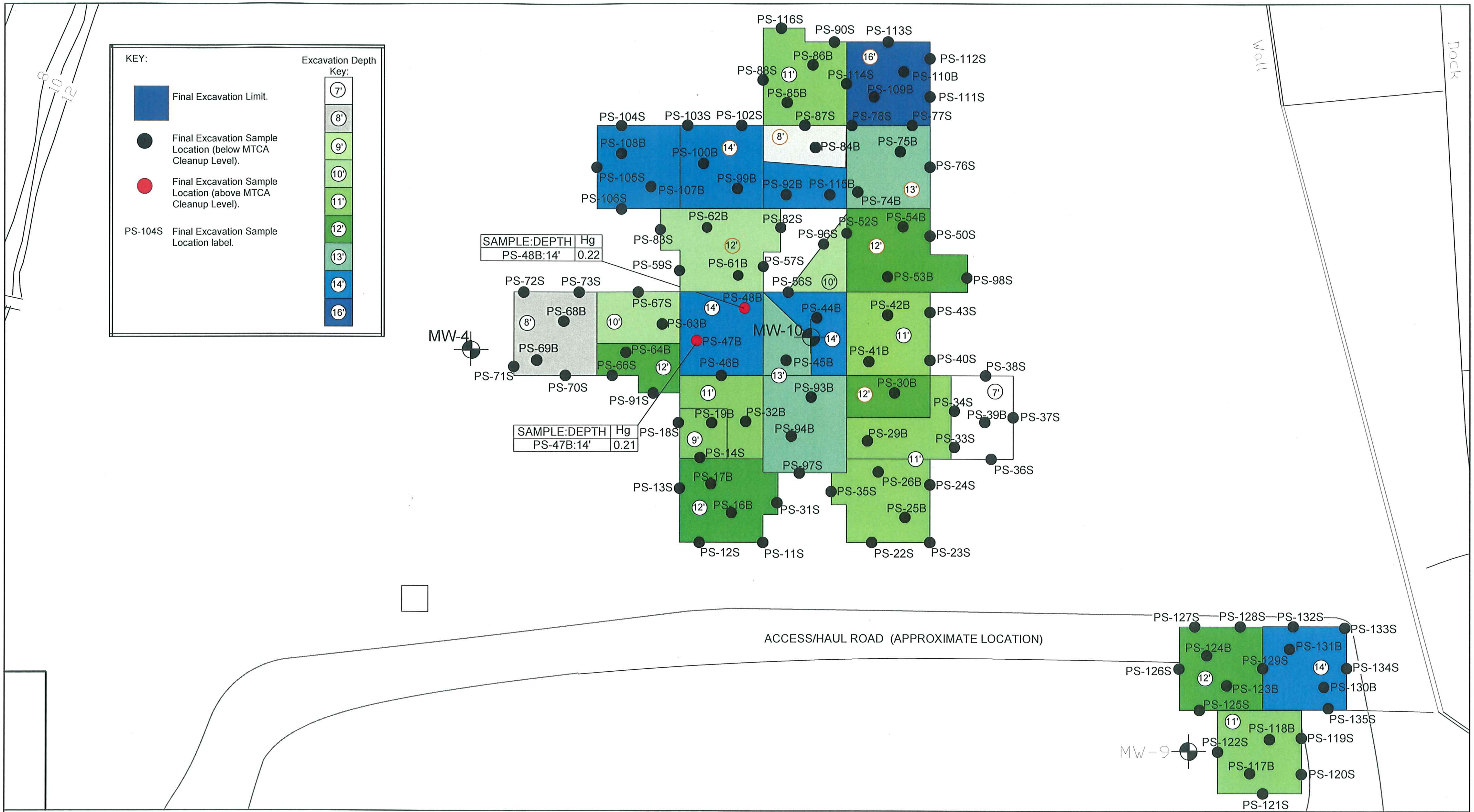
FIGURE 4-18

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING LOCATIONS
MW-8 AREA
2004/2005 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*MMH*	*SLG*	*05/08/07*



KEY:

0 15 30

APPROXIMATE SCALE: 1" = 30'

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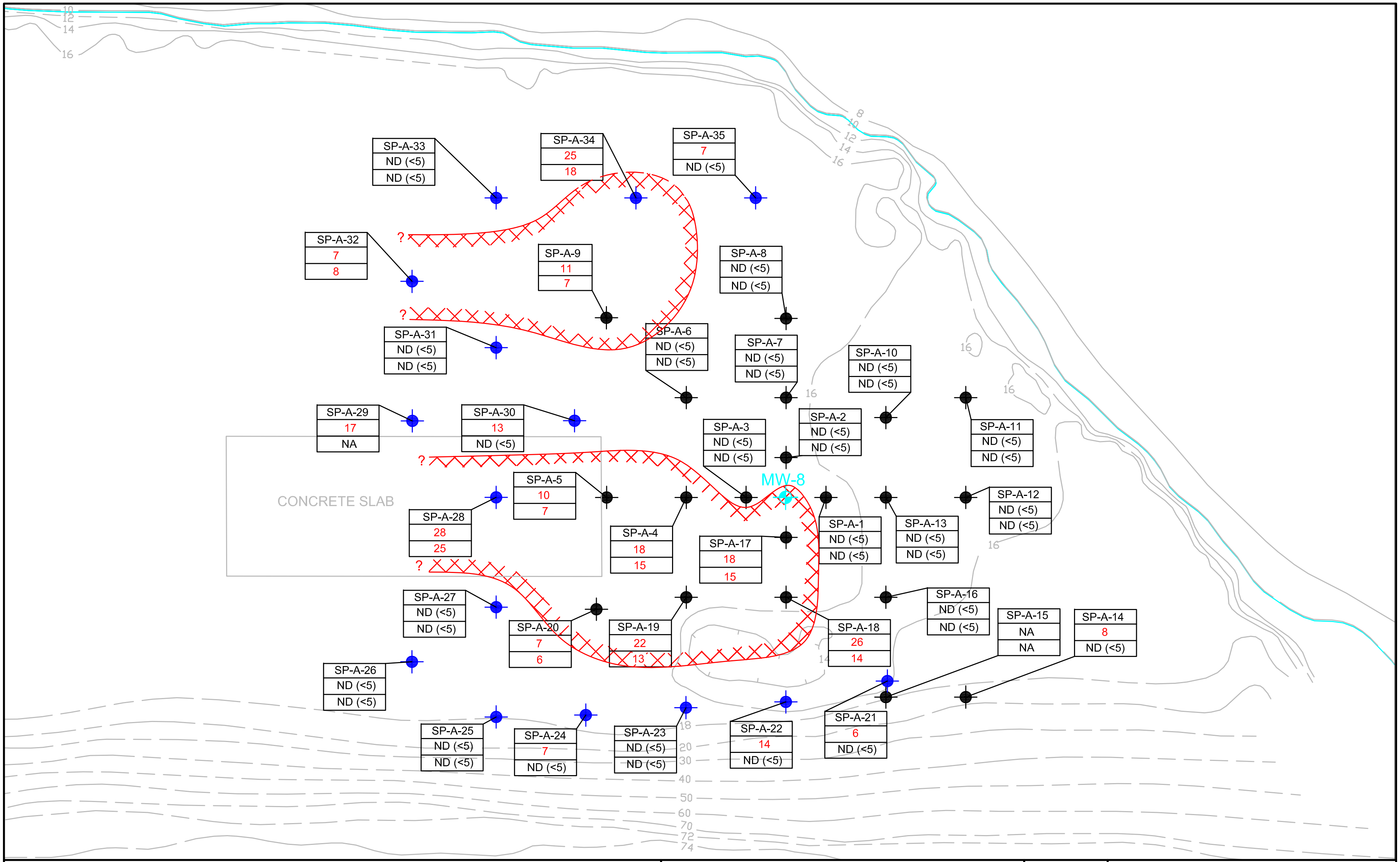
FIGURE 4-19

EXTENT OF EXCAVATION AND
FINAL PERFORMANCE SOIL SAMPLING LOCATIONS
MW-9 AND MW-10 AREA
2004/2005 IRM

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	MMH	SLG	05/08/07



KEY:

MW-1 EXISTING MONITORING WELL LOCATION

SOIL/GROUND WATER SAMPLING LOCATION - 2005

SOIL/GROUND WATER SAMPLING LOCATION - 2006

SP-A-20	PROBE LOCATION NUMBER
7	TOTAL ARSENIC (MICROGRAMS/LITER)
6	DISSOLVED ARSENIC (MICROGRAMS/LITER)

APPROXIMATE EXTENT OF DISSOLVED ARSENIC IN GROUND WATER

0 35 70

SCALE: 1" = 70'

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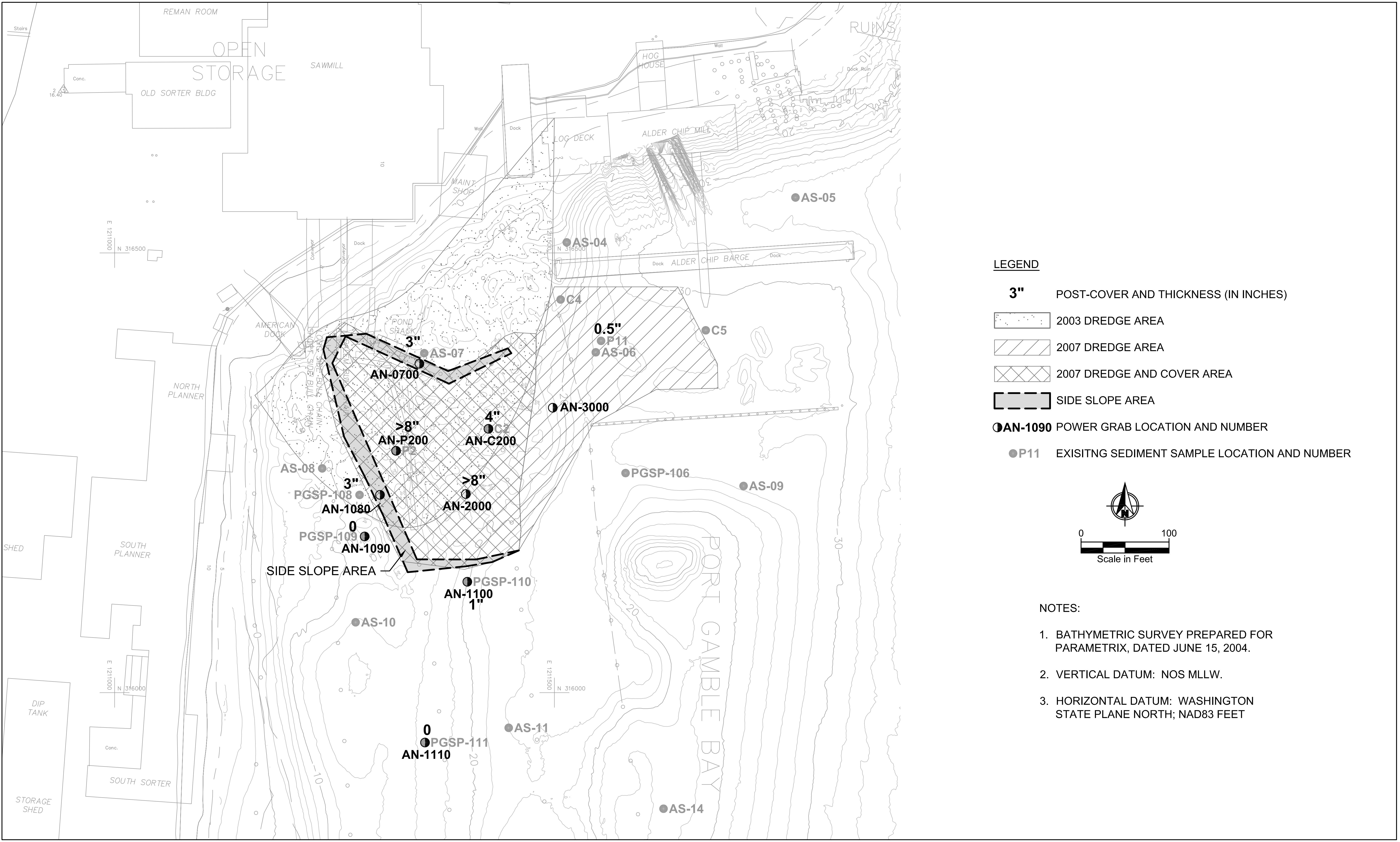
FIGURE 4-20

EXTENT OF ARSENIC IN GROUND WATER
2005/2006 INVESTIGATIONS

PROJECT	17008.2
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	SLG	SLG	05/09/07



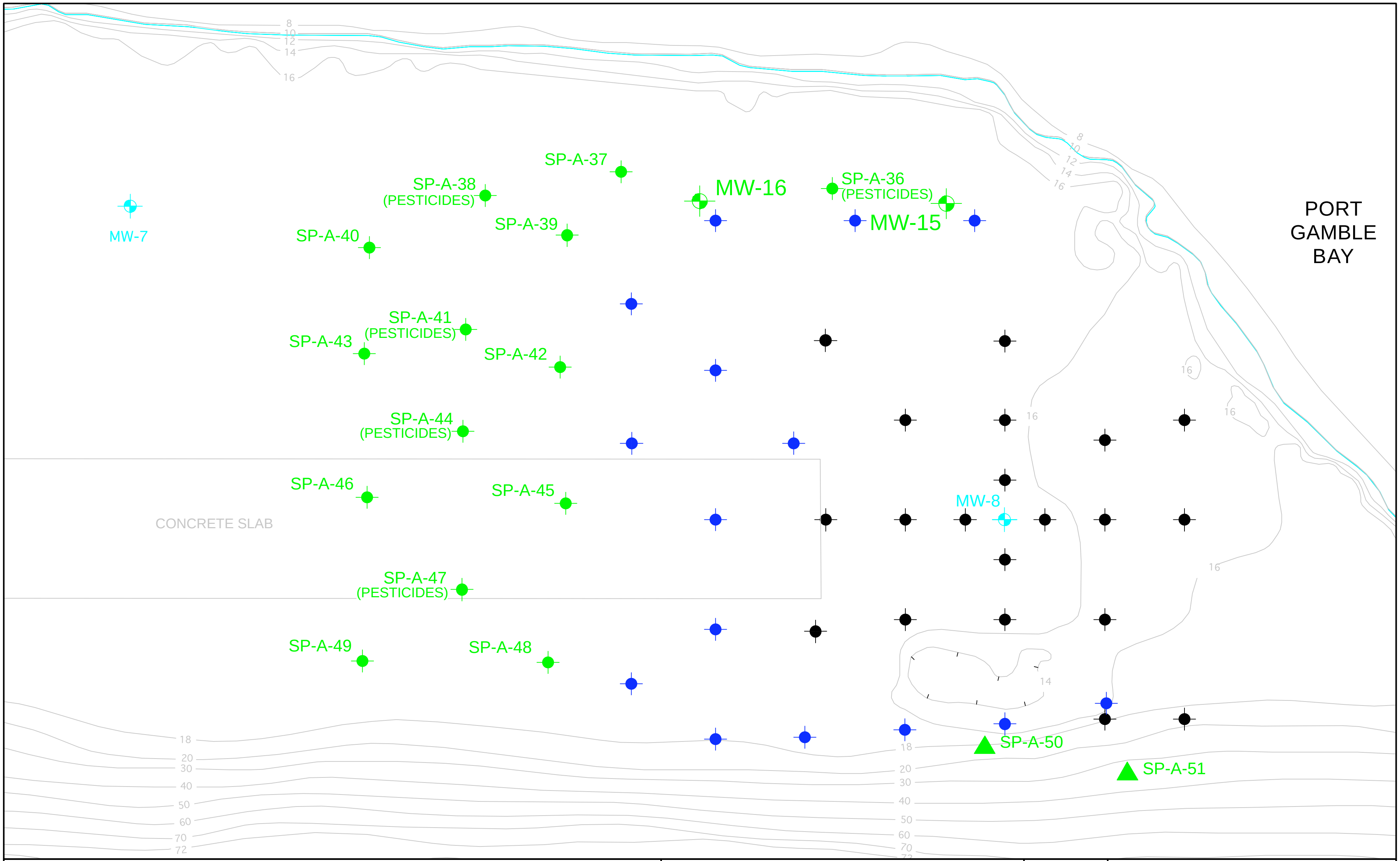
NOTES:

1. BATHYMETRIC SURVEY PREPARED FOR PARAMETRIX, DATED JUNE 15, 2004.
2. VERTICAL DATUM: NOS MLLW.
3. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH; NAD83 FEET

Jul 17, 2007 4:36pm cdavidson K:\Jobs\050207-PORT_GAMBLE_BAY\050207-02\05020702-022.dwg FIG 1

ANCHOR
ENVIRONMENTAL, L.L.C.

Figure 4-21
Post-Dredge Sand Cover Thickness Placed over 2007 Interim Action Area
Port Gamble



KEY:

MW-1 ⊕	EXISTING MONITORING WELL LOCATION
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2005
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2006
MW-15 ⊕	NEW MONITORING WELL LOCATION - 2009
SP-A-43 ●	DIRECT-PUSH SAMPLING LOCATION (ARSENIC ANALYSIS AT ALL LOCATIONS, PESTICIDE ANALYSIS WHERE INDICATED) - 2009
SP-A-50 ▲	HAND AUGER SAMPLING LOCATION - 2009

0 25 50 100

APPROXIMATE SCALE: 1" = 100'

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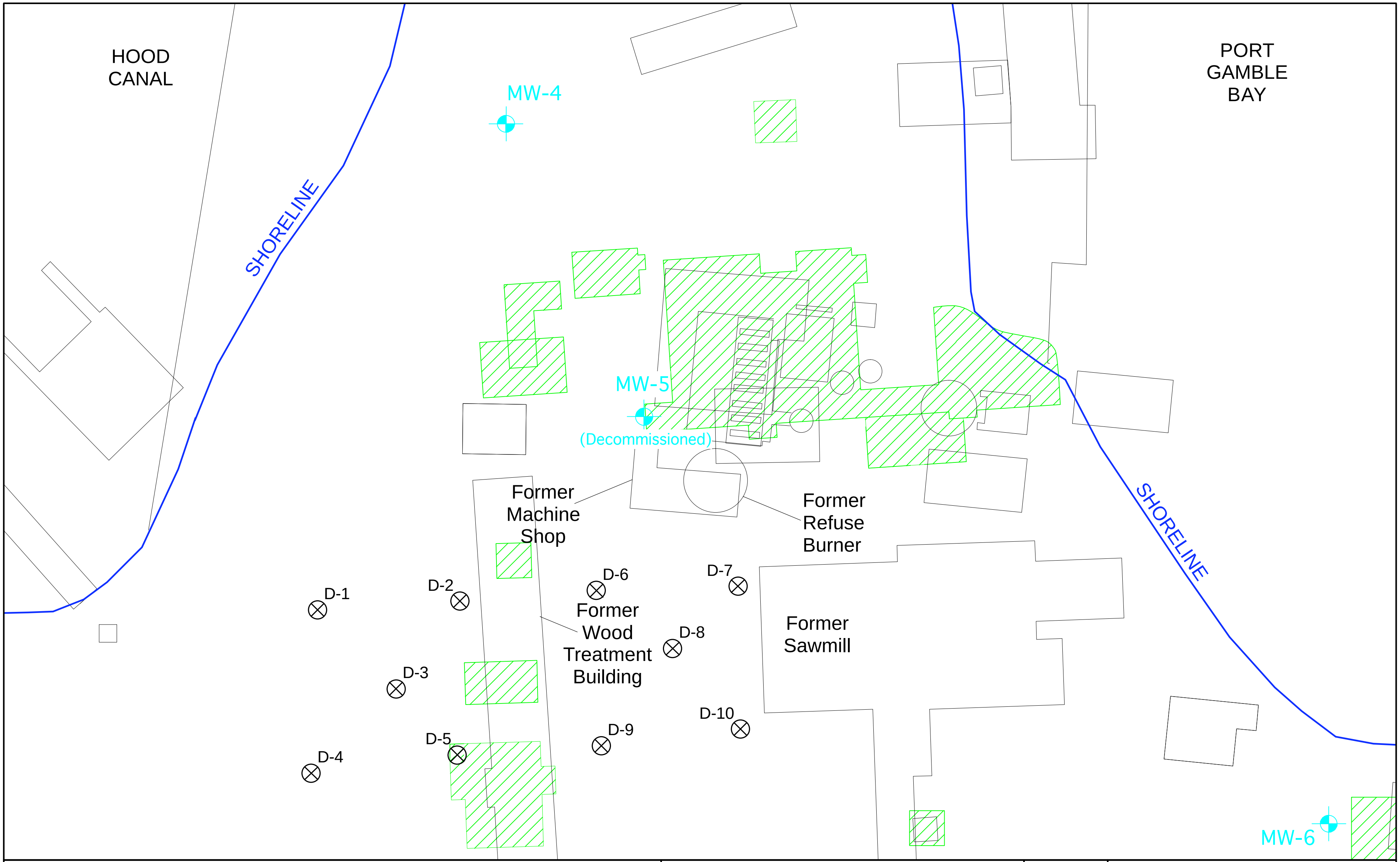
FIGURE 6-1

RI/FS ARSENIC AND PESTICIDE
SAMPLING LOCATIONS

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*ARM*	*DCK*	*05/05/09*



KEY:

⊗ SHALLOW SOIL SAMPLE LOCATIONS FOR DIOXINS, FURANS AND PESTICIDES

☐ LOCATIONS OF FORMER STRUCTURES

▨ REMEDIAL EXCAVATION AREAS

0 25 50 100

APPROXIMATE SCALE: 1" = 100'

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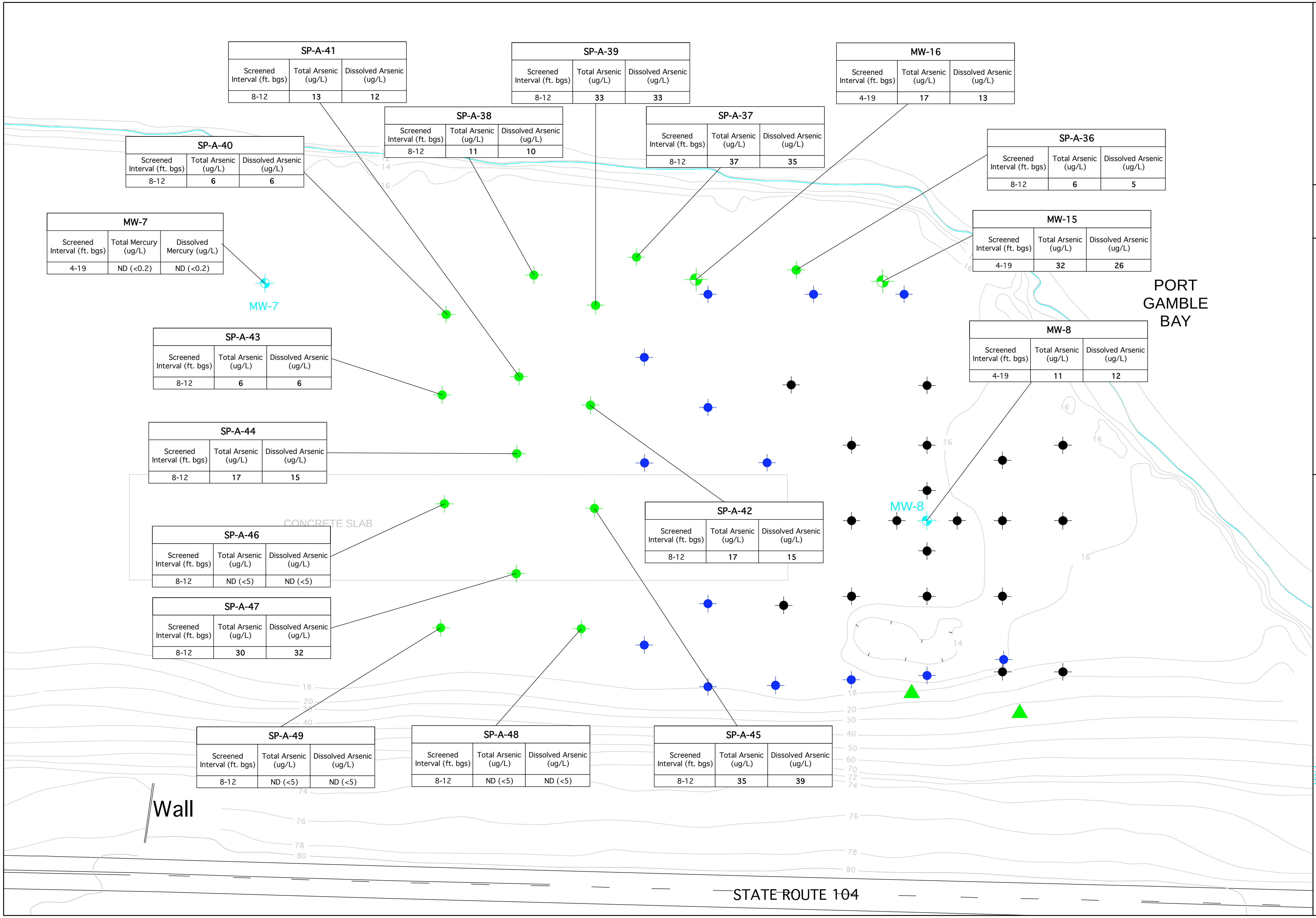
FIGURE 6-2

DIOXIN, FURAN, AND PESTICIDE SAMPLE LOCATIONS

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*ARM*	*DCK*	*05/05/09*



SP-A-41

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	13	12

SP-A-39

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	33	33

MW-16

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
4-19	17	13

SP-A-38

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	11	10

SP-A-37

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	37	35

SP-A-40

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	6	6

SP-A-36

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	6	5

MW-7

Screened Interval (ft. bgs)	Total Mercury (ug/L)	Dissolved Mercury (ug/L)
4-19	ND (<0.2)	ND (<0.2)

MW-15

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
4-19	32	26

SP-A-43

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	6	6

MW-8

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
4-19	11	12

SP-A-44

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	17	15

SP-A-42

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	17	15

SP-A-46

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	ND (<5)	ND (<5)

SP-A-47

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	30	32

SP-A-49

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	ND (<5)	ND (<5)

SP-A-48

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	ND (<5)	ND (<5)

SP-A-45

Screened Interval (ft. bgs)	Total Arsenic (ug/L)	Dissolved Arsenic (ug/L)
8-12	35	39

KEY:

⊕ MW-1	EXISTING MONITORING WELL LOCATION
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2005
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2006
⊕ MW-15	MONITORING WELL LOCATION - 2009
● SP-A-43	DIRECT-PUSH SAMPLING LOCATION - 2009
▲ SP-A-50	HAND AUGER SAMPLING LOCATION - 2009

0 15 30 60

SCALE: 1" = 60'

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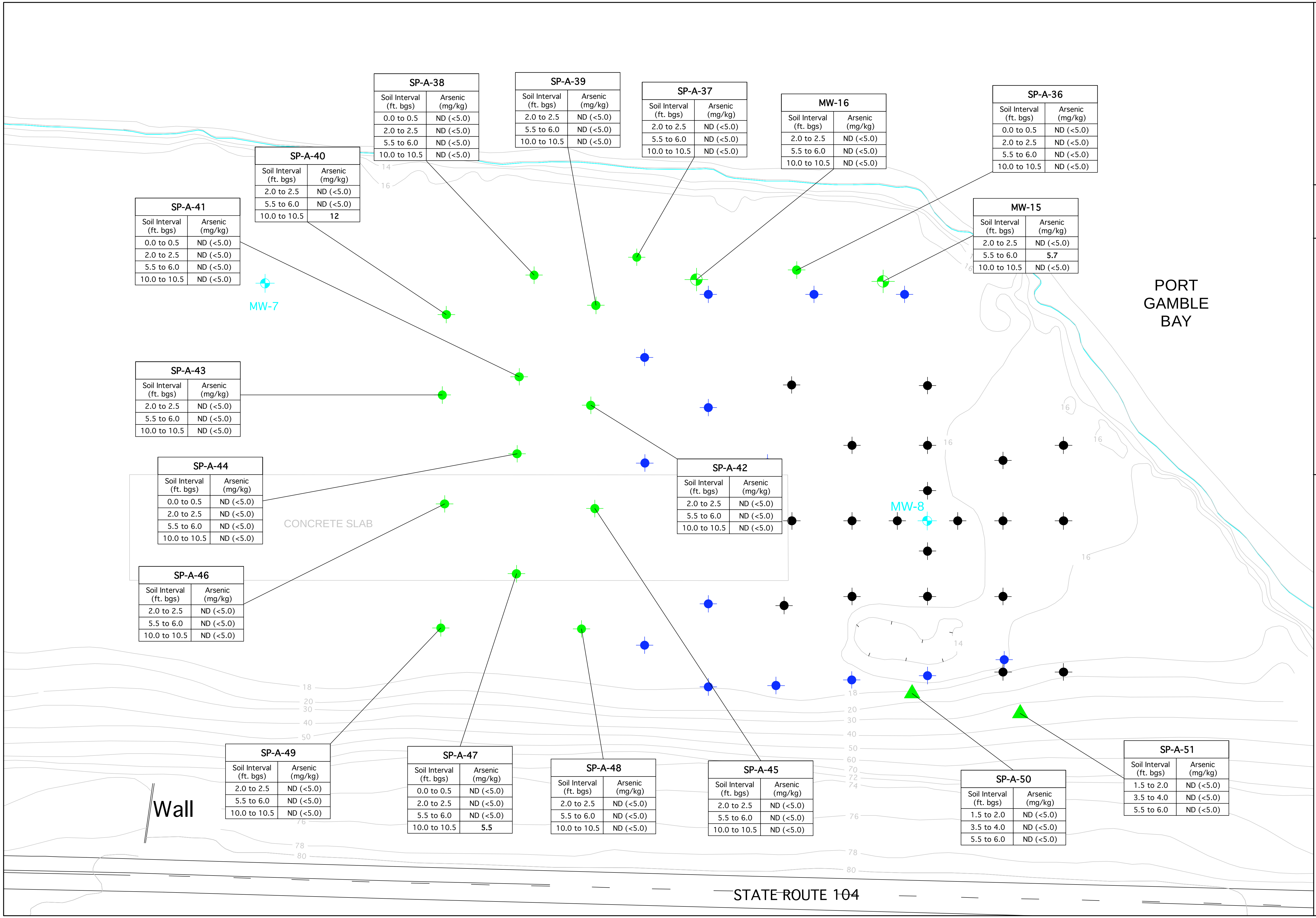
Issaquah, Washington 98027

FIGURE 7-1

ARSENIC AND MERCURY GROUNDWATER SAMPLING LOCATIONS AND RESULTS

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON
SHEET	*1 of 1*
DRAWN BY	*ARM*
REVIEWED BY	*DCK*
DATE	*05/05/09*



SP-A-38

Soil Interval (ft. bgs)	Arsenic (mg/kg)
0.0 to 0.5	ND (<5.0)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-39

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-37

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

MW-16

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-36

Soil Interval (ft. bgs)	Arsenic (mg/kg)
0.0 to 0.5	ND (<5.0)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-40

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	**12**

SP-A-41

Soil Interval (ft. bgs)	Arsenic (mg/kg)
0.0 to 0.5	ND (<5.0)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

MW-15

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	**5.7**
10.0 to 10.5	ND (<5.0)

SP-A-43

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-44

Soil Interval (ft. bgs)	Arsenic (mg/kg)
0.0 to 0.5	ND (<5.0)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-42

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-46

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-49

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-47

Soil Interval (ft. bgs)	Arsenic (mg/kg)
0.0 to 0.5	ND (<5.0)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	**5.5**

SP-A-48

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-45

Soil Interval (ft. bgs)	Arsenic (mg/kg)
2.0 to 2.5	ND (<5.0)
5.5 to 6.0	ND (<5.0)
10.0 to 10.5	ND (<5.0)

SP-A-50

Soil Interval (ft. bgs)	Arsenic (mg/kg)
1.5 to 2.0	ND (<5.0)
3.5 to 4.0	ND (<5.0)
5.5 to 6.0	ND (<5.0)

SP-A-51

Soil Interval (ft. bgs)	Arsenic (mg/kg)
1.5 to 2.0	ND (<5.0)
3.5 to 4.0	ND (<5.0)
5.5 to 6.0	ND (<5.0)

KEY:

MW-1	EXISTING MONITORING WELL LOCATION
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2005
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2006
MW-15	MONITORING WELL LOCATION - 2009
SP-A-43	DIRECT-PUSH SAMPLING LOCATION - 2009
SP-A-50	HAND AUGER SAMPLING LOCATION - 2009

SCALE: 1" = 60'

0 15 30 60

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON
DRAWN BY	ARM
REVIEWED BY	DCK
DATE	05/05/09
SHEET	1 of 1

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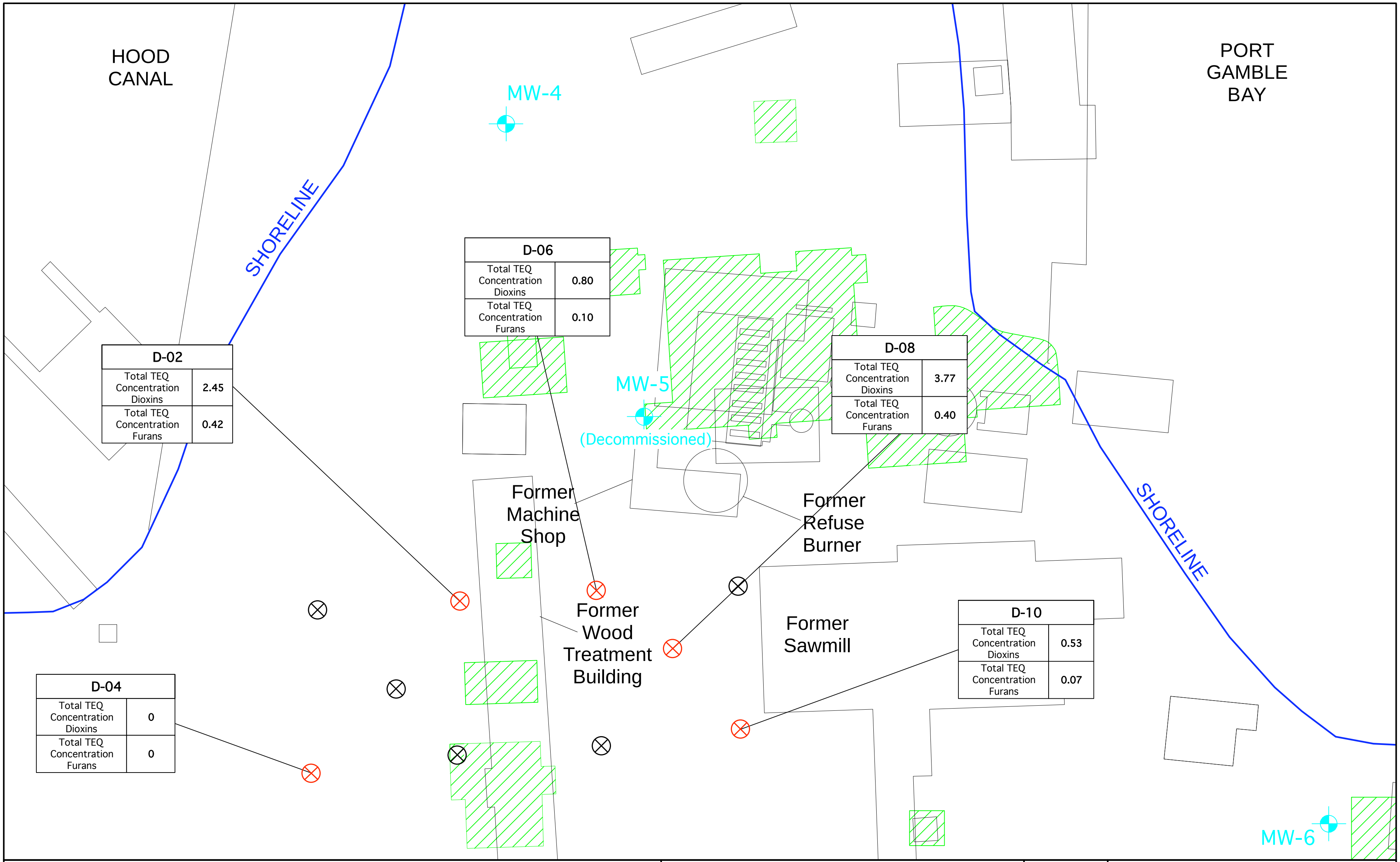
Issaquah, Washington 98027

ARSENIC SOIL SAMPLING LOCATIONS AND RESULTS

FIGURE 7-2



D-02	
Total TEQ Concentration Dioxins	2.45
Total TEQ Concentration Furans	0.42

D-06	
Total TEQ Concentration Dioxins	0.80
Total TEQ Concentration Furans	0.10

D-08	
Total TEQ Concentration Dioxins	3.77
Total TEQ Concentration Furans	0.40

D-04	
Total TEQ Concentration Dioxins	0
Total TEQ Concentration Furans	0

D-10	
Total TEQ Concentration Dioxins	0.53
Total TEQ Concentration Furans	0.07

KEY:

0 25 50 100

APPROXIMATE SCALE: 1" = 100'

⊗	SHALLOW SOIL SAMPLE LOCATIONS (SUBMITTED FOR ANALYSIS)
⊗	SHALLOW SOIL SAMPLE LOCATIONS (ARCHIVED)
☐	LOCATIONS OF FORMER STRUCTURES
▨	REMEDIAL EXCAVATION AREAS

Simplified Terestrial Ecological Evaluation Cleanup Levels
Dioxins - 5.0 Furans - 3.0

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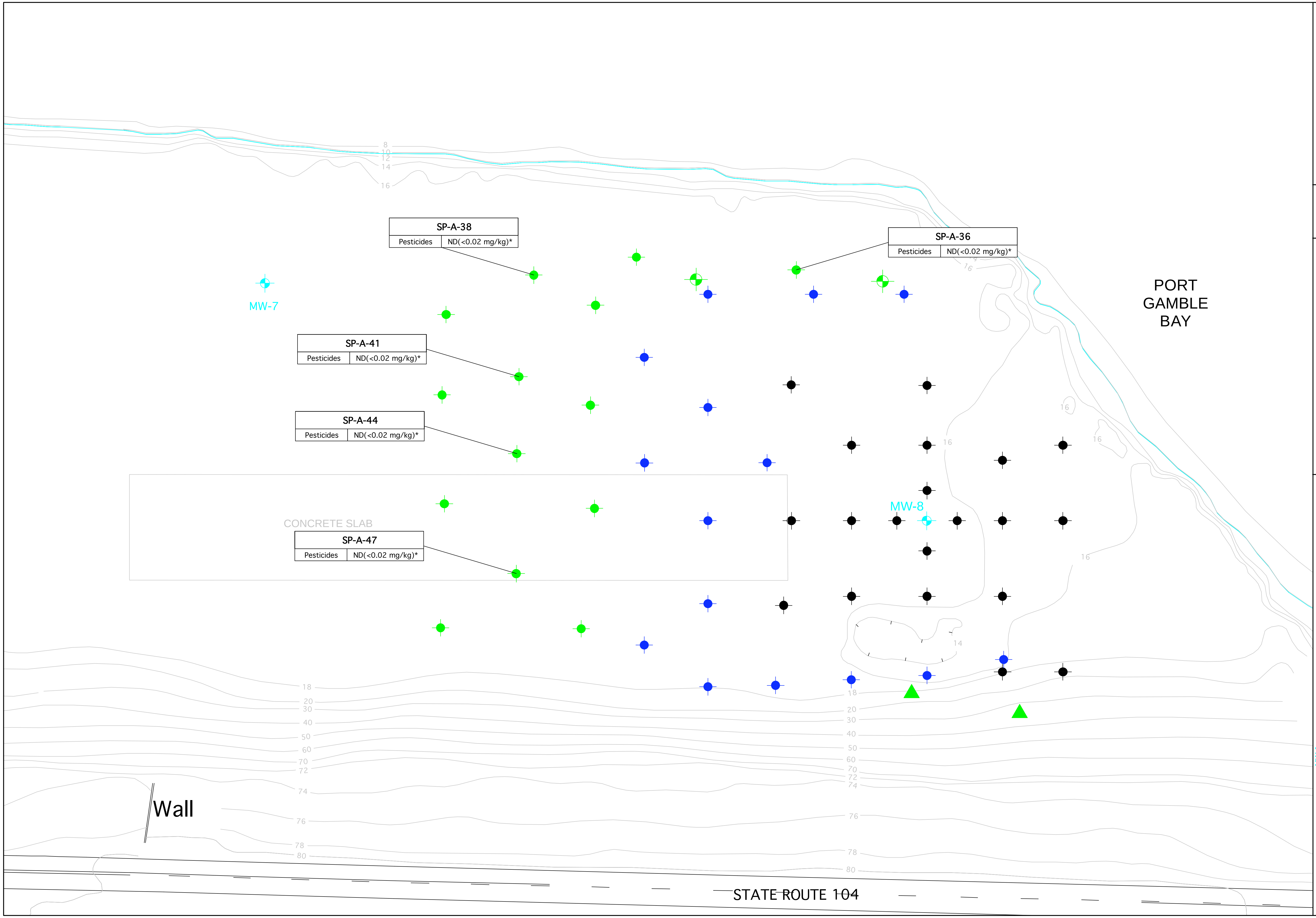
FIGURE 7-3

DIOXIN AND FURAN SAMPLE RESULTS IN pg/g

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	***DRAWN BY***	***REVIEWED BY***	***DATE***
1 of 1	*ARM*	*DCK*	*05/05/09*



KEY:

MW-1	EXISTING MONITORING WELL LOCATION
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2005
●	SOIL/GROUNDWATER SAMPLING LOCATION - 2006
MW-15	MONITORING WELL LOCATION - 2009
SP-A-43	DIRECT-PUSH SAMPLING LOCATION - 2009
SP-A-50 ▲	HAND AUGER SAMPLING LOCATION - 2009
*	CHLORDANE ND AT 0.04 mg/kg, TOXAPHENE ND AT 1.0 mg/kg

0 15 30 60

SCALE: 1" = 60'

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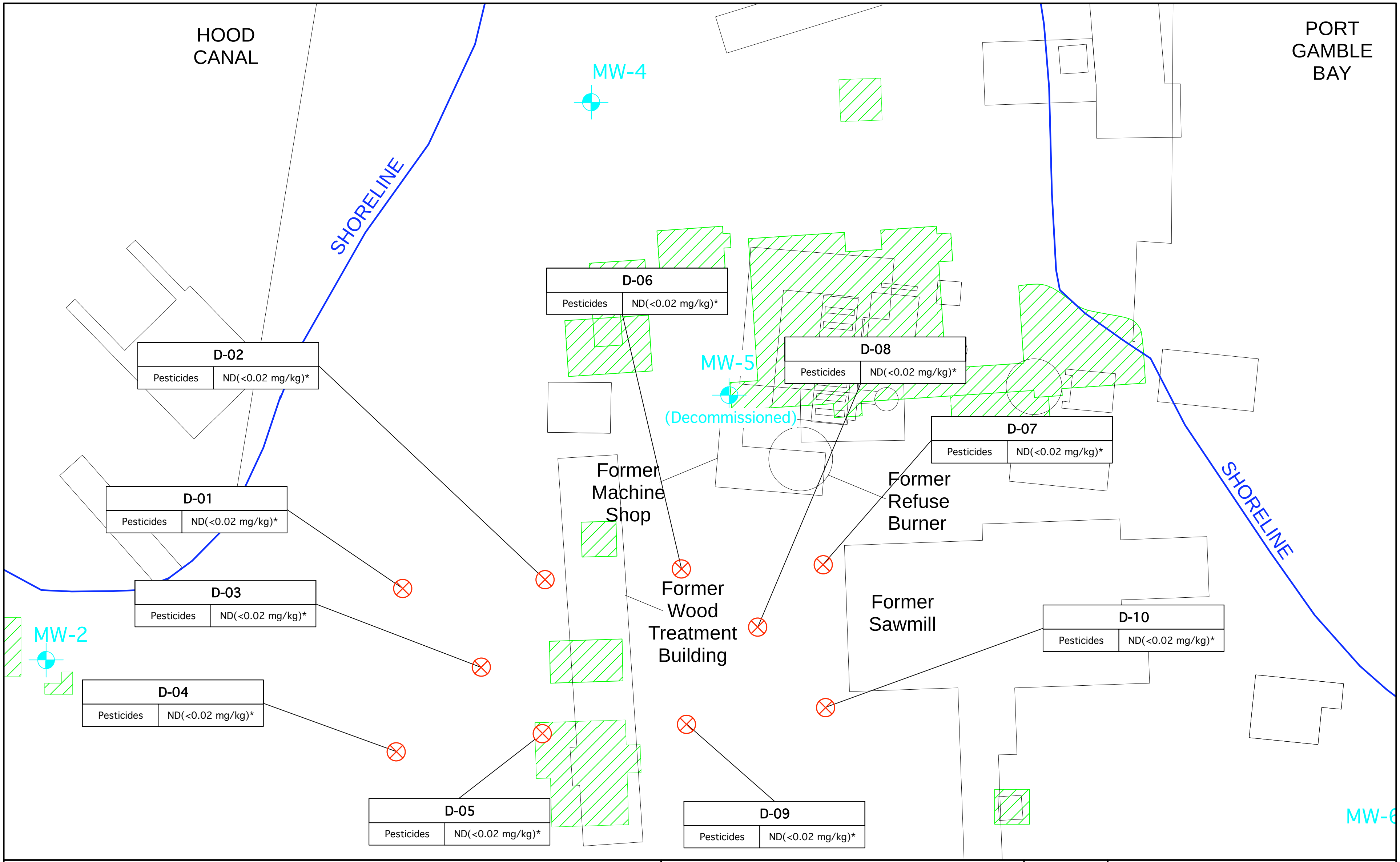
Issaquah, Washington 98027

FIGURE 7-4

SOUTH MILL SITE
PESTICIDE SOIL SAMPLING
LOCATIONS AND RESULTS

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*ARM*	*DCK*	*05/05/09*



KEY:

⊗ SHALLOW SOIL SAMPLE LOCATIONS

LOCATIONS OF FORMER STRUCTURES

▨ REMEDIAL EXCAVATION AREAS

* CHLORDANE ND AT 0.04 mg/kg, TOXAPHENE ND AT 1.0 mg/kg

0 25 50 100

APPROXIMATE SCALE: 1" = 100'

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FIGURE 7-5

NORTH MILL SITE PESTICIDE
SAMPLING LOCATIONS AND RESULTS IN mg/kg

PROJECT	17010.1
PREPARED FOR	POPE RESOURCES
LOCATION	FORMER MILL SITE PORT GAMBLE, WASHINGTON

SHEET	**DRAWN BY**	**REVIEWED BY**	**DATE**
1 of 1	*ARM*	*DCK*	*05/05/09*

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Figure 7-6
Surface Sediment Percent Fines
Former Pope & Talbot Sawmill Site

ANCHOR QEA

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Figure 7-7

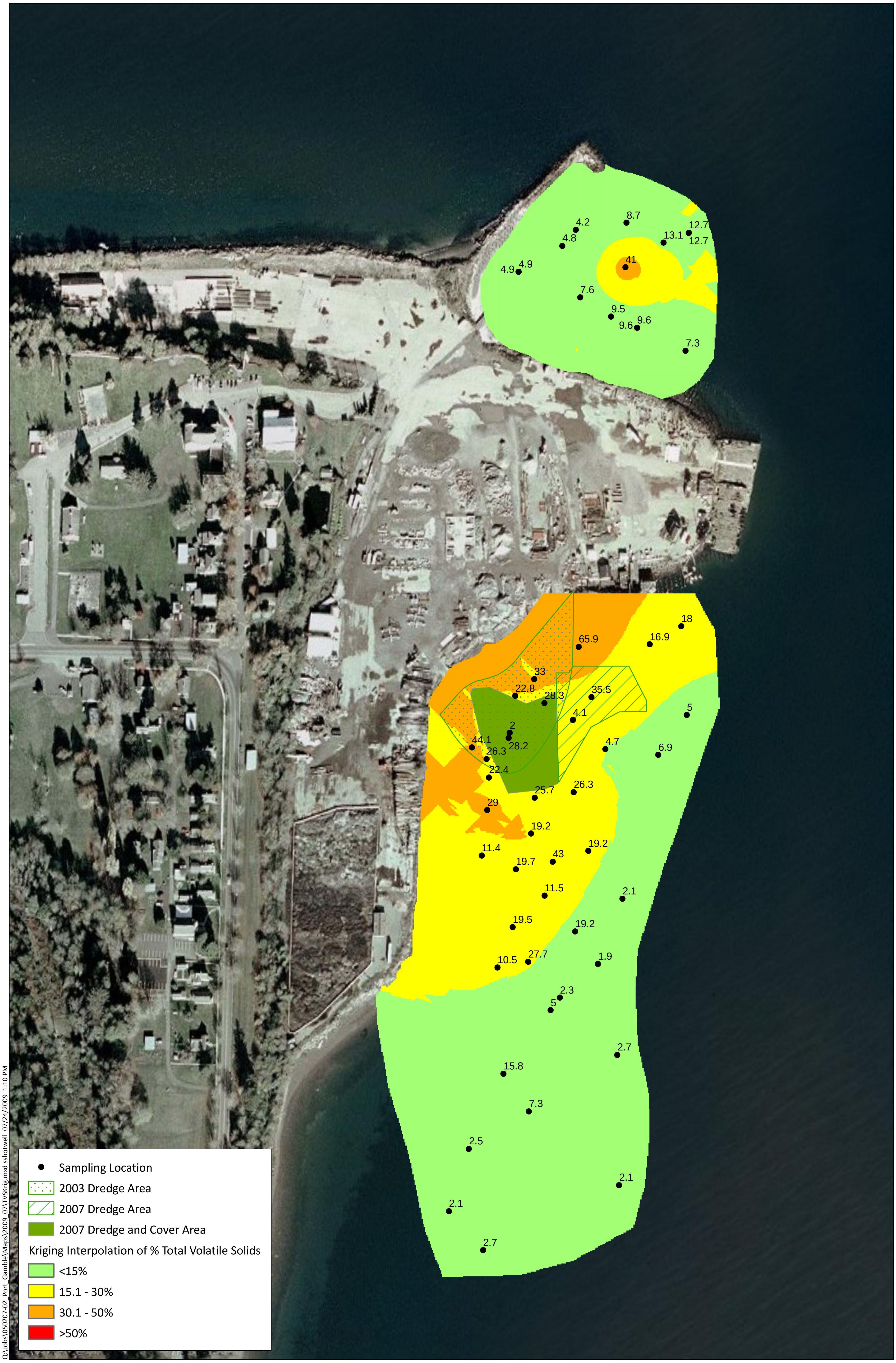
Surface Sediment Woody Debris Percentage

Former Pope & Talbot Sawmill Site

Feet

0 100 200

ANCHOR QEA



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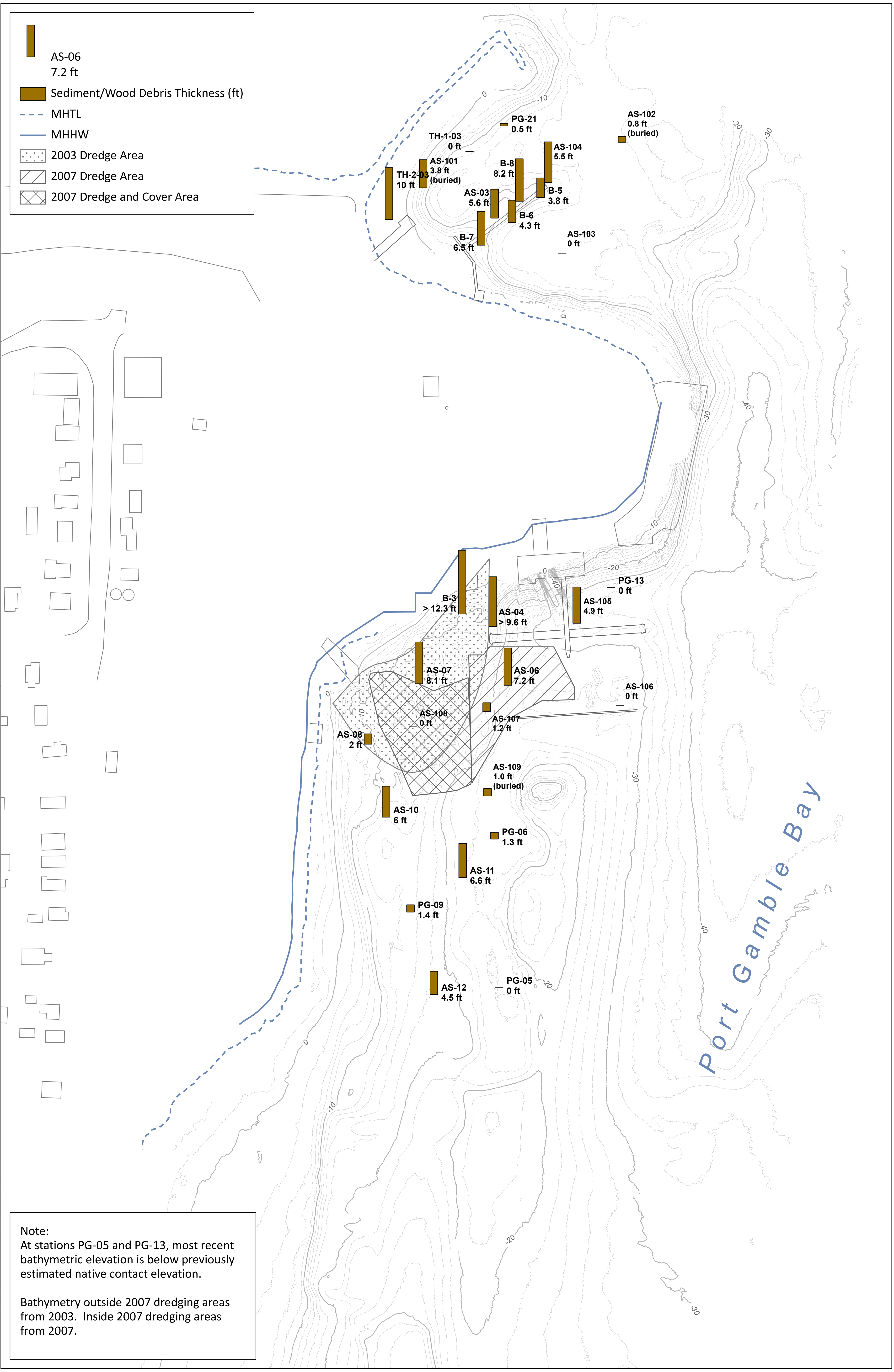
ANCHOR QEA

Figure 7-9
Surface Sediment Total Volatile Solids
Former Pope & Talbot Sawmill Site



Note:
At stations PG-05 and PG-13, most recent bathymetric elevation is below previously estimated native contact elevation.

Bathymetry outside 2007 dredging areas from 2003. Inside 2007 dredging areas from 2007.

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ANCHOR QEA

Figure 7-8
Estimated Wood Waste Thickness
Former Pope & Talbot Sawmill Site

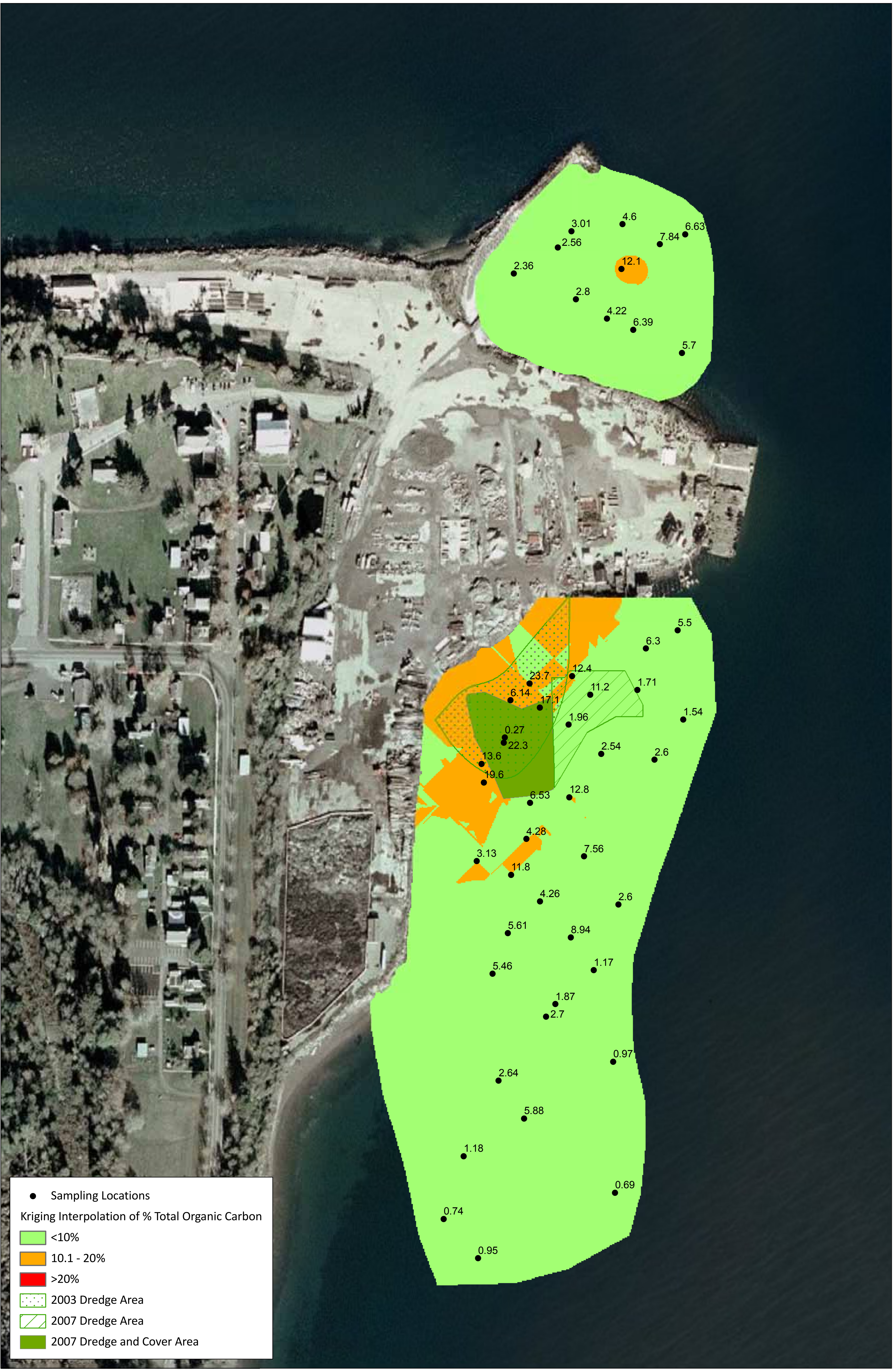

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Figure 7-10

Surface Sediment Total Organic Carbon

Former Pope & Talbot Sawmill Site

ANCHOR QEA

Feet

0 100 200

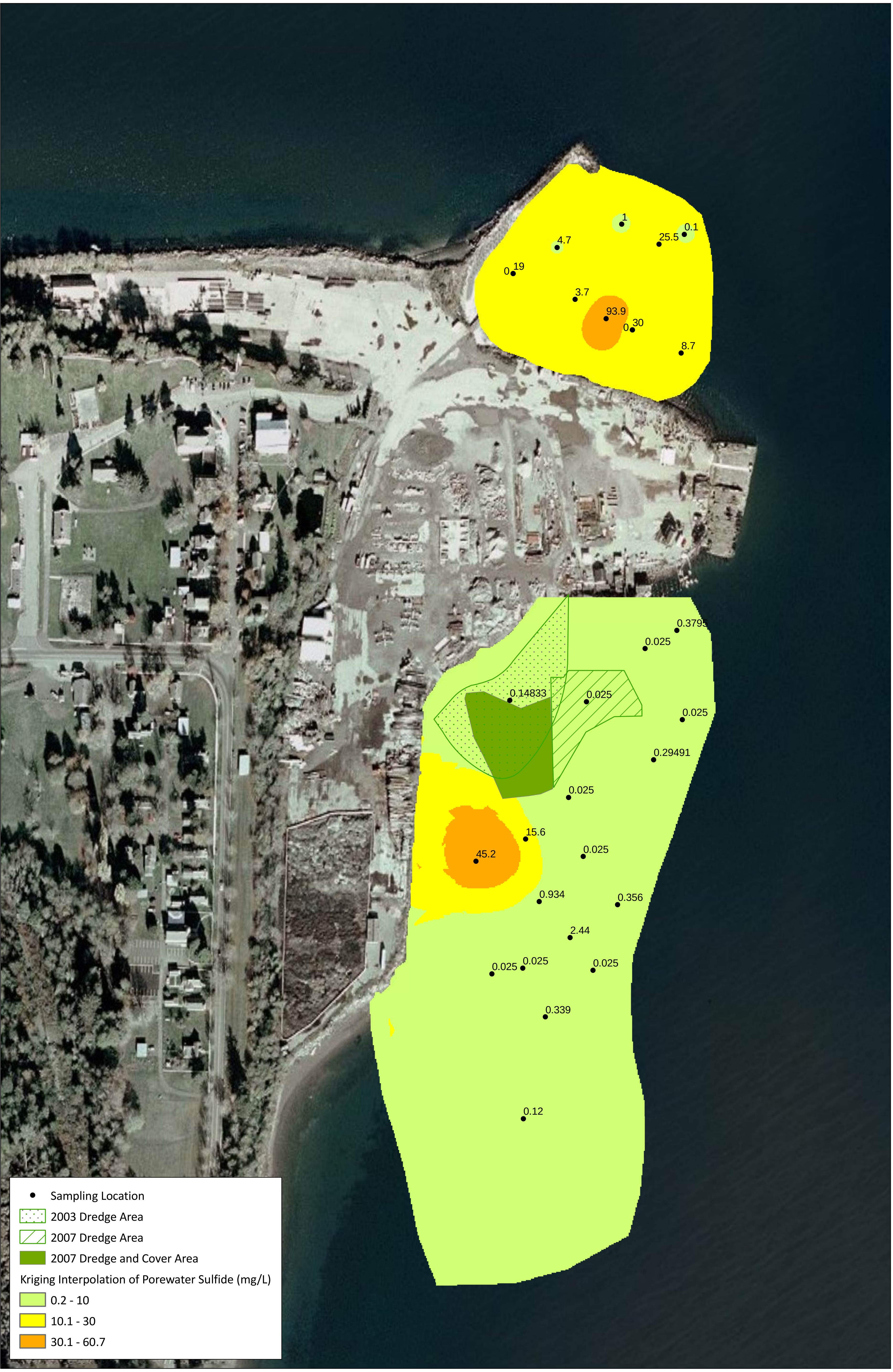

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Figure 7-11
Surface Sediment Porewater Sulfide
Former Pope & Talbot Sawmill Site

*Note: Northern portion of site evaluated
by Inverse Distance Weighted interpolation

Feet
0 100 200

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Figure 7-12
Surface Sediment Amphipod Survival
Former Pope & Talbot Sawmill Site

ANCHOR QEA

*Note: Northern portion of site evaluated by Inverse Distance Weighted interpolation

Feet
0 100 200

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Figure 7-13
Surface Sediment PSEP Larval Survivorship
Former Pope & Talbot Sawmill Site

ANCHOR QEA

*Note: Northern portion of site evaluated by Inverse Distance Weighted interpolation

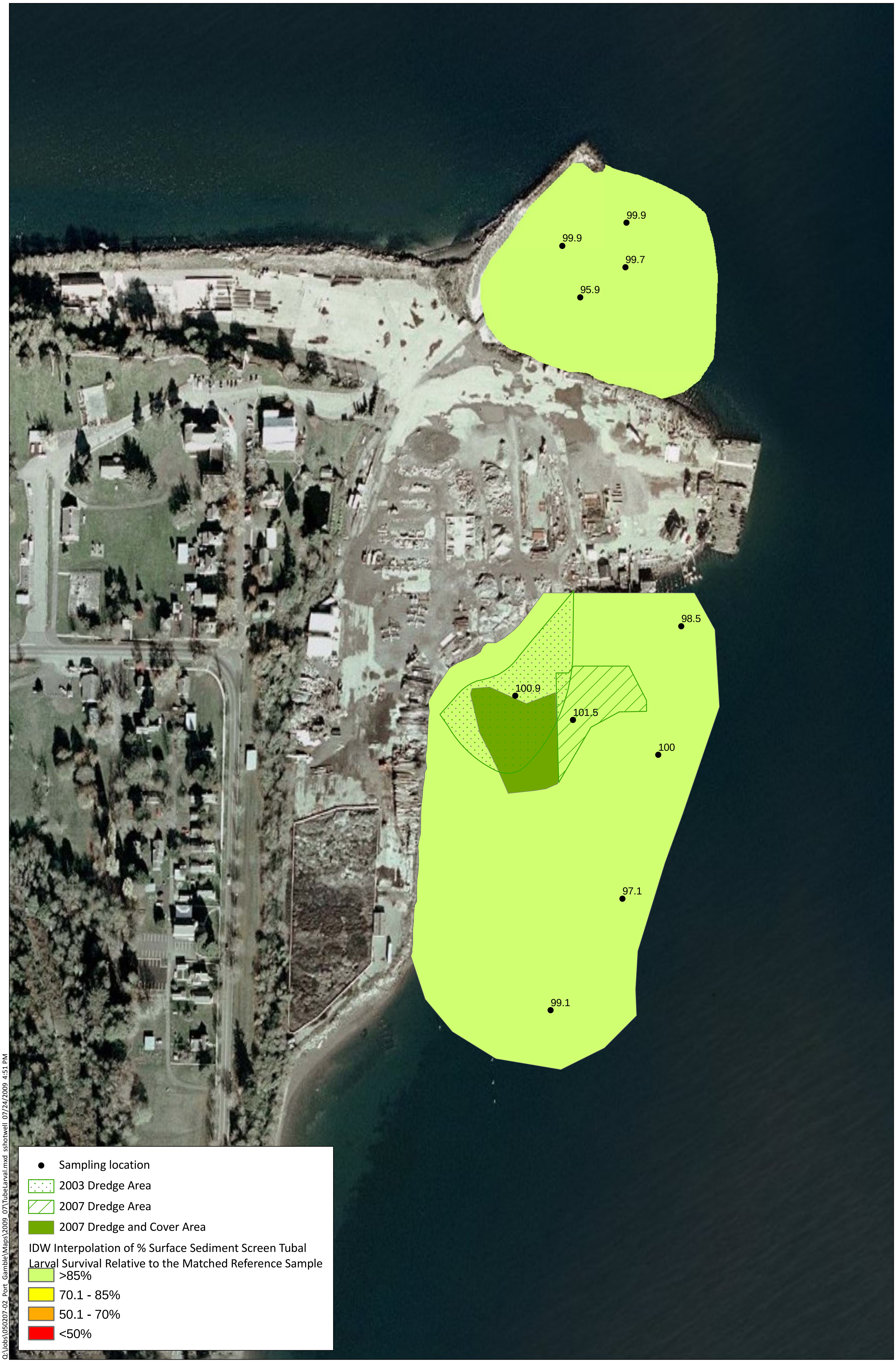

Figure 7-14

Surface Sediment Screen Tube Larval Survivorship
Former Pope & Talbot Sawmill Site

ANCHOR QEA

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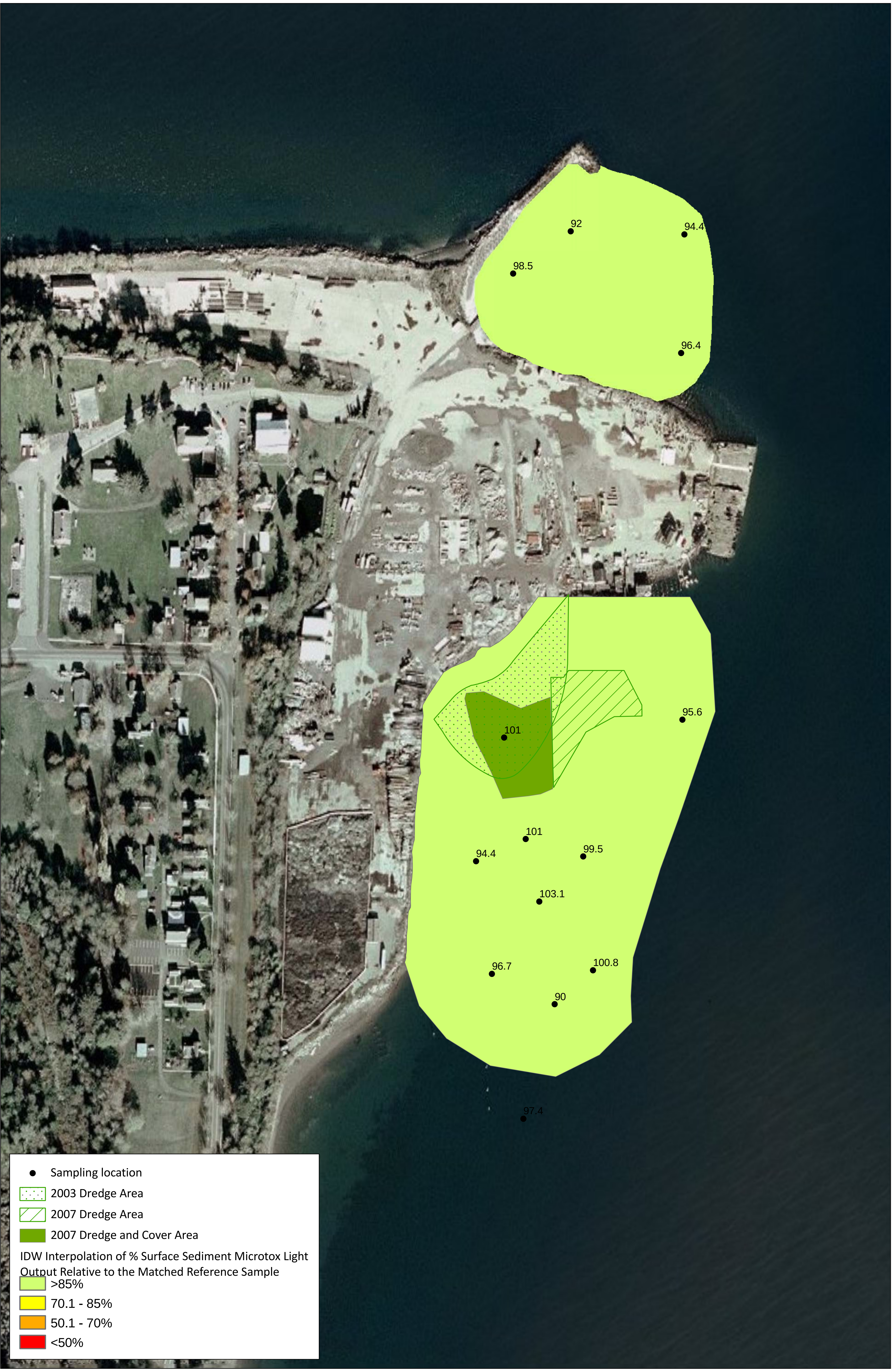
Figure 7-15
Surface Sediment Neanthes Growth
Former Pope & Talbot Sawmill Site



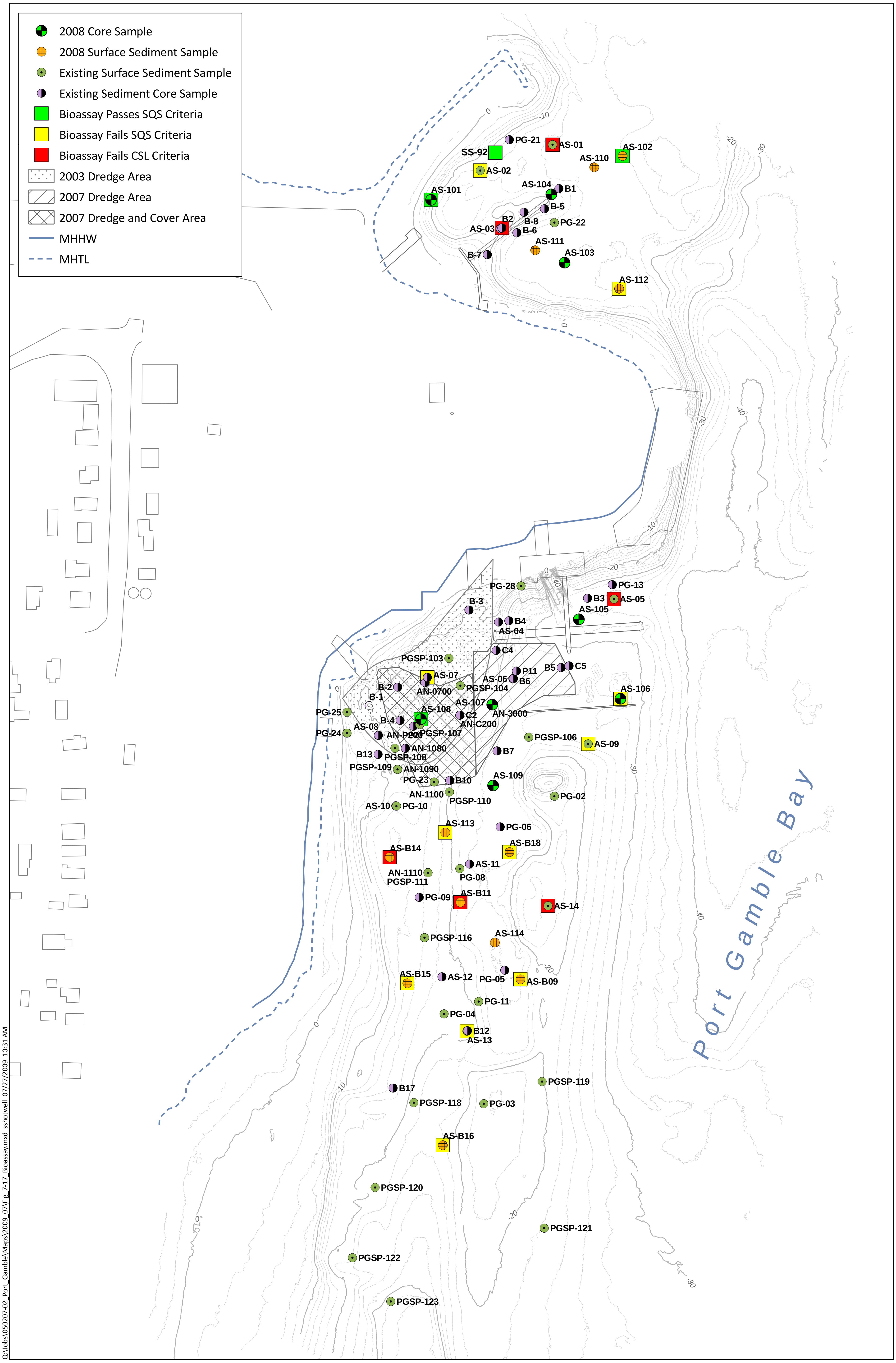
Q:\Jobs\050207-02_Port_Gamble\Maps\2009_07\Microtox.mxd sshotwell 07/24/2009 4:51 PM

Figure 7-16

Surface Sediment Microtox Light Output
Former Pope & Talbot Sawmill Site

ANCHOR QEA

Feet
0 100 200



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ANCHOR QEA

Feet
0 100 200

Figure 7-17
Summary of 2006 to 2008
SMS Bioassay Interpretations
Former Pope & Talbot Sawmill Site

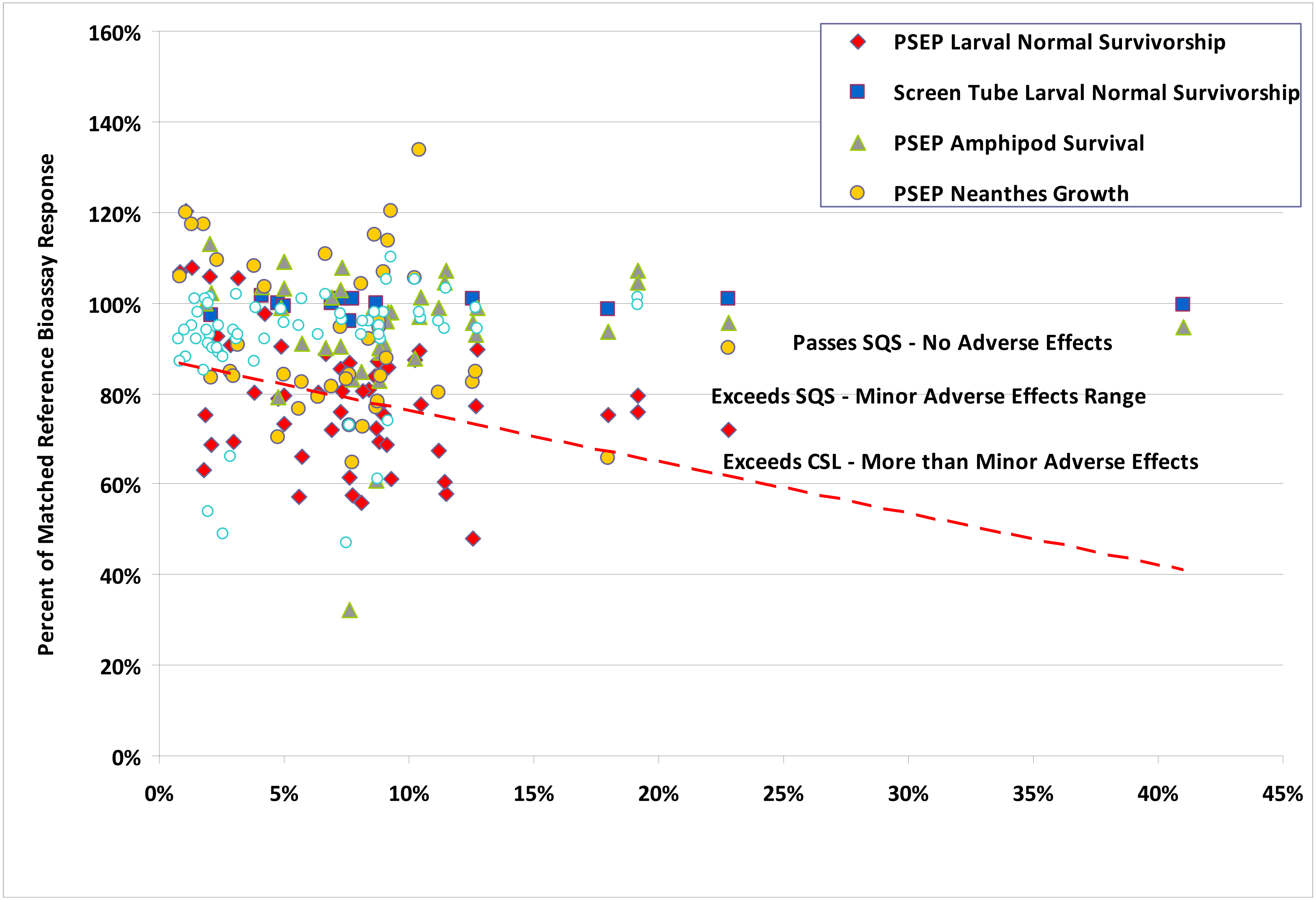


Figure 7-18
Sediment Bioassay Responses versus Total Volatile Solids
Port Gamble, Washington

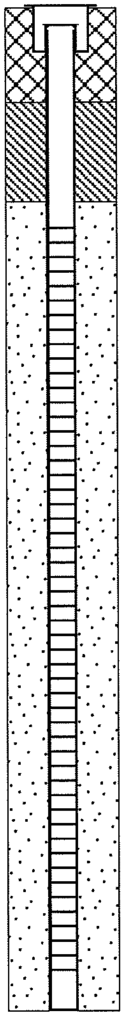
APPENDIX A
SOIL AND SEDIMENT BORING AND PROBE LOGS

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: MW-15

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/21/09
Location: 4770 View Drive
Drilling Contractor: Cascade Drilling, Inc.
Drill Rig:
Method: Hollow Stem Auger
Borehole: 8"

Site Representation:

Depth	SUBSURFACE PROFILE			SAMPLE				PID (ppm)	Well Data	Comments
	Log	USCS Code	Description	Interval	Recovery	Blows per 6"	Sample			
0			Ground Surface							Flush-Mounted Well Monument
0		SP	***Poorly-Graded Sand with Gravel*** Brown; dry; medium dense; coarse sand with gravel							Lockable Water Tight Well Cap
3						2, 5, 7 n=12	MW-15-2-2.5	0.0		Hydrated Bentonite Chip Seal
5										2" PVC Well Casing
6						2, 2, 2 n=4	MW-15-5.5-6	0.6		
8		SW	***Well-Graded Sand*** Dark gray; saturated; loose; fine to coarse sand							
10						1, 2, 2 n=4	MW-15-10-10.5	0.7		2/12 Monterey Sand Filter pack
12		SP	***Poorly-Graded Sand with Gravel*** Brown; saturated; loose; fine to coarse sand with gravel							
15						5, 4, 3 n=7		2.6		15ft - 10-Slot Well Screen
18		ML	***Silt*** Dark gray; stiff; silt with trace clay							
19						6, 6, 4 n=10		2.1		
20			End of Borehole							Sump/Threaded End Cap
21										

Project No. 17010.1

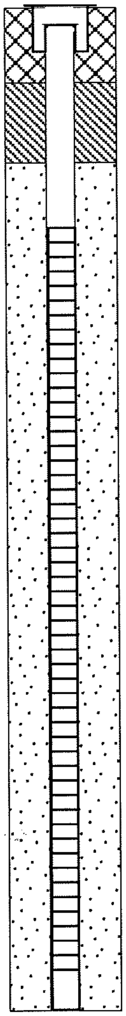
ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: MW-16

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/21/09
Location: 4770 View Drive
Drilling Contractor: Cascade Drilling, Inc.
Drill Rig:
Method: Hollow Stem Auger
Borehole: 8"

Site Representation:

Depth	SUBSURFACE PROFILE			SAMPLE				PID (ppm)	Well Data	Comments
	Log	USCS Code	Description	Interval	Recovery	Blows per 6"	Sample			
0			Ground Surface							Flush-Mounted Well Monument Lockable Water Tight Well Cap
0–8		SP	***Poorly-Graded Sand with Gravel*** Brown; dry; loose; coarse sand with gravel							
2–3.5						2, 2, 2	MW-16-2-2.5	0.6		Hydrated Bentonite Chip Seal
5										2" PVC Well Casing
5.5–7						2, 4, 6	MW-16-5.5-6	0.7		
8–12		SW	***Well-Graded Sand*** Dark gray; saturated; loose; fine to coarse sand							
10–11.5			Wood Debris noted			1, 2, 1	MW-16-10-10.5	1.0		2/12 Monterey Sand Filter pack
12–20		SP	***Poorly-Graded Sand with Gravel*** Brown; saturated; loose fine to coarse sand with gravel							
14–15.5			becomes medium dense			5, 6, 7		0.5		15 ft - 10-Slot Well Screen
19–20.5						7, 8, 7		0.1		Sump/Threaded End Cap
20			End of Borehole							



Project No.

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-36

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0	▩	SP	Poorly-Graded Sand with Gravel Brown; dry; mostly coarse sand with gravel	‖	■				
2						SP-A-36-2-2.5	0.9	no	
3			Shell fragments noted						
4			Silt lense	‖	■				
5.5	░	SW	Well-Graded Sand Brown; moist; fine to coarse sand			SP-A-36-5.5-6	0.5	no	
8				‖	■				
9			Becomes saturated and dark gray with depth						
10						SP-A-36-10-10.5	0.0	no	
12			End of Borehole						
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-37

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Brown; dry; fine to coarse sand						
2						SP-A-37-2-2.5	0.0	no	
6						SP-A-37-5.5-6	0.3	no	
8			Becomes saturated at 8'						
10						SP-A-37-10-10.5	0.0	no	
12			End of Borehole						
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-38

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Dark gray; dry; fine to coarse sand						
1									
2						SP-A-38-2-2.5	0.0	no	
3									
4			Becomes light brown and moist						
5									
6						SP-A-38-5.5-6	0.3	no	
7									
8			Becomes saturated at 8.5'						
9			Becomes dark gray						
10						SP-A-38-10-10.5	0.5	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-39

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Brown; dry; fine to coarse sand						
1									
2						SP-A-39-2-2.5	0.0	no	
3									
4									
5									
6						SP-A-39-5.5-6	0.0	no	
7			Becomes saturated at 7.5'						
8			Becomes dark gray						
9									
10						SP-A-39-10-10.5	0.0	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-40

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Dark gray; dry; fine to coarse sand						
1									
2						SP-A-40-2-2.5	3.4	no	
3									
4									
5									
6			Becomes brown			SP-A-40-5.5-6	2.1	no	
7									
8			Becomes saturated at 8.5'						
9									
10		SP	Poorly-Graded Sand with Gravel Gray; saturated; coarse sand with gravel			SP-A-40-10-10.5	1.6	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-41

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/14/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0	▨	SP	Poorly-Graded Sand with Gravel Light brown; dry; coarse sand with gravel						
1			Becomes gray						
2						SP-A-41-2-2.5	0.0	no	
3	░	SW	Well-Graded Sand Gray; moist; fine to coarse sand						
4									
5			Shell Fragments noted						
6						SP-A-41-5.5-6	0.2	no	
7									
8			Becomes saturated at 8.5'						
9	▨	SP	Poorly-Graded Sand with Gravel Gray; saturated; coarse sand with gravel						
10						SP-A-41-10-10.5	0.1	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-42

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/14/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Brown; dry; fine to coarse sand						
2						SP-A-42-2-2.5	0.0	no	
4			Becomes gray and moist						
6						SP-A-42-5.5-6	0.1	no	
8			Becomes saturated at 8.5'						
10			Wood debris noted			SP-A-42-10-10.5	0.3	no	
12			End of Borehole						
20									

Project No.: 17010.1

epi ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-43

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/14/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Brown; dry; fine to coarse sand						
1									
2						SP-A-43-2-2.5	0.0	no	
3									
4			Shell fragments noted						
5									
6						SP-A-43-5.5-6	0.0	no	
7									
8			Becomes gray and saturated at 8.0'						
9		SP	Poorly-Graded Sand with Gravel Gray; saturated; coarse sand with gravel						
10						SP-A-43-10-10.5	0.0	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-44

Client: Pope Resources ***Logged By:*** Josh Bernthal ***Date of Drilling:*** 1/14/09 ***Site Address:*** 4770 View Drive ***Drilling Contractor:*** Cascade Drilling ***Method:*** Direct Push Technology ***Drill Rig:*** Probe Rig ***Borehole:*** 1-1/4"	***Site Representation:***

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0	░	SW	Well-Graded Sand Light brown; dry; fine to coarse sand						
1	░								
2	░					SP-A-44-2-2.5	0.0	no	
3	░								
4	░		Becomes gray						
5	░								
6	░		Shell fragments noted			SP-A-44-5.5-6	0.0	no	
7	░								
8	░		Becomes saturated at 8.5'						
9	░								
10	░					SP-A-44-10-10.5	0.1	no	
11	░								
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

Boring/Well Designation: SP-A-45

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Brown; dry; fine to coarse sand						
2						SP-A-45-2-2.5	3.1	no	
5			Becomes gray						
6						SP-A-45-5.5-6	2.6	no	
8			Becomes saturated at 8.0'						
10			Wood Debris noted			SP-A-45-10-10.5	0.0	no	
12			End of Borehole						

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-46

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/15/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SW	Well-Graded Sand Brown; dry; fine to coarse sand						
1									
2						SP-A-46-2-2.5	2.3	no	
3									
4			Becomes gray and moist						
5									
6						SP-A-46-5.5-6	5.6	no	
7									
8			Becomes saturated at 8.5'						
9		SP	Poorly-Graded Sand with Gravel Gray; saturated; fine to coarse sand with gravel						
10						SP-A-46-10-10.5	5.7	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

epi ENVIRONMENTAL PARTNERS INC

Boring/Well Design ation: SP-A-47

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/14/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0–4	▨	SP	Poorly-Graded Sand with Gravel Brown; dry; sand with gravel Becomes gray	▮	■	SP-A-47-2-2.5	0.0	no	
4–8	▨			▮	■	SP-A-47-5.5-6	0.6	no	
8–12	▨		Becomes dark gray and saturated at 9.0'	▮	■	SP-A-47-10-10.5	0.8	no	
12–20			End of Borehole						

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-48

Client: Pope Resources	***Site Representation:***
Logged By: Josh Bernthal	
Date of Drilling: 1/14/09	
Site Address: 4770 View Drive	
Drilling Contractor: Cascade Drilling	
Method: Direct Push Technology	
Drill Rig: Probe Rig	
Borehole: 1-1/4"	

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SP	Poorly-Graded Sand with Gravel Brown; dry; fine to coarse sand with gravel						
1		SW	Well-Graded Sand Dark gray; dry; fine to coarse sand						
2						SP-A-48-2-2.5	0.9	no	
3			Shell fragments noted						
4			Becomes moist						
5									
6			Becomes saturated at 6.5'			SP-A-48-5.5-6	2.1	no	
7									
8									
9									
10						SP-A-48-10-10.5	1.4	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-49

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/14/09
Site Address: 4770 View Drive
Drilling Contractor: Cascade Drilling
Method: Direct Push Technology
Drill Rig: Probe Rig
Borehole: 1-1/4"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0		SP	Poorly-Graded Sand with Gravel Brown; dry; sand with gravel						
1									
2			Becomes gray			SP-A-49-2-2.5	0.0	no	
3		SW	Well-Graded Sand Dark gray; moist; fine to coarse sand						
4									
5			Shell fragments noted						
6						SP-A-49-5.5-6	0.0	no	
7									
8									
9		SP	Poorly-Graded Sand with Gravel Dark gray; saturated; coarse sand with gravel						
10						SP-A-49-10-10.5	0.0	no	
11									
12			End of Borehole						
13									
14									
15									
16									
17									
18									
19									
20									

Project No.: 17010.1

ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-50

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/13/09
Site Address: 4770 View Drive
Drilling Contractor: Environmental Partners, Inc.
Method: Hand Auger
Drill Rig: None
Borehole: 6"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0	▒	SP	Poorly-Graded Sand with Gravel Brown; dry; coarse sand with gravel						
1	▒								
2	▒			▥	■	SP-A-50-1.5-2			
3	▒								
4	▒			▥	■	SP-A-50-3.5-4			
5	▒			▥	■	SP-A-50-5.5-6			
6			End of Borehole						
7									
8									
9									
10									

Project No.: 17010.1

epi ENVIRONMENTAL PARTNERS INC

Boring/Well Designation: SP-A-51

Client: Pope Resources
Logged By: Josh Bernthal
Date of Drilling: 1/13/09
Site Address: 4770 View Drive
Drilling Contractor: Environmental Partners, Inc.
Method: Hand Auger
Drill Rig: None
Borehole: 6"

Site Representation:

Depth	SUBSURFACE PROFILE					SAMPLE	PID (ppm)	Sheen	Comments
	Log	USCS Code	Description	Interval	Recovery	Sample			
			Ground Surface						
0	▨	SP	Poorly-Graded Sand with Gravel Brown; dry; coarse sand with gravel						
1	▨								
2	▨			▥	■	SP-A-51-1.5-2			
3	▨								
4	▨			▥	■	SP-A-51-3.5-4			
5	▨								
	▨			▥	■	SP-A-51-5.5-6			
6			End of Borehole						
7									
8									
9									
10									

Project No.: 17010.1

APPENDIX B
GROUNDWATER WELL DEVELOPMENT AND FIELD LOGS

Monitoring Well Development
Field Measurements Record

Job Name/Location: Old Mill Site, Port Gamble, WA
Job Number: 17010.1
Date: 1/27/09
Well #: MW-15
Page Number: 1 of 1

Time	Depth to Water (ft.)	Total Depth of Well (ft.)	Volume Purged (gal.)	pH	Cond.	Turbidity (NTU)	Temp. (oC)	Visual Observations
0730	-	-	5	-	-	-	-	Bail 5 gallons
0740	-	-	-	-	-	-	-	Surge 5 minutes
0745	-	-	10	-	-	-	-	Bail 5 gallons
0755	-	-	-	-	-	-	-	Surge 5 minutes
0800	-	-	20	-	-	-	-	Bail 10 gallons
0815	-	-	-	-	-	-	-	Surge 5 minutes
0820	6.88	-	22	6.63	30.5 mS/cm	292	10.98	Cloudy
0825	-	-	23	6.75	29.8 mS/cm	199	11.03	cloudy
0830	-	-	24	6.78	30.5 mS/cm	98.8	11.07	Cloudy
0835	-	-	25	6.79	28.9 mS/cm	62.3	11.10	Clear
0840	-	-	26	6.81	28.6 mS/cm	21.6	11.05	clear
0845	-	-	27	6.82	28,4 mS/cm	12.19	11.02	Clear
0850	6.88	20.15	28	6.82	28.3 mS/cm	6.85	11.01	clear

Monitoring Well Development
Field Measurements Record

Job Name/Location: Old Mill Site, Port Gamble, WA

Job Number: 17010.1

Date: 1/27/09

Well #: MW-16

Page Number: 1 of 1

Time	Depth to Water (ft.)	Total Depth of Well (ft.)	Volume Purged (gal.)	pH	Cond.	Turbidity (NTU)	Temp. (oC)	Visual Observations
0900	—	—	5	—	—	—	—	Bail 5 gallons
0910	—	—	—	—	—	—	—	Surge 5 minutes
0915	—	—	10	—	—	—	—	Bail 5 gallons
0925	—	—	—	—	—	—	—	Surge 5 minutes
0940	—	—	20	—	—	—	—	Bail 10 gallons
0945	—	—	—	—	—	—	—	Surge 5 minutes
0950	6.96	—	22	6.61 ~~8.41~~ JB	8.41µS/cm	22.2	10.91	Clear
0955	6.96	—	23	6.59 ~~8.42~~ JB	8.42µS/cm	19.09	10.88	Clear
1000	6.96	—	24	6.55 ~~8.19~~ JB	8.19µS/cm	15.06	10.95	clear
1005	6.96	—	25	6.58 ~~8.13~~ JB	8.13µS/cm	11.09	10.91	clear
1010	6.96	—	26	6.58 ~~8.12~~ JB	8.12µS/cm	8.41	10.94	clear
1015	6.96	20.31	27	6.58 ~~8.11~~ JB	8.11µS/cm	6.67	10.97	Clear

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-36

Date: 1/15/09

Sample: ID: SP-A-36-8-12-W

Field Team: (Initials): JB

Field Conditions: Cloudy + cool

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle): Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____________

Start Time: 1225

End Time: 1250

Total Gallons Purged: 1.1 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1232	.5	6.92	3350	µS/cm	38.7	2.30 mg/L	10.51	-120.1	clearing
1235	.7	7.42	3254	µS/cm	25.5	0.66 mg/L	10.99	-131.3	clear
1238	.9	7.62	3249	µS/cm	13.94	0.50 mg/L	11.10	-137.6	clear
1241	1.1	7.80	3254	µS/cm	9.97	0.34 mg/L	11.17	-140.9	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1250	2-500mL Poly	HNO_3 +FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1250

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-37

Sample: ID: SP-A-37-8-12-W

Field Conditions: Cloudy + cool

Date: 1/15/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle) : Submersible pump
Bladder Pump
[✓ Peristaltic Pump]
Other: : ____

Start Time: 1140

End Time: 1205

Total Gallons Purged: 1.2

Time	Gallons	pH	Cond.I Units		NTU	DO	Temp.	ORP	Appearance
1146	.6	7.05	5574	μS/cm	85.5	1.18mg/L	10.61	-91.1	clear
1149	.8	7.63	5608	μS/cm	37.5	0.69mg/L	10.69	-95.7	clear
1152	1.0	7.97	5625	μS/cm	8.30	0.58mg/L	10.72	-98.5	clear
1155	1.2	8.18	5637	μS/cm	5.18	0.50mg/L	10.76	-100.2	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1200	2-500mL Poly	HNO_3 + FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1205

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-38

Date: 11/15/09

Sample: ID: SP-A-38-8-12-W

Field Team: (Initials): JB

Field Conditions: Cloudy + cool

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle) : Submersible pump

Bladder Pump

[✓ Peristaltic Pump]

Other: :

Start Time: 1015

End Time: 1035

Total Gallons Purged: 1.1

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1020	.5	7.41	6250	µS/cm	69.8	1.31 mg/L	10.98	-137.9	clearing
1023	.7	7.78	6299	µS/cm	19.7	0.57 mg/L	11.12	-145.0	clear
1026	.9	8.01	6314	µS/cm	8.47	0.44 mg/L	11.18	-150.1	clear
1029	1.1	8.15	6310	µS/cm	5.18	0.37 mg/L	11.19	-153.9	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1030	2-500mL Poly	HNO$_3$ +FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1035

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-39

Sample: ID: SP-A-39-8-12-W0

Field Conditions: Cloudy + cool

Date: 1/15/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle): Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____________

Start Time: 1055

End Time: 1125

Total Gallons Purged: 1.4

Time	Gallons	pH	Cond.l Units		NTU	DO	Temp.	ORP	Appearance
1103	.6	7.19	7990	μS/cm	151	0.83 mg/L	10.83	-112.3	clearing
1106	.8	7.68	8056	μS/cm	49.3	0.55mg/L	11.12	-119.4	clear
1109	1.0	7.95	8051	μS/cm	21.6	0.35mg/L	11.15	-125.0	clear
1112	1.2	8.13	8088	μS/cm	16.53	0.35 mg/L	11.29	-130.3	clear
1115	1.9	8.22	8085	μS/cm	9.92	0.35 mg/L	11.33	-137.1	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1120	2-500mL Poly	HNO$_3$ +FILTERED	Total (non-filtered) + Dissolved (filtered)

End Time: 1125

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-40

Date: 11/15/09

Sample: ID: SP-A-40-8-12-W

Field Team: (Initials): JB

Field Conditions: Cloudy + cool

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle): Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: :

Start Time: 0930

End Time: 0950

Total Gallons Purged: 1.2

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
0935	.6	8.35	3566	µS/cm	75.9	1.33 mg/L	10.98	-107.8	clear
0938	.8	8.55	3724	µS/cm	35.5	0.68 mg/L	11.11	-114.6	clear
0941	1.0	8.60	3776	µS/cm	10.13	0.55 mg/L	11.13	-118.1	clear
0944	1.2	8.61	3780	µS/cm	5.85	0.46 mg/L	11.12	-121.0	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	0945	2-500mL Poly	HNO_3 +FILTERED	Total (non-filtered) + Dissolved (filtered)

End Time: 0950

Comments / Exceptions:

Presence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-41-~~8-12~~ DP

Sample: ID: SP-A-41-8-12-W

Field Conditions: Cloudy + cool

Date: 1/14/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.): 1"

Well Depth (ft.): 12'

Initial Depth to Water (ft.):

Depth of Water Column:

3 Casing Volumes:

1 Casing Volume:

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : __________

Start Time: 1310

End Time: 1335

Total Gallons Purged: 1.6 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1315	0.6	6.81	8811	µS/cm	28.3	1.19mg/L	11.01	-109.6	Clear
1320	1.0	7.23	8706	µS/cm	41.6	0.60mg/L	10.96	-111.4	clear
1325	1.4	7.31	8666	µS/cm	15.81	0.41mg/L	10.93	-113.6	clear
1328	1.6	7.33	8641	µS/cm	8.78	0.35mg/L	10.90	-115.5	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1330	2-500mL Poly	HNO$_3$ +FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1335

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station	SP-A-42	Date	1/14/09
Sample: ID	SP-A-42-8-12-W	Field Team: (Initials)	JB
Field Conditions	Cloudy + cool		

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____________

Start Time	1220
End Time	1250
Total Gallons Purged	1.3 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1230	0.6	7.63	5463	µS/cm	475	1.92 mg/L	10.81	-119.6	cloudy
1235	0.9	7.81	5431	µS/cm	46.0	0.86 mg/L	10.89	-121.4	clear
1238	1.1	8.01	5429	µS/cm	16.13	0.60 mg/L	10.92	-123.1	clear
1241	1.3	8.04	5429	µS/cm	5.24	0.56 mg/L	10.94	-123.9	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1245	2-500mL Poly	HNO$_3$ +FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time 1250

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-93
Sample: ID: SP-A-93-8-12-W
Field Conditions: Cloudy + cool
Date: 1/14/09
Field Team: (Initials): JB

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____

Start Time: 1350
End Time: 1420
Total Gallons Purged: 1.5 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1355	0.9	7.61	3131	µS/cm	46.4	1.94g/L	11.10	-129.1	Clear
1358	1.1	7.71	3151	µS/cm	28.6	0.60g/L	11.20	-135.4	clear
1401	1.3	7.75	3179	µS/cm	14.18	0.45g/L	11.25	-137.1	clear
1404	1.5	7.77	3200	µS/cm	9.36	0.41g/L	11.29	-137.9	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1415	2-500mL Poly	HNO_3 +FILTERED	Total (non-Filtered) + Dissolved (Filtered)

End Time: 1420

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-44

Sample: ID: SP-A-44-8-12-W

Field Conditions: Cloudy + cool

Date: 11/4/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.): 1"

Well Depth (ft.): 12'

Initial Depth to Water (ft.):

Depth of Water Column:

3 Casing Volumes:

1 Casing Volume:

Purge Method (circle): Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: :

Start Time: 1430

End Time: 1515

Total Gallons Purged: 3.1 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1440	2.3	7.01	5661	µS/cm	149	2.10 mg/L	10.61	-129.6	cloudy
1443	2.5	7.11	5605	µS/cm	43.9	1.10 mg/L	10.65	-168.4	clear
1446	2.7	7.13	5508	µS/cm	19.98	0.59 mg/L	10.68	-164.4	clear
1449	2.9	7.15	5581	µS/cm	15.20	0.45 mg/L	10.71	-162.1	clear
1452	3.1	7.17	5570	µS/cm	9.01	0.47 mg/L	10.74	-160.0	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1510	2-500mL Poly	HNO3 + FILTERED	Total (non-Filtered) + Dissolved (Filtered)

End Time: 1515

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-45
Date: 11/4/09
Sample: ID: SP-A-45-8-12-W
Field Team: (Initials): JB
Field Conditions: Cloudy + cool

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: :

Start Time: 1146
End Time: 1205
Total Gallons Purged: 1.2 gallons

Time	Gallons	pH	Cond.I Units		NTU	DO	Temp.	ORP	Appearance
1145	0.6	7.36	2219	µS/cm	29.4	2.19mg/L	10.18	-136.1	clear
1148	0.8	2.56	2564	µS/cm	12.22	0.71mg/L	10.29	-138.0	clear
1151	1.0	7.58	2579	µS/cm	12.87	0.50mg/L	10.32	-141.0	clear
1154	1.2	7.61	2588	µS/cm	8.81	0.45mg/L	10.34	-143.6	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1200	2-500mL Poly	HNO_3 +FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1205

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-46

Sample: ID: SP-A-46-8-12-W

Field Conditions: Cloudy + cool

Date: 1/15/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.): 1"

Well Depth (ft.): 12'

Initial Depth to Water (ft.):

Depth of Water Column:

3 Casing Volumes:

1 Casing Volume:

Purge Method (circle): Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____________

Start Time: 0830

End Time: 0905

Total Gallons Purged: 1.0

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
0835	.4	7.01	1101	μS/cm	318	4.46 mg/L	11.38	-50.4	cloudy
0838	.6	7.65	1081	μS/cm	47.9	3.01 mg/L	11.34	-79.8	clear
0841	.8	8.24	1665	μS/cm	13.93	1.24 mg/L	11.32	-121.2	clear
0844	1.0	8.69	1056	μS/cm	7.71	0.96 mg/L	11.32	-142.2	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	0900	2-500mL Poly	HNO_3 + FILTERED	Total (non-Filtered) + Dissolved (Filtered)

End Time: 0905

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

e multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-47

Sample: ID: SP-A-47-8-12-W

Field Conditions: Cloudy + cool

Date: 11/14/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____

Start Time: 1000

End Time: 1020

Total Gallons Purged: 1.2 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1005	0.6	7.80	4481	µS/cm	29.06	1.10 mg/L	10.06	-108.7	clear
1008	0.8	7.97	4506	µS/cm	14.78	0.61 mg/L	10.16	-115.1	clear
1011	1.0	8.01	4521	µS/cm	8.06	0.51 mg/L	10.20	-120.6	clear
1014	1.2	8.06	4533	µS/cm	7.61	0.46 mg/L	10.29	-126.1	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1015	2-500mL Poly	HNO$_3$ +FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1020

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-48-
Sample: ID: SP-A-48-8-12
Field Conditions: Cloudy + cool
Date: 1/14/09
Field Team: (Initials): JB

Purge Information

Well Diameter (in.): 1"
Well Depth (ft.): 12'
Initial Depth to Water (ft.):
Depth of Water Column:
3 Casing Volumes:
1 Casing Volume:

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: :

Start Time: 1050
End Time: 1115
Total Gallons Purged: 1.3 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1055	0.6	7.06	4414	mS/cm	65.0	2.16 mg/L	10.71	-86.1	clear
1100	0.9	7.31	5061	µS/cm	20.0	0.60 mg/L	10.79	-97.0	clear
1103	1.1	7.35	5099	µS/cm	14.34	0.48 mg/L	10.80	-101.0	clear
1106	1.3	7.38	5111	µS/cm	9.60	0.40 mg/L	10.82	-107.1	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	1110	2-500mL Poly	HNO3 + FILTERED	Total (non-filtered) + Dissolved (Filtered)

End Time: 1115

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

2-40s Area Data Gap Groundwater Sampling Field Data

Boeing Plant 2, Seattle/Tukwila, Washington

Station: SP-A-49
Sample: ID: SP-A-49-8-12
Field Conditions: Cloudy + cool
Date: 11/4/09
Field Team: (Initials): JB

Purge Information

Well Diameter (in.)	1"
Well Depth (ft.)	12'
Initial Depth to Water (ft.)	
Depth of Water Column	
3 Casing Volumes	
1 Casing Volume	

Purge Method (circle): Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ______

Start Time: 0850
End Time: 0925
Total Gallons Purged: 2 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
0855	0.3	7.61	7689	µS/cm	529	4.60mg/L	10.26	-96.4	Grey/turbid
0900	0.6	7.70	7781	µS/cm	528	2.16mg/L	10.36	-100.1	Grey/turbid
0905	0.9	7.72	7806	µS/cm	259	1.16mg/L	10.41	-102.6	clearing
0910	1.2	7.74	7810	µS/cm	110	0.70mg/L	10.43	-104.4	clearing
0915	1.5	7.74	7811	µS/cm	51.0	0.58mg/L	10.47	-106.1	clear
0920	1.8	7.75	7812	µS/cm	14.78	0.51mg/L	10.49	-108.2	clear
0923	2.0	7.77	7812	µS/cm	9.46	0.45mg/L	10.50	-110.1	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
VOCs				
Dissolved Metals				
Total Metals				
Chromium VI				
Total and WAD CN				
TPH-Dx, TPH-Gx				
SVOCs				
PCBs				
Redox				
Arsenic	0920	2-500mL Poly	HNO_3 +FILTERED	Total (non-Filtered) + Dissolved (Filtered)

End Time: 0925

Comments / Exceptions:

esence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

re multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data

Old Mill Site, Port Gamble, WA

Station: MW-7
Date: 2/9/09
Sample: ID: MW-7-W
Field Team: (Initials): JB
Field Conditions: Cloudy & Cool

Purge Information

Well Diameter (in.): 2"
Well Depth (ft.): 19
Initial Depth to Water (ft.): 7.03
Depth of Water Column: 11.97
3 Casing Volumes: 6.09
1 Casing Volume: 2.03

Purge Method (circle) : Submersible pump / ~~Bladder Pump~~ / [✓ Peristaltic Pump] / Other: : ____

Start Time: 1150
End Time: 1235
Total Gallons Purged: 2.5 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1209	1.5	6.97	2265	mS/cm	14.78	0.51 mg/L	11.55	-113.0	clear
1212	1.7	7.12	2.257	mS/cm	9.67	0.50 mg/L	11.51	-124.7	clear
1215	1.9	7.23	2.265	mS/cm	8.30	0.43 mg/L	11.45	-131.9	clear
1218	2.1	7.31	2.270	mS/cm	7.06	0.46 mg	11.42	-136.7	clear
1221	2.3	7.33	2.286	mS/cm	6.96	0.43 mg/L	11.42	-142.6	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
~~Arsenic~~ 23 Mercury	1230	2-500ml Poly	HNO3	1 Filtered and 1 NOT Filtered

End Time: 1235

Comments / Exceptions:

Presence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data

Old Mill Site, Port Gamble, WA

Station	MW-8	Date	2/4/09
Sample: ID	MW-8-W	Field Team: (Initials)	JB
Field Conditions	Cloudy + cool		

Purge Information

Well Diameter (in.)	2"
Well Depth (ft.)	19
Initial Depth to Water (ft.)	5.89
Depth of Water Column	13.11
3 Casing Volumes	6.69
1 Casing Volume	2.23

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____________

Start Time	1030
End Time	1105
Total Gallons Purged	2.2 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
1043	1.0	7.13	2.375	mS/cm	13.49	0.54 mg/L	9.15	-167.9	clear
1046	1.2	7.22	2.369	mS/cm	7.67	0.41 mg/L	9.14	-168.7	clear
1049	1.4	7.46	2.367	mS/cm	6.63	0.42 mg/L	9.18	-167.1	clear
1052	1.6	7.55	2.367	mS/cm	5.01	0.39 mg/L	9.22	-165.5	clear
1055	1.8	7.64	2.367	mS/cm	4.96	0.40 mg/L	9.24	-165.0	clear
1058	2.0	7.66	2.365	mS/cm	4.93	0.39 mg/L	9.26	-164.3	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Arsenic	1100	2-500ml Poly	HNO3	1 Filtered and 1 NOT Filtered

End Time 1105

Comments / Exceptions:

Presence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data

Old Mill Site, Port Gamble, WA

Station: MW-15

Sample: ID: MW-15-U

Field Conditions: Cloudy + cool

Date: 2/4/09

Field Team: (Initials): JB

Purge Information

Well Diameter (in.): 2"

Well Depth (ft.): 20.15

Initial Depth to Water (ft.): 7.17

Depth of Water Column: 12.98

3 Casing Volumes: 6.60

1 Casing Volume: 2.20

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____

Start Time: 0800

End Time: 0842

Total Gallons Purged: 2.0 gallon

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
0815	1	7.65	33.62	mS/cm	12.88	0.82mg/L	10.85	-77.3	clear
0818	1.2	7.68	32.22	mS/cm	6.51	1.05mg/L	10.89	-73.9	clear
0821	1.4	7.69	31.74	mS/cm	4.82	1.14mg/L	10.81	-71.3	clear
0824	1.6	7.65	31.59	mS/cm	4.09	1.19mg/L	10.76	-68.8	clear
0827	1.8	7.63	31.51	mS/cm	3.79	1.22mg/L	10.72	-65.9	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Arsenic	0840	2-500ml Poly	HNO3	1 Filtered and 1 NOT Filtered

End Time: 0842

Comments / Exceptions:

Presence of floating product? YES [✓ NO] Presence of sinking product? YES / [✓ NO]

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

Groundwater Sampling Field Data

Old Mill Site, Port Gamble, WA

Station: MW-16
Sample: ID: MW-16-W
Field Conditions: Cloudy & Cool
Date: 2/4/09
Field Team: (Initials) JB

Purge Information

Well Diameter (in.): 2"
Well Depth (ft.): 20.31
Initial Depth to Water (ft.): 7.16
Depth of Water Column: 13.15
3 Casing Volumes: 6.69
1 Casing Volume: 2.23

Purge Method (circle) : Submersible pump / Bladder Pump / [✓ Peristaltic Pump] / Other: : ____

Start Time: 0906
End Time: 0950
Total Gallons Purged: 2.0 gallons

Time	Gallons	pH	Cond.	Units	NTU	DO	Temp.	ORP	Appearance
0915	1.0	7.31	8.463	mS/cm	8.79	.041mg/L	11.46	-161.6	clear
0918	1.2	7.32	8.479	mS/cm	7.76	.044mg/L	11.51	-165.0	clear
0921	1.4	7.34	8.461	mS/cm	6.51	.049mg/L	11.54	-168.0	clear
0924	1.6	7.38	8.459	mS/cm	6.76	.054mg/L	11.52	-170.1	clear
0927	1.8	7.39	8.466	mS/cm	5.09	0.057mg/L	11.51	-171.0	clear

Sample Information

Sample Method(s) (circle): [✓ Peristaltic pump] / Submersible pump / Bladder Pump / Other

Analysis	Time	Bottle Type	Preservative/Filtration	Comments
Arsenic	0945	2-500ml Poly	HNO3	1 Filtered and 1 NOT Filtered

End Time: 0950

Comments / Exceptions:

Presence of floating product? YES / [✓ NO] Presence of sinking product? YES / [✓ NO]

Notes: Where multiple visits are required to complete sampling, parameters are to be checked prior to sampling for each visit. Enter data under field comments.

APPENDIX C
SIMPLIFIED TERRESTRIAL ECOLOGICAL EVALUATION EXPOSURE ANALYSIS

APPENDIX C
PORT GAMBLE RI/FS
TERRESTRIAL ECOLOGICAL EVALUATION NOTES

Soil concentrations considered protective of terrestrial ecological receptors (plants and animals) were developed using a simplified TEE (WAC 173-340-7492). Site-specific terrestrial ecological evaluation is not required for the Site because it does not meet any of the criteria in WAC 173-340-7491(2). Consistent with WAC 173-340-7492(1)(d), chemical concentrations listed in Table 749-2 of WAC 173-340-900, which are based on protection of terrestrial ecological receptors, were used in developing preliminary cleanup levels for constituents detected in soil, obtained from Table 749-2 of WAC 173-340-900. The existing and planned future uses of the Site are industrial and commercial; therefore, the simplified TEE industrial/commercial site cleanup levels are appropriate and are included in Table 6-1.

Two of the final excavation sidewall performance samples collected during the 2002 IRM in Area 2 were slightly greater than the simplified TEE cleanup level for lead of 220 mg/kg (270 mg/kg in sample PS-72B, and 230 mg/kg in sample PS-122S). However, the detected lead concentrations were within the requirements for statistical compliance as allowed by Section 173-340-740(7) of the MTCA regulation. The dataset of the performance sampling results was analyzed using MTCAStat to determine compliance parameters based on the distribution of the data. The calculated true mean of the data is 78 mg/kg. Because the data were neither normally nor lognormally distributed, the Z-statistic was used to calculate the 95 percent upper confidence level (UCL 95). Using this method, the UCL 95 around the true mean is 98 mg/kg. This results in a UCL 95 that is less than the 220 mg/kg TEE cleanup level for lead in soil. The MTCAStat report is presented as Appendix D.

The performance sampling data set for the limits of the remedial excavation therefore comply with the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses since:

1. No more than 10 percent of sample results exceed the 220 mg/kg cleanup level for lead (i.e., two of 31 final performance samples from the Area 2 excavation, or 6.5 percent)
2. No single sample is more than twice the cleanup level (i.e., maximum concentration is 270 mg/kg)

3. The UCL 95 around the true mean is less than the cleanup level (i.e., the UCL 95 is 98 mg/kg).

Based upon this analysis of the performance sampling dataset, the remaining in-place soil at the 2002 IRM excavation in Area 2 is currently in compliance with the TEE soil standard. Therefore, no further remedial action is required or necessary at this location.

Determine if Site Qualifies for Exclusion. This step of the TEE is conducted to determine if there is a potential for concentrations of chemicals in Site soils to pose a risk to soil biota, plants, or wildlife. The Site may be excluded from the TEE process if there is an incomplete exposure pathway from contaminants in soil to terrestrial ecological receptors (based on current or future Site use); or if there is no habitat for terrestrial ecological receptors in the area(s) of the Site where contaminants are located; or, if concentrations of Site contaminants are at or lower than natural background levels. If Site conditions meet any one of the Primary Exclusions, the TEE process is complete. If Site conditions do not meet any of the four exclusions (as in the case for this Site), the TEE process continues to determine whether a Simplified or Site-specific TEE assessment is warranted.

Determine if a Simplified TEE can be Performed. The type of TEE required is dependant upon four Site-specific conditions. If none of the four conditions exist at the site being evaluated, then a Simplified TEE can be performed; otherwise, a Site-specific TEE is required. The Site qualifies for a Simplified TEE based on the following (as described in Form C2):

1. The Site is not located on or directly adjacent to an area where management or land use plans will maintain or restore native or semi-native vegetation.
2. The Site is not used by either a) threatened or endangered species; b) wildlife species classified by Ecology as “priority species” or “species of concern” under Title 77 Revised Code of Washington (RCW); or c) plant species classified by Washington State Department of Natural Resources Natural Heritage Program as “endangered,” “threatened,” or “sensitive.”

3. The Site is not located on an area of land containing at least 10 acres of native vegetation within 500 feet of the area of contamination.
4. Ecology has not determined that the Site may present a risk to significant wildlife populations.

Though there are small pockets of undeveloped land within a 500-foot offset from Site boundaries, they do not represent a significant amount of habitat and are not related to the Site by historical operations.

Determine if Simplified TEE can be Ended - Exposure Analysis

The following exposure analysis is based on the following questions and scoring results (Form C3):

1. Based on the lack of significant native vegetation or suitable wildlife habitat, a simplified TEE is appropriate (Form C2-terrestrial concern). The total area of soil contamination at the Site is not less than or equal to 350 square feet. The Site is approximate 25 acres.
2. Land use at the Site and surrounding area does not make substantial wildlife use unlikely based on Ecology Table 749-1 (Figure 5). The scoring from Ecology Table 749-1 is presented below:
    a. The area of the Site is estimated to be approximately 25 acres (12 points).
    b. The Site is and will be an industrial or commercial property (3 points).
    c. The habitat quality of the Site is rated as Low (3 points).
    d. The undeveloped land is unlikely attract wildlife (21 points).
    e. There are none of the indicated chemicals present at concentrations above screening levels (4 points).
    f. The sum of the points from “b” through “e” is 12, which is equal to the score of “a” resulting in continuation of the Simplified TEE. If the sum of “b” through “e” is greater than “a,” the TEE process could end.

Pathway and Contaminant Evaluation Given that the Simplified TEE process could not be ended based on the Exposure Analysis, a pathway and contaminant evaluation was performed. For a commercial or industrial site, on the wildlife pathway needs to be considered and only exposure pathways for priority chemicals of ecological concern listed in Table 749-2 (http://www.ecy.wa.gov/programs/tcp/policies/terrestrial/table_749-2.htm) at or above the concentrations provided must be considered. While there is a small chance of exposure, it is unlikely that a contaminant pathway for wildlife would be complete due to the lack of suitable habitat. Further, the detected Site concentrations of are all below those listed for commercial/industrial sites in Ecology's Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation (Table 749-2).

Based on the Simplified TEE, soils at the Site are unlikely to pose a substantial threat of significant adverse effects to terrestrial ecological receptors and no further terrestrial ecological evaluation is required.

Attachments

Figure 1. Flow Diagram of the Terrestrial Ecological Evaluation Process

Figure 2. Approximate Upland Habitat Area

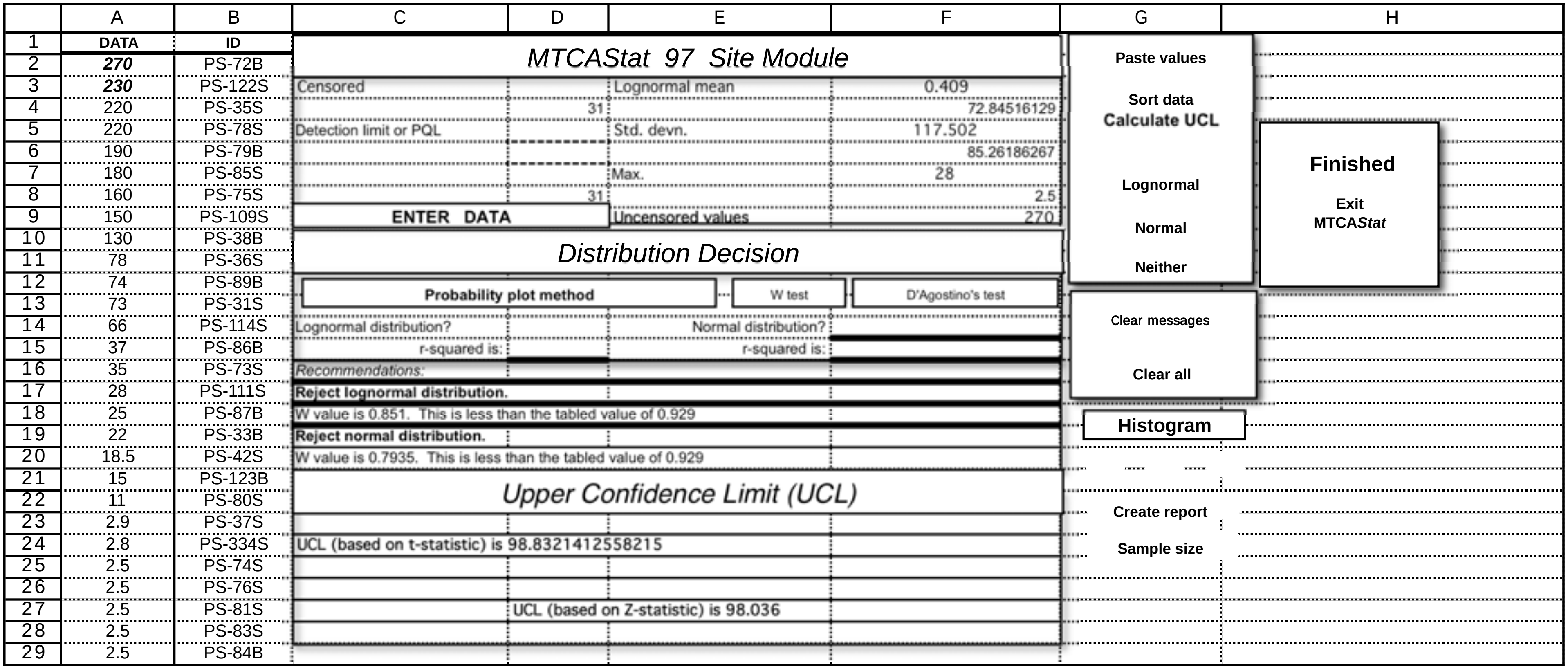
Form C1 – Primary Exclusions Documentation Form

Form C2 – Simplified or Site-Specific Evaluation Documentation Form

Form C3 – Exposure Analysis Procedure Documentation Form (Table 749-1)

APPENDIX D
MTCASTAT REPORT

Background data analysis



	A	B
1	DATA	ID
2	***270***	PS-72B
3	***230***	PS-122S
4	220	PS-35S
5	220	PS-78S
6	190	PS-79B
7	180	PS-85S
8	160	PS-75S
9	150	PS-109S
10	130	PS-38B
11	78	PS-36S
12	74	PS-89B
13	73	PS-31S
14	66	PS-114S
15	37	PS-86B
16	35	PS-73S
17	28	PS-111S
18	25	PS-87B
19	22	PS-33B
20	18.5	PS-42S
21	15	PS-123B
22	11	PS-80S
23	2.9	PS-37S
24	2.8	PS-334S
25	2.5	PS-74S
26	2.5	PS-76S
27	2.5	PS-81S
28	2.5	PS-83S
29	2.5	PS-84B

MTCAStat 97 Site Module

C	D	E	F
Censored		Lognormal mean	0.409
	31		72.84516129
Detection limit or PQL		Std. devn.	117.502
			85.26186267
		Max.	28
	31		2.5
ENTER DATA		Uncensored values	270

Distribution Decision

Lognormal distribution?

r-squared is:

Normal distribution?

r-squared is:

Recommendations:

Reject lognormal distribution.

W value is 0.851. This is less than the tabled value of 0.929

Reject normal distribution.

W value is 0.7935. This is less than the tabled value of 0.929

Upper Confidence Limit (UCL)

UCL (based on t-statistic) is 98.8321412558215

UCL (based on Z-statistic) is 98.036

Version 1.0

APPENDIX F
CHEMISTRY DATA VALIDATION REPORTS

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Data Validation Review Report- EPA Level 2

Project: Port Gamble

Project Number: 080388-01

Date: November 4, 2008

This report summarizes the review of analytical results for four sediment samples collected on September 12, 2008. Samples were collected by Anchor Environmental and submitted to Columbia Analytical Services, Inc. (CAS), in Kelso, Washington. Samples were analyzed for the following:

- Total organic carbon (TOC) by Puget Sound Estuary Program (PSEP)
- Total solids (TS) by United States Environmental Protection Agency (USEPA) method 160.3 modified
- Total volatile solids (TVS) by USEPA method 160.4 modified
- Grainsize by ASTM D422 modified
- Porewater ammonia (NH3) by USEPA method 350.1
- Porewater nitrate and nitrite (NO3 + NO2) by USEPA method 353.2
- Porewater sulfides by Standard Methods (SM) 4500-S2-D
- Porewater sulfate (SO4) by USEPA method 300.0
- Porewater salinity by SM 2520B

CAS sample data group (SDG) numbers K0808879 and K0808881 were reviewed in this report. The samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Lab ID	Matrix	Analysis Requested
AS-SEDG-101-080912	K0808879-001	Sediment	TOC, TS, TVS, grainsize
AS-SEDG-102-080912	K0808879-002	Sediment	TOC, TS, TVS, grainsize
AS-SEDG-106-080912	K0808879-003	Sediment	TOC, TS, TVS, grainsize
AS-SEDG-B15-080912	K0808879-004	Sediment	TOC, TS, TVS, grainsize
AS-PW-101-080912	K0808881-001	Porewater	NH3, NO3+NO2, sulfides, SO4, salinity
AS-PW-102-080912	K0808881-002	Porewater	NH3, NO3+NO2, sulfides, SO4, salinity

Sample ID	Lab ID	Matrix	Analysis Requested
AS-PW-106-080912	K0808881-003	Porewater	NH3, NO3+NO2, sulfides, SO4, salinity
AS-PW-B15-080912	K0808881-004	Porewater	NH3, NO3+NO2, sulfides, SO4, salinity

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective section of the Sampling and Analysis Plan (SAP). Laboratory results were reviewed following USEPA guidelines using *USEPA Contract Laboratory Program National Functional Guidelines for Inorganics Data Review (USEPA, 2004)* and *USEPA Contract Laboratory National Functional Guidelines for Organics Data Review* (*USEPA, 1999*) as guidelines, and applying laboratory and method QC criteria as stated in SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody was signed by CAS at the time of sample receipt; the samples were received cold and in good condition.

Holding Times and Sample Preservation

Samples were appropriately preserved and analyzed within holding times.

Analytical Methods

The laboratory followed the recommended analytical methods specified in the QAPP with the following exceptions:

- TVS: Lab used 160.4 instead of ASTM-D2974
- TOC: Lab used PSEP instead of 9060
- Porewater sulfides: Lab used SM 4500-S2-D instead of 376.2
- Grainsize: Lab used ASTM D422M instead of PSEP

The difference between the recommended methods and the actual methods for TVS and TOC is sample aliquot size used for analyses. Both PSEP and ASTM-D2974 use larger volumes than the 160 methods. For TOC the PSEP method uses a larger sample size than the 9060 method. The method listed in the SAP for sulfides analysis has been eliminated from the EPA federal registry.

The difference in the grainsize methods is how the fines are determined and defined. PSEP determines fines by pipette method, ASTM D422 uses hydrometer. PSEP defines fines as less than 63µm (sieve No. 230 in size, ASTM D422 defines fines as less than 75 µm (sieve No. 200) in size. The laboratory used a modified ASTM D422 method that included the addition of sieve No. 230, therefore fines were categorized the same as they would be if the PSEP method had been used.

Because data quality is not significantly affected by these discrepancies, no data were qualified.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes with the exception of ammonia which was detected at a level between the method detection limit (MDL) and the method reporting limit (MRL). All sample results were significantly greater (>5x) than the levels found in the blank so no data were qualified.

Field Quality Control

Field Blanks

No field blanks were collected in association with this data package.

Field Duplicates

No field duplicates were collected in association with this data package.

Matrix Spike (MS)

MS samples were analyzed at the required frequencies for all analyses. All MS analyses yielded percent recoveries (%R)s and/or relative percent difference (RPD) values within the project data quality objectives.

Laboratory Control Sample (LCS)

An LCS was analyzed at the required frequencies and resulted in recoveries within project required control limits.

Laboratory Duplicates

Laboratory duplicates were analyzed at the required frequencies. All RPD values were within the project required control limits.

Method Reporting Limits

Reporting limits were deemed acceptable as reported. All values were reported using the laboratory's reporting limits. Values were reported as undiluted, or when diluted, the reporting limit accurately reflects the dilution factor. All porewater sample aliquots for nitrate/nitrite were diluted due to matrix interference and one sample aliquot for sulfides was analyzed at a dilution due to insufficient sample volume extracted from the sediment. All of these results were below the elevated detection limits.

Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable, as demonstrated by the LCS and MS %R values. Precision was also acceptable as demonstrated by the laboratory duplicates RPD values, with the exceptions noted above. All data were deemed acceptable as reported.

REFERENCES

USEPA. 1983. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA-600/4-79-020.

USEPA. 1986. Test methods for Evaluating Solid Waste: Physical/Chemical Methods. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA-530/SW-846.

USEPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Office of Emergency Response. EPA 540/R-99/008. October.

USEPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

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Data Validation Review Report- EPA Level 2

Project: Port Gamble RI/FS

Project Number: 080388-01

Date: November 14, 2008

This report summarizes the review of analytical results 34 sediment samples collected on September 10 and 11, 2008. Porewater extraction and analysis at the lab was requested on 31 of these samples. Samples were collected by Anchor Environmental and submitted to Columbia Analytical Services, Inc. (CAS), in Kelso, Washington. Samples were analyzed for the following:

- Semivolatile Organic Compounds (SVOCs) by United States Environmental Protection Agency (USEPA) method 8270C
- Volatile organic compounds (VOCs) by USEPA method 8260B
- Organochlorine pesticides by USEPA method 8081A
- Aroclor polychlorinated biphenyls (PCBs) by USEPA method 8082
- Total metals by USEPA method 6020
- Total mercury by USEPA method 7471A
- Ammonia by USEPA method 350.1
- Sulfides by USEPA method 9030B and Standard Method (SM) 4500-S2-D
- Nitrate + Nitrite by EPA method 353.2
- Sulfate by USEPA method 300.0
- Salinity by SM 2520B
- Total organic carbon (TOC) by ASTM D4129-82
- Total solids (TS) by USEPA method 160.3
- Total volatile solids (TVS) by USEPA method 160.4
- Grainsize by ASTM D422
- Polychlorinated dibenzodioxins (PCDD) and polychlorinated dibenzofurans (PCDF) by USEPA method 1613B

CAS sample data group (SDG) numbers K0808853 and K0808855 were reviewed in this report. The samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Lab ID	Matrix	Analyses Performed
AS-SEDC-103-A-080910	K0808853-036	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-105-A-080910	K0808853-045	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-105-B-080910	K0808853-046	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-105-C-080910	K0808853-047	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-105-D-080910	K0808853-048	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-102-A-080911	K0808853-050	Porewater	Ammonia, nitrate+nitrite, sulfate
AS-SEDC-106-A-080911	K0808853-052	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate
AS-SEDC-106-B-080911	K0808853-053	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate
AS-SEDC-108-C-080911	K0808853-056	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate
AS-SEDC-109-A-080911	K0808853-057	Porewater	Ammonia, sulfides, nitrate+nitrite
AS-SEDC-109-B-080911	K0808853-058	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-109-C-080911	K0808853-059	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-109-D-080911	K0808853-060	Porewater	Ammonia, sulfides, nitrate+nitrite, sulfate, salinity
AS-SEDC-101-A-080910	K0808855-001	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-101-B-080910	K0808855-002	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-101-C-080910	K0808855-003	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-101-D-080910	K0808855-004	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-103-A-080910	K0808855-005	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-103-B-080910	K0808855-006	Sediment	TS, TVS, TOC, grainsize, mercury
AS-SEDC-103-C-080910	K0808855-007	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-103-D-080910	K0808855-008	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-104-A-080910	K0808855-009	Sediment	TS, TVS, TOC, grainsize, SVOCs, VOCs, PCBs, pesticides, metals, mercury, ammonia, sulfides, PCDD/PCDF
AS-SEDC-104-B-080910	K0808855-010	Sediment	TS, TVS, TOC, grainsize, SVOCs, VOCs, PCBs, pesticides, metals, mercury, ammonia, sulfides, PCDD/PCDF
AS-SEDC-104-Z-080910	K0808855-011	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-107-A-080910	K0808855-012	Sediment	TS, TVS, TOC, grainsize, SVOCs, VOCs, PCBs, pesticides, metals, mercury, ammonia, sulfides, PCDD/PCDF
AS-SEDC-107-B-080910	K0808855-013	Sediment	TS, TVS, TOC, grainsize, SVOCs, VOCs, PCBs, pesticides, metals, mercury, ammonia, sulfides, PCDD/PCDF
AS-SEDC-105-A-080910	K0808855-014	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-105-B-080910	K0808855-015	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-105-C-080910	K0808855-016	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-105-D-080910	K0808855-017	Sediment	TS, TVS, TOC, grainsize, mercury
AS-SEDC-105-E-080910	K0808855-018	Sediment	TS, TVS, TOC, grainsize, mercury
AS-SEDC-105-Z-080910	K0808855-019	Sediment	TS, TVS, TOC, grainsize, SVOCs, PCBs, metals, mercury, ammonia, sulfides

Sample ID	Lab ID	Matrix	Analyses Performed
AS-SEDC-102-A-080911	K0808855-020	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-102-B-080911	K0808855-021	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-106-A-080911	K0808855-022	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-106-B-080911	K0808855-023	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-156-B-080911	K0808855-024	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-108-A-080911	K0808855-025	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-108-B-080911	K0808855-026	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-108-C-080911	K0808855-027	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-108-D-080911	K0808855-028	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-109-A-080911	K0808855-029	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-109-B-080911	K0808855-030	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-109-C-080911	K0808855-031	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-109-D-080911	K0808855-032	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-109-Z-080911	K0808855-033	Sediment	TS, TVS, TOC, grainsize
AS-SEDC-106-C-080911	K0808855-034	Sediment	TS, TVS, TOC, grainsize

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective section of the Sampling and Analysis Plan (SAP). Laboratory results were reviewed following USEPA guidelines using *USEPA Contract Laboratory Program National Functional Guidelines for Inorganics Data Review (USEPA, 2004)* and *USEPA Contract Laboratory National Functional Guidelines for Organics Data Review* (*USEPA, 1999*) as guidelines, and applying laboratory and method QC criteria as stated in SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody was signed by CAS at the time of sample receipt; the samples were received cold and in good condition. Porewater extraction and analyses were requested on 31 samples. The lab could extract porewater from only 13 of these samples. Not enough sample volume was extracted for the 13 samples to perform all analyses requested. There was insufficient sample volume to analyze tributyltin on any of the porewater samples. The 18 samples from which no porewater could be extracted are listed in Table 2.

Table 2

Porewater Samples not Extracted

Sample ID
AS-PW-101-A-080910
AS-PW-101-B-080910
AS-PW-101-C-080910
AS-PW-101-D-080910
AS-PW-103-B-080910
AS-PW-103-C-080910
AS-PW-103-D-080910
AS-PW-104-A-080910
AS-PW-104-B-080910
AS-PW-104-Z-080910
AS-PW-105-Z-080910
AS-PW-102-B-080910
AS-PW-107-A-080910
AS-PW-107-B-080910
AS-PW-108-A-080910
AS-PW-108-B-080910
AS-PW-109-Z-080910
AS-PW-106-C-080911

Holding Times and Sample Preservation

Samples were appropriately preserved and analyzed within holding times with the exception of total volatile solids analyses which were performed seven days past the fourteen day holding time for samples collected on September 11th. These results have been qualified "J" to indicate they are estimated.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes with the following exceptions:

- Conventionals: Ammonia was detected in the porewater method blank between the method detection limit (MDL) and the method reporting limit (MRL). All sample results were significantly greater than (>5x) the level detected in the blank so no data were qualified.

- PCDD/PCDF: 1,2,3,4,6,7,8-HpCDD, OCDD, 1,2,3,4,6,7,8-HpCDF, OCDF, total hepta-dioxins, and total hepta-furans were all detected in the method blank at levels between the estimated detection limit (EDL) and MRL. All associated results were significantly greater than (>5x) the levels in the method blank with some exceptions. See Table 4 for qualified data.

Field Quality Control

Field Blanks

No field blanks were collected in association with this data package.

Field Duplicates

One set of field duplicates were collected in association with this data package: AS-SEDC-106-B-080911 and AS-SEDC-156-B-080911. Results are summarized in Table 3.

Table 3
Duplicate Sample Summary

Analyte	AS-SEDC-106-B-080911	AS-SEDC-156-B-080911	RPD
TS	73.1	72.9	0%
TVS	4.20	4.59	9%
TOC	1.43	1.02	33%
Medium Gravel	3.35	6.93	70%
Fine Gravel	5.65	6.22	10%
Very Coarse Sand	6.30	5.88	7%
Coarse Sand	7.32	10.8	38%
Medium Sand	40.7	37.1	9%
Fine Sand	32.3	30.3	6%
Very Fine Sand	1.77	1.83	3%
Silt	3.42	3.29	4%
Clay	2.65	2.54	4%

Internal Standard/Surrogate Recoveries

Internal standard recoveries were within method control limits for all internal standards. Surrogate recoveries were within laboratory control limits for all surrogates. Eight labeled compounds in the PCDD/PCDF analysis of sample AS-SEDC-104-B-080910 and six labeled compounds in the analysis of sample AS-SEDC-107-B-080910 recovered below laboratory control limits. The associated results have been qualified "J" or "UJ" to indicate they may be estimated.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD)

MS and MSD samples were analyzed at the required frequencies for all analyses. Some samples were batched with non-project samples and reported MS/MSD results were performed on the non-project samples. These results were not used to evaluate this data. All MS/MSD analyses performed on project samples yielded percent recoveries (%R)s and/or relative percent difference (RPD) values within the project data quality objectives with the exception of antimony in the metals analysis, which recovered low in the MS. All sample results for this element has been qualified "J" to indicate they may be biased low.

Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

An LCS and LCSD were analyzed at the required frequencies and resulted in recoveries within project required control limits, with the exception of one analyte in the SVOC LCS/LCSD. Benzoic acid recovered low in both the LCS and LCSD. Sample results for this analyte have been qualified "UJ" to indicate a potentially low bias.

Laboratory Duplicates

Laboratory duplicates were analyzed at the required frequencies. All RPD values were within the project required control limits with the exception of the duplicate analysis of copper and lead which resulted in high RPD values. Associated results for all samples have been qualified "J" to indicate they are estimated.

Method Reporting Limits

Reporting limits were deemed acceptable as reported. All values were reported using the laboratory's reporting limits. Values were reported as undiluted, or when diluted, the reporting limit accurately reflects the dilution factor. Porewater nitrate/nitrite samples were analyzed at a dilution due to matrix interference. All results were below the elevated reporting limit. Some reporting limits for some analytes in the PCB and pesticides analyses were elevated due to matrix interference. Sample AS-SEDC-104-A-080910 was diluted prior to analysis for SVOCs due to the elevated presence of non-target background compounds.

Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical methods and all requested sample analyses were completed with the exception of some of the porewater analyses. This was due to the inability of the lab to extract porewater from the sediments. Some TVS results were qualified as estimated because the analyses were performed outside of recommended hold times. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD %R values, with the exceptions noted above. Precision was also acceptable as demonstrated by the laboratory duplicates, MS/MSD and LCS/LCSD RPD values, with the exceptions noted above. Most data were deemed acceptable as reported; all other data are judged to be acceptable as qualified. No data were rejected in this review. Table 4 summarizes the qualifiers applied to samples reviewed in this report.

Table 4
Data Qualification Summary

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
AS-SEDC-102-B-080911	Conventionals	TVS	3.12%	3.12J%	Analyzed past hold time.
AS-SEDC-104A-080910	Metals	Antimony	0.13 mg/kg	0.13J mg/kg	MS %R below control limit.
		Copper	25.2 mg/kg	25.2J mg/kg	Duplicate RPD outside of control limits.
		Lead	7.74 mg/kg	7.74J mg/kg	
	SVOCs	Benzoic acid	1300U µg/kg	1300UJ µg/kg	LCS, LCSD %R below control limit
AS-SEDC-104-B-080910	Metals	Antimony	0.05U mg/kg	0.05UJ mg/kg	MS %R below control limit.
		Copper	10.1 mg/kg	10.1J mg/kg	Duplicate RPD outside of control limits.
		Lead	2.03 mg/kg	2.03J mg/kg	
	SVOCs	Benzoic acid	200U µg/kg	200UJ µg/kg	LCS, LCSD %R below control limit
	PCDD/PCDF	1,2,3,4,6,7,8-HpCDF	1.53BJ ng/kg	6.63U ng/kg	Method blank contamination.
		OCDF	4.86BJ ng/kg	13.3U ng/kg	
		1,2,3,4,7,8-HxCDD	6.63U ng/kg	6.63UJng/kg	Labeled compounds %R outside of control limits.
		1,2,3,6,7,8-HxCDD	1.28JK ng/kg	1.28J ng/kg	
		1,2,3,4,6,7,8-HpCDD	16.6B ng/kg	16.6Jng/kg	
		OCDD	181B ng/kg	181J ng/kg	
		1,2,3,4,7,8-HxCDF	0.246JK ng/kg	0.246J ng/kg	
		1,2,3,7,8,9-HxCDF	6.63U ng/kg	6.63UJ ng/kg	

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
		2,3,4,6,7,8-HxCDF	6.63U ng/kg	6.63UJ ng/kg	
		1,2,3,4,6,7,8-HpCDF	6.63U ng/kg	6.63UJ ng/kg	
AS-SEDC-105-Z-080910	Metals	Antimony	0.04U mg/kg	0.04UJ mg/kg	MS %R below control limit.
		Copper	12.9 mg/kg	12.9J mg/kg	Duplicate RPD outside of control limits.
		Lead	2.57 mg/kg	2.57J mg/kg	
	SVOCs	Benzoic acid	200U µg/kg	200UJ µg/kg	LCS, LCSD %R below control limit
AS-SEDC-106-A-080911	Conventionals	TVS	7.43%	7.43J%	Analyzed past hold time.
AS-SEDC-106-B-080911	Conventionals	TVS	4.20%	4.20J%	Analyzed past hold time.
AS-SEDC-156-B-080911	Conventionals	TVS	4.59%	4.59J%	Analyzed past hold time.
AS-SEDC-107-A-080910	Metals	Antimony	0.05B mg/kg	0.05J mg/kg	MS %R below control limit.
		Copper	7.70 mg/kg	7.70J mg/kg	Duplicate RPD outside of control limits.
		Lead	2.56 mg/kg	2.56J mg/kg	
	SVOCs	Benzoic acid	200U µg/kg	200UJ µg/kg	LCS, LCSD %R below control limit
	PCDD/PCDF	1,2,3,4,6,7,8-HpCDF	0.385BJ ng/kg	6.43U ng/kg	Method blank contamination.
		OCDF	2.43BJ ng/kg	12.9U ng/kg	
		Total hepta-furans	1.46 J ng/kg	6.43U ng/kg	
AS-SEDC-107-B-080910	Metals	Antimony	0.08 mg/kg	0.08J mg/kg	MS %R below control limit.
		Copper	7.83 mg/kg	7.83J mg/kg	Duplicate RPD outside of control limits.
		Lead	1.29 mg/kg	1.29J mg/kg	
	SVOCs	Benzoic acid	200U µg/kg	200UJ µg/kg	LCS, LCSD %R below control limit
	PCDD/PCDF	1,2,3,4,6,7,8-HpCDF	1.64BJ ng/kg	5.76U ng/kg	Method blank contamination.
		OCDF	6.36BJ ng/kg	11.5U ng/kg	
		Total hepta-furans	1.87 J ng/kg	5.76U ng/kg	
		1,2,3,4,7,8-HxCDD	5.76U ng/kg	5.76UJ ng/kg	Labeled compounds %R outside of control limits.
		1,2,3,6,7,8-HxCDD	5.76U ng/kg	5.76UJ ng/kg	
		OCDD	5.77BJ ng/kg	5.77J ng/kg	
		1,2,3,7,8,9-HxCDF	5.76U ng/kg	5.76UJ ng/kg	
		2,3,4,6,7,8-HxCDF	5.76U ng/kg	5.76UJ ng/kg	
		1,2,3,4,6,7,8-HpCDF	5.76U ng/kg	5.76UJ ng/kg	
AS-SEDC-108-A-080911	Conventionals	TVS	2.04%	2.04J%	Analyzed past hold time.
AS-SEDC-108-B-080911	Conventionals	TVS	4.72%	4.72J%	Analyzed past hold time.
AS-SEDC-108-C-080911	Conventionals	TVS	1.90%	1.90J%	Analyzed past hold time.
AS-SEDC-108-D-080911	Conventionals	TVS	2.19%	2.19J%	Analyzed past hold time.
AS-SEDC-109-A-080911	Conventionals	TVS	26.3%	26.3J%	Analyzed past hold time.
AS-SEDC-109-B-080911	Conventionals	TVS	23.0%	23.0J%	Analyzed past hold time.
AS-SEDC-109-C-080911	Conventionals	TVS	29.9%	29.9J%	Analyzed past hold time.
AS-SEDC-109-D-080911	Conventionals	TVS	33.9%	33.9J%	Analyzed past hold time.

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
AS-SEDC-109-Z-080911	Conventionals	TVS	2.91%	2.91J%	Analyzed past hold time.
AS-SEDC-106-C-080911	Conventionals	TVS	2.35%	2.35J%	Analyzed past hold time.

REFERENCES

USEPA. 1983. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA-600/4-79-020.

USEPA. 1986. Test methods for Evaluating Solid Waste: Physical/Chemical Methods. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA-530/SW-846.

USEPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Office of Emergency Response. EPA 540/R-99/008. October.

USEPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

USEPA. 2005. USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-05-001. September 2005.

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Data Validation Review Report- EPA Level 2

Project: Port Gamble

Project Number: 080388-01

Date: December 1, 2008

This report summarizes the review of analytical results for thirteen sediment samples collected on August 15, 2008. Samples were collected by Anchor Environmental and submitted to Analytical Resources, Inc. (ARI) in Tukwila, Washington. Samples were analyzed for the following:

- Total organic carbon (TOC) by Plumb, 1981
- Total solids (TS) by United States Environmental Protection Agency (USEPA) method 160.3 modified
- Total volatile solids (TVS) by USEPA method 160.4
- Porewater ammonia (NH3) by USEPA method 350.1M
- Porewater sulfides by USEPA method 376.2

ARI sample data group (SDG) number NL02 was reviewed in this report. The samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Lab ID	Matrix	Analysis Requested
AS-101	NL02A	Sediment	TOC, TS, TVS
AS-102	NL02B	Sediment	TOC, TS, TVS
AS-103	NL02C	Sediment	TOC, TS, TVS
AS-110	NL02D	Sediment	TOC, TS, TVS
AS-111	NL02E	Sediment	TOC, TS, TVS
AS-112	NL02F	Sediment	TOC, TS, TVS
AS-113	NL02G	Sediment	TOC, TS, TVS
AS-114	NL02H	Sediment	TOC, TS, TVS
AS-B09	NL02I	Sediment	TOC, TS, TVS
AS-B11	NL02J	Sediment	TOC, TS, TVS
AS-B14	NL02K	Sediment	TOC, TS, TVS
AS-B16	NL02L	Sediment	TOC, TS, TVS
AS-B18	NL02M	Sediment	TOC, TS, TVS

Sample ID	Lab ID	Matrix	Analysis Requested
AS-101	NL02N	Porewater	NH3, sulfides
AS-103	NL02O	Porewater	NH3, sulfides
AS-110	NL02P	Porewater	NH3, sulfides
AS-111	NL02Q	Porewater	NH3, sulfides
AS-112	NL02R	Porewater	NH3, sulfides
AS-113	NL02S	Porewater	NH3, sulfides
AS-114	NL02T	Porewater	NH3, sulfides
AS-B09	NL02U	Porewater	NH3, sulfides
AS-B11	NL02V	Porewater	NH3, sulfides
AS-B14	NL02W	Porewater	NH3, sulfides
AS-B16	NL02X	Porewater	NH3, sulfides
AS-B18	NL02Y	Porewater	NH3, sulfides

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective section of the Sampling and Analysis Plan (SAP). Laboratory results were reviewed following USEPA guidelines using *USEPA Contract Laboratory Program National Functional Guidelines for Inorganics Data Review (USEPA, 2004)* and *USEPA Contract Laboratory National Functional Guidelines for Organics Data Review* (*USEPA, 1999*) as guidelines, and applying laboratory and method QC criteria as stated in SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custody was signed by CAS at the time of sample receipt; the samples were received cold and in good condition.

Holding Times and Sample Preservation

Samples were appropriately preserved and analyzed within holding times.

Analytical Methods

The laboratory followed the recommended analytical methods specified in the QAPP with the following exceptions:

- TVS: Lab used 160.4 instead of ASTM-D2974
- TOC: Lab used Plumb, 1981 instead of 9060

The difference between the recommended methods and the actual methods for TVS and TOC is sample aliquot size used for analyses. Both Plumb and ASTM-D2974 use larger volumes than the 160 methods. Because data quality is not significantly affected by this discrepancy no data were qualified.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes with the exception of ammonia which was detected at a level between the method detection limit (MDL) and the method reporting limit (MRL). All sample results were significantly greater (>5x) than the levels found in the blank so no data were qualified.

Field Quality Control

Field Blanks

No field blanks were collected in association with this data package.

Field Duplicates

No field duplicates were collected in association with this data package.

Matrix Spike (MS)

MS samples were analyzed at the required frequencies for all analyses. All MS analyses yielded percent recoveries (%R)s within the project data quality objectives.

Laboratory Control Sample (LCS)

An LCS was analyzed at the required frequencies and resulted in recoveries within project required control limits.

Laboratory Duplicates/Triplicates

Laboratory duplicates and triplicates were analyzed at the required frequencies. All relative percent difference (RPD) and relative standard deviation (RSD) values were within the project required control limits with the exception of TVS. The triplicate analyses of resulted in high RSD values. All TVS values have been qualified "J" in the parent sample to indicate they are estimated.

Method Reporting Limits

Reporting limits were deemed acceptable as reported. All values were reported using the laboratory's reporting limits. Values were reported as undiluted, or when diluted, the reporting limit accurately reflects the dilution factor.

Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable, as demonstrated by the LCS and MS %R values. Precision was also acceptable as demonstrated by the laboratory duplicates and triplicates RPD and RSD values, with the exception noted above. Most data were deemed acceptable as reported; all other data are judged to be acceptable as qualified. Table 2 summarizes the qualifiers applied to samples reviewed in this report.

Table 2
Data Qualification Summary

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
AS-101	Conventionals	TVS	4.89%	4.89J%	Triplicate RPD outside of control limit
AS-102	Conventionals	TVS	12.73%	12.73J%	Triplicate RPD outside of control limit
AS-103	Conventionals	TVS	9.58%	9.58J%	Triplicate RPD outside of control limit
AS-110	Conventionals	TVS	13.07%	13.07J%	Triplicate RPD outside of control limit
AS-111	Conventionals	TVS	9.47%	9.47J%	Triplicate RPD outside of control limit

Sample ID	Parameter	Analyte	Reported Result	Qualified Result	Reason
AS-101	Conventionals	TVS	4.89%	4.89J%	Triplicate RPD outside of control limit
AS-112	Conventionals	TVS	7.33%	7.33J%	Triplicate RPD outside of control limit
AS-113	Conventionals	TVS	19.19%	19.19J%	Triplicate RPD outside of control limit
AS-114	Conventionals	TVS	19.16%	19.16J%	Triplicate RPD outside of control limit
AS-B09	Conventionals	TVS	1.87%	1.87J%	Triplicate RPD outside of control limit
AS-B11	Conventionals	TVS	11.48%	11.48J%	Triplicate RPD outside of control limit
AS-B14	Conventionals	TVS	11.44%	11.44J%	Triplicate RPD outside of control limit
AS-B16	Conventionals	TVS	7.28%	7.28J%	Triplicate RPD outside of control limit
AS-B18	Conventionals	TVS	19.18%	19.18J%	Triplicate RPD outside of control limit

REFERENCES

USEPA. 1983. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA-600/4-79-020.

USEPA. 1986. Test methods for Evaluating Solid Waste: Physical/Chemical Methods. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA-530/SW-846.

USEPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Office of Emergency Response. EPA 540/R-99/008. October.

USEPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004

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Data Validation Review Report – EPA Level 2

Project: Port Gamble

Project Number: 080388-01

Date: February 19, 2009

This report summarizes the review of analytical results for 7 soils samples collected on January 13th and 27th 2009. Samples were collected by Environmental Partners, Inc. and submitted to Analytical Resources, Inc. (ARI), in Tukwila, WA. Samples were analyzed for the following:

- Polycyclic Aromatic Hydrocarbons (PAHs) by United States Environmental Protection Agency (USEPA) method 8270D

ARI sample data group (SDG) numbers OH88 and OK02 were reviewed in this report. The samples reviewed in this report are presented in Table 1.

Table 1
Samples Reviewed

Sample ID	Lab ID	Matrix	Analyses Requested
PG-SS-L1-S	OH88A	Soil	PAHs
PG-SS-L2-S	OH88B	Soil	PAHs
PG-SS-L3-S	OH88C	Soil	PAHs
PG-SS-L4-S	OH88D	Soil	PAHs
PG-SS-L5-S	OH88E	Soil	PAHs
PG-SS-L5A-S	OK02A	Soil	PAHs
PG-SS-L5B-S	OK02B	Soil	PAHs

Data Validation and Qualifications

The following comments refer to the laboratory's performance in meeting the quality assurance/quality control (QA/QC) guidelines outlined in the analytical procedures and data quality objective section of the Sampling and Analysis Plan (SAP). Laboratory results were reviewed following USEPA guidelines using *USEPA Contract Laboratory Program National Functional Guidelines for Inorganics Data Review (USEPA, 2004),* and *USEPA Contract Laboratory National Functional Guidelines for Organics Data Review* (*USEPA, 1999*) as guidelines, and applying laboratory and method QC criteria as stated in SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998. Unless noted in this report, laboratory results for the samples listed above were within QC criteria.

Field Documentation

Field documentation was checked for completeness and accuracy. The chain-of-custodies were signed by ARI at the time of sample receipt; the samples were received cold and in good condition with the following exception:

- Soil samples PG-SS-L5A-S and PG-SS-L5B-S were received at 11.8°C; however, samples were delivered within 3 hours of collection. No data were qualified based on this finding.

Holding Times and Sample Preservation

Samples were appropriately preserved and analyzed within holding times.

Laboratory Method Blanks

Laboratory method blanks were analyzed at the required frequencies. All method blanks were free of target analytes.

Field Quality Control

Field Blanks and Field Duplicates

Field blanks and/or field duplicates were not collected in association with this data set.

Surrogate Recoveries

All samples yielded surrogate recoveries within laboratory generated control limits.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD)

MS and MSD samples were analyzed at the required frequencies for all analyses and resulted in recoveries within laboratory control limits.

Laboratory Control Sample (LCS) and LCS Duplicate (LCSD)

An LCS and LCSD were analyzed at the required frequencies and resulted in recoveries within laboratory control limits.

Method Reporting Limits

Reporting limits were deemed acceptable as reported. All values were reported using the laboratory's reporting limits. Values were reported as undiluted, or when diluted, the reporting limit accurately reflects the dilution factor.

Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical methods and all requested sample analyses were completed. Accuracy was acceptable, as demonstrated by the LCS/LCSD, MS/MSD and surrogate %R values. Precision was also acceptable as demonstrated by the laboratory LCS/LCSD, and MS/MSD RPD values. All data were deemed acceptable as reported.

REFERENCES

USEPA. 1983. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. EPA-600/4-79-020.

USEPA. 1986. Test methods for Evaluating Solid Waste: Physical/Chemical Methods. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. EPA-530/SW-846.

USEPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. U.S. Environmental Protection Agency, Office of Emergency Response. EPA 540/R-99/008. October.

USEPA. 2004. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI). EPA 540-R-04-004. October 2004.

PORT GAMBLE – UPLANDS AREA RI/FS
DATA VALIDATION QA/QC REVIEW

A total of eighteen groundwater samples and sixty-nine soil samples were collected January 13, 14, 15, 21 and February 4 of 2009 as part of the *Final Remedial Investigation/Feasibility Study Work Plan and Sampling and Analysis Plan* for the Former Pope & Talbot Inc. Sawmill Site in Port Gamble, Washington (Anchor, 2008). Selected samples were analyzed by CCI Analytical Laboratories (CCI) of Everett, Washington for the following parameters:

- Organochlorine Pesticides (OC Pesticides) by EPA Method 8081
- Arsenic by EPA Method 6010
- Mercury (Total and Dissolved) by EPA Method 7470

Groundwater samples were analyzed by Aquatic Resources Incorporated (ARI) of Seattle, Washington for the following parameter:

- Arsenic (Total and Dissolved) by EPA Method 200.8

Samples were analyzed in accordance with procedures described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (USEPA SW-846, 3rd edition) 8081, 6010, 7470, and EPA Method 200.8, Revision 5.5; Determination of Trace Elements in Water and Wastes by Inductively Coupled Plasma-Mass Spectrometry.*

Samples were analyzed and results reported by the laboratory in batch numbers as summarized below:

901063 (OC Pesticides):
PG-D-01-S
PG-D-02-S
PG-D-03-S
PG-D-04-S
PG-D-05-S
PG-D-06-S
PG-D-07-S
PG-D-08-S
PG-D-09-S
PG-D-10-S

901063 (Arsenic):
SP-A-50-1.5-2-S
SP-A-50-3.5-4-S
SP-A-50-5.5-6-S
SP-A-51-1.5-2-S
SP-A-51-3.5-4-S
SP-A-51-5.5-6-S

901063 (Arsenic (Total and Dissolved)):
SP-A-49-8-12-W
SP-A-47-8-12-W
SP-A-48-8-12-W
SP-A-45-8-12-W
SP-A-42-8-12-W
SP-A-41-8-12-W
SP-A-43-8-12-W
SP-A-44-8-12-W
SP-A-46-8-12-W
SP-A-40-8-12-W
SP-A-38-8-12-W
SP-A-39-8-12-W
SP-A-37-8-12-W
SP-A-36-8-12-W

901063 (OC Pesticides* and Arsenic):
SP-A-40-2-2.5-S
SP-A-40-5.5-6-S
SP-A-40-10-10.5-S
SP-A-38-0-0.5-S (*)
SP-A-38-2-2.5-S
SP-A-38-5.5-6-S
SP-A-38-10-10.5-S
SP-A-39-2-2.5-S
SP-A-39-5.5-6-S
SP-A-39-10-10.5-S
SP-A-37-2-2.5-S
SP-A-37-5.5-6-S
SP-A-37-10-10.5-S
SP-A-36-0-0.5-S (*)
SP-A-36-2-2.5-S
SP-A-36-5.5-6-S
SP-A-36-10-10.5-S

901063 (OC Pesticides* and Arsenic):
SP-A-43-2-2.5-S
SP-A-43-5.5-6-S
SP-A-43-10-10.5-S
SP-A-44-0-0.5-S (*)
SP-A-49-2-2.5-S
SP-A-49-5.5-6-S
SP-A-49-10-10.5-S
SP-A-47-0-0.5-S (*)
SP-A-45-2-2.5-S
SP-A-45-5.5-6-S
SP-A-45-10-10.5-S
SP-A-42-2-2.5-S

SP-A-44-2-2.5-S
SP-A-44-5.5-6-S
SP-A-44-10-10.5-S
SP-A-46-2-2.5-S
SP-A-46-5.5-6-S
SP-A-46-10-10.5-S
SP-A-47-2-2.5-S
SP-A-47-5.5-6-S
SP-A-47-10-10.5-S
SP-A-48-2-2.5-S
SP-A-48-5.5-6-S
SP-A-48-10-10.5-S
SP-A-42-5.5-6-S
SP-A-42-10-10.5-S
SP-A-41-0-0.5-S (*)
SP-A-41-2-2.5-S
SP-A-41-5.5-6-S
SP-A-41-10-10.5-S

902020 (Arsenic and Mercury (Total and Dissolved)):
MW-7-W
MW-8-W
MW-15-W
MW-16-W

902021 (Arsenic):
MW-15-2-2.5-S
MW-15-5.5-6-S
MW-15-10-10.5-S
MW-16-2-2.5-S
MW-16-5.5-6-S
MW-16-10-10.5-S

Quality assurance/quality control (QA/QC) reviews of laboratory data were performed in the laboratory in general accordance with the laboratory quality assurance program plan. The data validation QA/QC review focused primarily on laboratory result summary sheets and quality control summary sheets to ensure that work plan data quality objectives were met for the project. The validation level for analytical parameters is a limited review as described in the Quality Assurance Project Plan (QAPP). It should be noted that initial and continuing calibrations were not assessed for this review since sample collection activities were largely investigative (EPI, 2009). The following is a summary of quality control elements associated with each analytical fraction and the status of that element as a result of the data validation process.

Data validation was conducted in accordance with the criteria 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 method specific requirements of the laboratory analytical methods.

The following is a summary of quality control elements associated with each analytical fraction and the status of that element as a result of the data validation process.

SAMPLING, DOCUMENTATION, AND REPORTING

The following sampling, documentation, and reporting discrepancies are noted:

CCI Lab Numbers: 901063 and 902021: Selected samples were archived for various analyses. No action was taken other than to note that extraction holding time for five samples was exceeded by one day for OC Pesticide analysis. Refer to the Section on OC Pesticide Holding Time for more information.

CCI Lab Numbers: 901063, 902020, and 902021: CCI originally submitted Form 1 (sample results) results only. Additional data were requested from CCI to perform a basic data review. The following requested data should be included in a basic data package as stipulated in QAPP (Section 9.3.10 - Laboratory Deliverables). At a minimum requested data should include the following:

- Cover letter detailing the scope of the project and discussion of any discrepancies or anomalies;
- Chain of custody documentation;
- Documentation regarding condition of samples upon sample receipt detailing any discrepancies or anomalies;
- Method Blank Summary;

- Date(s) of Extraction (where applicable);
- Surrogate Recovery Summary (with applicable control limit criteria);
- MS/MSD Accuracy and Precision Summary;
- LCS/LCSD Accuracy and Precision Summary;
- Reporting limits.

CCI Lab Numbers 901063 and 902020: CCI incorrectly reported using EPA Method 7060 to analyze groundwater samples for arsenic. Groundwater samples were analyzed, due to instrument failure at CCI, by a subcontracted laboratory (ARI) for arsenic using EPA Method 200.8. Form 1 results were revised and resubmitted.

CCI Analytical Laboratory (a division of DataChem Laboratories, Inc) was acquired by ALS Laboratory Group (ALS) of Houston, Texas. CCI indicated that the transition is nearly complete and ALS corporate logo and headers will appear on future laboratory reports.

CCI Laboratory Number 901063: Five arsenic and OC Pesticide sample results are reported on the same page. No action was taken other to note that the arsenic results can easily be overlooked.

CCI Laboratory Number 901063: Extraction dates were not reported along with EPA Method 8081 results. The data validator notes that in this case this was an issue because the analysis date exceeded the 14 day recommended holding time for extraction.

QAPP Table 9-2 - Data Quality Objectives specify that metals soil and groundwater data should have a precision goal of 20% RPD. This goal was achieved for groundwater however precision data for soils was not assessed via laboratory duplicates or field replicates. Precision for soils was assessed via blank spike/blank spike duplicate data. It should be noted that QAPP provides a precision goal of 35% for water (refer to Section 9.2.1). The more conservative RPD value of 20% was used for assessment purposes.

QAPP Table 9-3 - Laboratory Quality Control Sample Analysis Minimum Frequency Requirements specify calibration, replicate, and spike frequency. Calibration data were not reviewed as discussed earlier. Precision and accuracy data was assessed through LCS/LCSD, laboratory duplicate, MS/MSD, or MS data. No action was taken other than to note that replicate and spike frequency were not performed as requested on Table 9-3 however sufficient accuracy and precision data were available for this review.

ORGANOCHLORINE PESTICIDE COMPOUNDS

The laboratory information provided for the OC Pesticide analysis was limited to data results and quality assurance forms and these are summarized below.

Analytical Methods – *acceptable*

Samples for OC Pesticide analysis were analyzed by gas chromatography/electron capture detector (GC/ECD) using EPA SW846 Method 8081.

Sample Holding Times– *acceptable*

All samples were extracted within 14 days for soils and analyzed within 40 days of sample extraction with the following exceptions:

CCI Laboratory Number 901063: Samples PG-D-02-S, PG-D-04-S, PG-D-06-S, PG-D-08-S, and PG-D-10-S were extracted one day outside of the recommended holding time of 14 days. Samples had been archived upon sample receipt by CCI and analyzed upon EPI's request. OC Pesticide results for Samples PG-D-02-S, PG-D-04-S, PG-D-06-S, PG-D-08-S, and PG-D-10-S are qualified as estimated (UJ/J) due to a minor holding time exceedance.

Laboratory Reporting Limits

Work Plan QAPP does not list EPA Method 8081 thus target compounds and reporting levels were not assessed. It should be noted that method detection limit (MDL) information provided by CCI did not include data for toxaphene one of the reported compounds. CCI indicated that toxaphene is represented by a number of peaks and is typically identified by comparing the chromatogram with a known standard. CCI will include toxaphene in its next MDL study and results are considered acceptable based on calibration data (the low standard is at or below the reporting level for toxaphene).

Several samples were run at a dilution due to matrix effect. No action was taken other than to note that reporting limits are elevated in these cases.

Blank Contamination

The method blanks were free of target compounds.

Surrogate Recovery

All surrogate recoveries were within CCI's control limits.

Matrix Spike Compound Recovery

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses were not performed. Refer to laboratory control sample and sample duplicate (LCS/LCSD) results for precision and accuracy data.

Laboratory Control Sample Recovery

Laboratory control sample and sample duplicate (LCS/LCSD) results were acceptable and within CCI control limit criteria.

Field Duplicate Sample Analysis

Field duplicate samples were not collected for this sampling event. Refer to LCS/LCSD results for precision data.

INORGANICS

Analytical Methods – *acceptable*

Metals analysis was completed by EPA Methods 6010, 200.8, and 7470. Arsenic analysis on groundwater samples was subcontracted to ARI due to instrument issues at CCI.

Sample Holding Times

All samples were prepared and analyzed within the recommended holding period from the date of collection; 180 days for metals and 28 days for mercury.

Laboratory Reporting Limits

The laboratory Practical Quantitation Limits (PQLs) required by the approved quality assurance project plan were met with the following exception:

Parameter	QAPP Stipulated EPA Method	QAPP PQL (µg/L)	Lab Reported EPA Method	Lab Reported PQL (µg/L)
Arsenic (groundwater)	7060	5.0	200.8	5
Mercury (groundwater)	7470 Modified	0.02	7470	0.20

QAPP stipulated reporting level for mercury in groundwater for Sample MW-7-W (CCI Laboratory Number 902020) was not met. Upon request, CCI is capable of achieving a reporting level of 0.11 µg/L for mercury though this reporting level still does not meet QAPP criteria (0.02 µg/L).

CCI subcontracted groundwater samples for arsenic analysis to ARI due to analytical instrument issues. ARI's reporting level for arsenic by EPA Method 200.8 is 1 µg/L (method detection limit of 0.04 µg/L) however CCI reported groundwater results at a reporting level of 5 µg/L. No action was taken other than to note that requested reporting level was achieved.

Blank Contamination

The method blanks were free of target compounds.

Laboratory Control Sample Recovery – *acceptable*

The default QC criteria for evaluating LCS (blank spike) recoveries was used for CCI and ARI were within QC limits of 80 to 120 percent.

Matrix Spike/Matrix Spike Duplicate Analysis (MS/MSD)

The groundwater arsenic MS and mercury MS/MSD percent recoveries and relative percent difference (RPD) for mercury were acceptable.

Matrix spike analysis was not performed on soil samples. For precision and accuracy information refer to laboratory control sample data.

Duplicate Analysis

Laboratory duplicate analysis was performed on selected groundwater samples. Duplicate analysis criteria were met. No laboratory duplicates were performed on soil samples. No action was taken.

Field Duplicate Sample Analysis

Field duplicate sample were not collected for this sampling event.

Data Qualifiers

Data qualifiers applied by the laboratory have been crossed-out and initialed on the data summary report sheets and superseded by data validation qualifiers as follows:

The following qualifiers were used to modify the data quality and usefulness of individual analytical results.

U - The constituent was analyzed for, but was not detected above the reported sample quantitation limit.

J - The constituent was positively identified and detected; however, the concentration reported is an estimated value because the result is less than the quantitation limit or quality control criteria were not met.

UJ – The constituent was not detected; the associated quantitation limit is an estimated value because quality control criteria were not met.

R – Data are rejected due to significant exceedence of quality control criteria. The analyte may or may not be present. Additional sampling and analysis may be required to determine the presence or absence of the constituent. For statistical reasons, rejected values are not included in the database.

Data Assessment

Data review and validation was performed by an experienced quality assurance chemist independent of the analytical laboratory and not directly involved in the project. This is to certify that I have examined the analytical data and based on the information provided to me by the laboratory, in my professional judgment, the data are acceptable for use except where indicated by data qualifiers, which may modify the usefulness of those individual values.

Jessie Compeau

Jessie Compeau
Validator
Informa, LLC

April 6, 2009
Date

Douglas C. Kunkel
Project Manager
EPI

Date

REFERENCES

Anchor, 2008, Final Remedial Investigation/Feasibility Study Work Plan and Sampling and Analysis Plan, Former Pope & Talbot Inc. Sawmill Site, Port Gamble, Washington, October 2008.

EPA 1999, USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review, EPA-540/R-99/008, October, 1999.

EPA 2004, USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review, EPA-540-R-02-003, October, 2004

APPENDIX G

HUMAN HEALTH FOCUSED RISK EVALUATION

APPENDIX G
HUMAN HEALTH FOCUSED RISK EVALUATION

This appendix presents a focused human health risk evaluation for shellfish ingestion, to accompany the Port Gamble Bay remedial investigation (RI). The Port Gamble Bay RI was initially scoped as an Ecology Sediment Management Standard (SMS) investigation to determine if there were adverse impacts to bay-wide sediment benthic invertebrates due to former activities at the Mill Site, the Former Log Transfer Facility (FLTA) or the Former Lease Area (FLA). Following discussions with the Port Gamble S'Klallam Tribe, the scope of the RI was expanded to include shellfish tissue analysis to evaluate potential human health risks from shellfish ingestion.

The risk assessment focuses on exposure of tribal members to chemicals in shellfish using a tribal ingestion of shellfish scenario. This appendix presents the methods and results of the risk assessment, and calculates risk-based sediment cleanup levels (CULs) for contaminants identified as chemicals of concern (COCs) for shellfish ingestion risks. The sediment CULs are based on MTCA Method B procedures and on parameters for direct contact with sediment that might occur during tribal clamming activities. Concentrations of COCs in sediment and in tissue collected from the site are also compared to available reference data from background locations considered appropriate to Port Gamble Bay.

G.1 Methods for Assessing Risk

Figure G-1 identifies the general objectives and methods for evaluating human health risks and developing sediment cleanup standards that are protective of human health. This effort was intended as a focused exposure assessment and risk evaluation rather than a comprehensive human health risk assessment. As requested by the Port Gamble S'Klallam Tribe, the assessment focuses on risks associated with the collection and ingestion of shellfish from Port Gamble Bay. The risk assessment was primarily intended to estimate human health risks to tribal members who consume shellfish from Port Gamble Bay. The risk assessment also identifies COCs for bay sediments, which are those chemicals with estimated health risks for shellfish ingestion that exceed regulatory thresholds.

The assessment was performed using the following procedures:

- Identify potential exposure pathways and the reasonable maximum exposure (RME) scenario;

- Calculate carcinogenic and noncarcinogenic risks for chemicals detected in shellfish using representative tribal ingestion rates;

- Identify COCs based on tribal shellfish ingestion risk estimates;

- Evaluate the sediment direct contact exposure route by comparing sediment concentrations of COCs for seafood ingestion with MTCA criteria and with sediment cleanup levels calculated for a tribal clamming scenario;

- Compare Port Gamble Bay sediment concentrations of COCs to local Puget Sound sediment background levels obtained as part of the EPA Bold Survey (EPA 2009), using statistical procedures approved by Ecology and consistent with those described in MTCA;

- Compare concentrations of COCs in shellfish tissue collected from Port Gamble Bay to reference levels considered representative of tissue background concentrations for Puget Sound, using statistical procedures approved by Ecology and consistent with those described in MTCA; and

- Determine cleanup levels for sediment that are protective of human health according to procedures described in MTCA and supporting guidance.

G.2 Exposure Assessment

G.2.1 Exposure Pathways and Reasonable Maximum Exposure Scenarios

Two likely exposure pathways were identified for the Port Gamble Bay site:

- Tribal ingestion of shellfish; and

- Direct sediment contact (incidental sediment ingestion and dermal contact) during shellfish gathering.

Two reasonable maximum exposure (RME) scenarios were developed to address these exposure pathways: (1) the tribal seafood ingestion scenario with the focus on shellfish ingestion, and (2) the tribal RME clamming scenario. The RME scenarios were developed for the Port Gamble bay site based on the EPA tribal framework document (EPA 2007). As described below, procedures and relevant exposure parameter values are taken from the recent EPA and Ecology-approved human health risk assessment for the Lower Duwamish Waterway (LDW) site, including directions from EPA regarding exposure parameters for the shellfish ingestion and the clamming RME scenarios (Windward 2007).

In addition to shellfish collection and ingestion, risk from incidental contact with potentially contaminated sediment could occur from activities such as recreational use of the intertidal areas of the bay or use of fishing nets. However, these risks are expected to be significantly less than the risk from consumption of shellfish under the tribal shellfish ingestion scenario or the tribal RME clamming scenario.

Evaluation of the tribal RME clamming scenario consists of the development of sediment cleanup levels using the RME clamming exposure parameters and following MTCA methods. Decisions on the shellfish ingestion and tribal RME clamming scenarios and parameters for quantifying exposures, as well as identification of chemicals of potential concern (COPCs), were based on discussions between Ecology and the Port Gamble S'Klallam Tribe.

G.2.2 Tribal Ingestion of Shellfish Scenario

For the tribal ingestion of shellfish scenario, COPCs, exposure data for shellfish, and calculation of exposures as chronic daily intakes are presented below.

Chemicals of Potential Concern

COPCs were identified in discussions between Ecology and the Port Gamble S'Klallam Tribe, and were analyzed in shellfish tissue samples collected from Port Gamble Bay:

- Metals, consisting of arsenic, cadmium, chromium, copper, mercury, silver, and zinc;
- Polychlorinated dioxins/furans (PCDD/PCDF), congeners and homolog groups;
- Polychlorinated biphenyls (PCBs), both as Aroclors and selected PCB congeners with dioxin-like activity; and
- Carcinogenic PAHs (cPAHs).

Target Species

Shellfish were collected from Port Gamble Bay by the Port Gamble S'Klallam Tribe in two phases. Samples collected in 2009 were transferred to Hart Crowser for subsequent preparation and laboratory analysis. Results for 2009 samples are presented in Tables 11 and 12 of the RI report. Samples collected by the tribe in 2010 were submitted directly to the laboratory and results were forwarded to Hart Crowser. Results for the 2010 tissue data are presented in Table G-1.

Tissue samples were prepared and homogenized following EPA methods and protocols for Puget Sound. Composite tissue samples from multiple specimens were analyzed to provide representative tissue for testing purposes and obtain an accurate estimate of average chemical concentrations. Sampling stations are depicted on Figure G-2. Only one species was collected at each station, with numbers of individuals per composite varying across the locations, resulting in the following samples collected in 2009 and 2010:

- Three geoduck composite samples, each comprising three specimens, analyzed for all COPCs;

- Nine oyster composite samples comprising 15 oysters, analyzed for metals, PCB Aroclors, and PAHs with dioxins/furans and PCB congeners analyzed in two of the nine oyster samples;

- Twenty composite samples of littleneck clams, manila clams, cockles, and mussels. Each sample was made up of approximately 30 individual organisms and was analyzed for metals, cPAHs, and PCBs, with dioxins/furans and PCB congeners analyzed in two clam samples; and

- One crab composite sample (hepatopancreas and meat analyzed separately) made up of eight adult male specimens, analyzed for all COPCs.

Site-Specific Consumption Rates

Consumption rates for each of these seafood categories were developed following the EPA Tribal Fish and Shellfish Consumption Framework (EPA 2007) and consultation with the Port Gamble S’Klallam Tribe. In addition, although salmon are a highly preferred and consumed fish from Port Gamble Bay, human health risks were not calculated for salmon consumption. The Port Gamble Bay sediment contaminant concentration is not expected to significantly contribute to the salmon tissue concentrations because of the relatively small portion of their lifetime spent in the bay, consistent with EPA guidance in the Framework document (EPA 2007).

A daily tribal shellfish consumption rate of 499 g/day was used with the following breakdown for the species collected from the bay:

- Geoduck – 96.8 g/day. Samples submitted for analysis included the gutball; the skin was removed from the siphon prior to analysis.

- Clams – 255.9 g/day, whole organism without shell. Littleneck clams, manila clams, cockles, and mussels were pooled together under the clam category.

- Oysters – 62.4 g/day, whole organism without shell.

- Dungeness crab – 83.9 g/day, assuming 25 percent hepatopancreas (20.975 g/day) and 75 percent meat (62.925 g/day), which were analyzed separately.

The total ingestion rate for shellfish was taken from the Tribal Framework Document (EPA 2007) using the Suquamish survey data, as agreed with Ecology and the Port Gamble S'Klallam Tribe. The total shellfish ingestion rate was allocated among the shellfish categories of clams, geoducks, oysters, and crabs following the rates identified by EPA in the risk assessment for the LDW site (Windward 2007).

Chronic Daily Intake for Seafood Ingestion Pathway

Contaminant data for evaluating exposures from shellfish consumption were available for crabs, clams, oysters, and geoducks collected from Port Gamble Bay. Chronic daily intakes (CDIs) were calculated for the COPCs identified above. Dioxins, PCBs, and PAHs are evaluated as chemical groups by the following methods:

- Polychlorinated dioxins/furans (PCDD/PCDF) as total tetrachlorodibenzodioxin (TCDD) toxic equivalents (TEQs). World Health Organization (WHO) 2005 dioxin toxicity equivalence factors (TEFs) from MTCA Table 708-1 were used to calculate total TEQs. Non-detected congeners were quantified at one-half their detection limit prior to TEQ calculation.

- Polychlorinated biphenyls (PCBs) both as the sum of Aroclors and TCDD TEQs for PCB congeners with dioxin-like activity. Aroclors were summed following the procedure described in the Sediment Management Standards. Non-detected congeners were quantified at one-half their detection limit prior to TEQ calculation. WHO 2005 PCB congener TEFs listed in MTCA Table 708-4 were used to calculate PCB TEQs.

- Carcinogenic PAHs (cPAHs) as benzo(a)pyrene TEQs. The California-EPA 2005 cPAH TEFs listed in MTCA Table 708-2 were used to calculate benzo(a)pyrene equivalents. Non-detected PAHs were quantified at one-half their detection limit prior to TEQ calculation.

As described below in the Toxicity Assessment, the toxic and carcinogenic form of arsenic is inorganic arsenic. The amount of inorganic arsenic in the shellfish categories was estimated from the measured total arsenic by assuming 1.2 percent inorganic arsenic in clams, and 0.2 percent inorganic arsenic in crabs, as documented for Puget Sound organisms (Ecology 2002).

The CDI for the adult tribal shellfish consumption scenario was calculated as follows:

$$CDI = \frac{\sum (EPC\, x\, IR)\, x\, FI\, x\, EF\, x\, ED\, x\, CF}{BW\, x\, AT}$$

Where:

CDI = Chronic daily intake (mg/kg-day)
EPC = Exposure point concentration (mg/kg) calculated as the mean tissue concentration for each shellfish tissue category
IR = Ingestion rate (499 g/day) allocated among ingestion rates for each seafood category
FI = Fractional seafood intake from Port Gamble (1.0, assumed at 100%)
EF = Exposure frequency (365 days/year)
ED = Exposure duration (70 years)
CF = Conversion factor (0.001 kg/g)
BW = Body weight (79 kg, EPA 2007)
AT = Averaging time (25550 days)

Exposure point concentrations (EPCs) for COPCs in clam, geoduck, and oyster tissues were the calculated mean values, whereas crab meat and hepatopancreas EPCs are based on the single measurement. Upper confidence limits (UCLs) or percentiles were not used for tissue EPCs since the numbers of organisms in the samples were either sufficiently high to be considered representative of average exposures or, in the case of crab, the number of samples was too low.

For dioxins/furans and dioxin-like PCB TEQs, only two samples of clams and two samples of oysters were analyzed; values are the means from the two samples. For dioxin/furans in clams and oysters, all of the samples were non-detect for all congeners and homolog groups; therefore, the EPCs for dioxins/furans in both clams and oysters are the sum of one-half the detection limit for each congener multiplied by the TEF. In other words, the EPCs are based only on the detection limits, not on detected values. In geoducks, dioxin/furans were non-detected except for octachlorodibenzodioxin (OCDD) in all three samples.

PCBs as Aroclors were detected in only two oyster samples collected from the mill area. PCBs as Aroclors were not detected in any of the three geoduck samples, in any of the 20 clam samples, or in any of the crab samples. Because of the lack of detections, bay wide health risks associated with PCBs as Aroclors in shellfish tissue are not estimated. While PCB congeners were not analyzed in the Tribe's 2010 shellfish samples, bay wide carcinogenic risks related to exposure to PCBs are evaluated using PCB TEQs obtained for the 2009 shellfish samples.

In geoducks, all cPAHs were non-detect in all three samples. Some cPAHs were detected in some of the clam and oyster samples and TEQ EPCs are based on one-half detection limits for non-detected individual PAHs.

For crab, the EPCs for all COPCs are single values, and all cPAHs were non-detect, resulting in EPCs for cPAHs in crab based only on one-half the detection limits.

The EPC for each COPC in each shellfish tissue category was multiplied by the IR for that category and the products were summed to arrive at the total CDI for each COPC for shellfish ingestion. Results are summarized in Table G-2.

G.2.3 Direct Sediment Contact Scenario

The direct sediment contact scenario was evaluated as the adult tribal RME clamming scenario, as described in the recent EPA and Ecology-approved human health risk assessment for the LDW site (Windward 2007). The tribal RME clamming direct contact scenario was used to derive sediment cleanup levels for those COCs identified in the tribal shellfish ingestion scenario.

The exposure parameters for direct contact were identified for both incidental sediment ingestion and dermal contact with sediment during tribal clamming activities. Equations and exposure parameter values for evaluating the tribal clamming scenario are presented in Tables G-3 and G-4 for noncarcinogens and carcinogens, respectively. The resultant sediment CULs and comparison with site concentration data are presented in the risk characterization (Section G.4) below.

G.3 Toxicity Assessment

Carcinogenic risks and noncarcinogenic health effects were evaluated separately because of differences in assumptions about the mechanism of these toxic effects. The toxicity values used to evaluate exposure to chemicals with noncarcinogenic and carcinogenic effects are called the reference dose (RfD) and cancer slope factor (CSF), respectively. All toxicity values were taken from the EPA IRIS database.

Carcinogenic chemicals are assumed to have no threshold for carcinogenicity. Carcinogenic risks are presented as the chance of contracting cancer over a 70-year lifetime due to the site-related exposure. These risks are considered by EPA to be excess cancer risks that are in addition to the national rates of cancer for the general population.

Chemicals with noncarcinogenic health effects are generally not toxic below a certain threshold; a critical chemical dose must be exceeded before adverse health effects are observed. The potential for noncarcinogenic health effects is represented by the ratio of the estimated chemical intake to the RfD, and is expressed as a hazard quotient (HQ). Exposures resulting in an HQ less than or equal to 1 are unlikely to result in non-cancer adverse health effects.

For chemicals of potential concern (COPCs) evaluated as a group that consists of dioxins/furans, PCBs, and cPAHs, the CSFs are applied to the TEQs, determined as described above. For arsenic, the carcinogenic and toxic form of the metal is inorganic arsenic, and risks are evaluated by comparison of the CDI for inorganic arsenic with the toxicity value for inorganic arsenic.

G.4 Risk Characterization and Identification of COCs for Shellfish Ingestion

Carcinogenic risks and noncarcinogenic HQs for the tribal shellfish ingestion scenario were calculated separately. Carcinogenic risk estimates were calculated by multiplying the estimated chemical CDI by its CSF. Excess cancer risk estimates for individual COPCs were compared to the MTCA acceptable risk level of 1 x 10^{-6}. A 1 x 10^{-6} excess cancer risk represents an additional one-in-one-million probability that an individual may develop cancer over a 70-year lifetime as a result of indirect exposure to chemicals through the consumption of seafood. Noncarcinogenic HQs are calculated as the ratio of the CDI to the RfD.

COCs were identified for the tribal shellfish ingestion scenario as chemicals with an excess cancer risk greater than 1 x 10^{-6} or a noncarcinogenic HQ greater than 1.0. COCs were retained for additional evaluation of sediment cleanup levels.

Hazard quotients for noncarcinogenic and excess cancer risks for carcinogenic chemicals for the tribal shellfish ingestion scenario are summarized in Table G-5. Cadmium and copper are the only COPCs that have non-cancer HQs greater than 1.0 and were carried through for additional evaluation:

- Cadmium, HQ = 2.0
- Copper, HQ = 1.1.

Inorganic arsenic, dioxin/furans, PCB dioxin-like congeners, and cPAHs are the COPCs with an excess cancer risk above the 1 x 10^{-6} threshold and were carried through for additional evaluation:

- Arsenic, inorganic, excess cancer risk = 1.5 x 10^{-4}
- Dioxin/furan TEQ, excess cancer risk = 3.6 x 10^{-4}
- PCB congener TEQ, excess cancer risk = 1.2 x 10^{-4}
- cPAH TEQ, excess cancer risk = 7.0 x 10^{-5}.

The majority of the calculated excess risk values for dioxins, PCB congeners, and cPAHs is due to substitution of one-half the detection limit for non-detected analytes.

G.5 Risk-Based Concentrations for Sediment

G.5.1 Shellfish Ingestion

Risk-based concentrations in sediment for shellfish ingestion are those concentrations in sediment that correspond to concentrations in shellfish that are protective of human health at the tribal ingestion rate. However, data are insufficient to quantify a relationship between the chemical concentrations in shellfish from Port Gamble Bay with those in bay sediment; hence, a risk-based sediment concentration that directly relates to shellfish ingestion cannot be determined with certainty. Instead, the assumption was made that 100 percent of the shellfish tissue COC concentrations were derived from sediment uptake at the site, and that the potential need for cleanup to protect shellfish ingestion would be based on a comparison of sediment concentrations with natural background levels, consistent with cleanup goals under MTCA.

The above approach for evaluating sediment cleanup to protect shellfish ingestion was used in lieu of developing site-specific, biota-sediment bioaccumulation factors (BSAFs) or borrowing them from other sources. BSAFs quantify the relationship between sediment and tissue chemical concentrations. Development of site-specific BASFs is data intensive, very costly, and constitutes a level of effort considerably beyond the current assessment. In addition, there is a high level of uncertainty in BSAFs taken from other sources because of limited documentation or high uncertainty due to variability. Therefore, it was assumed that sediment concentrations of shellfish tissue COCs exceeded risk-based levels for protection of shellfish ingestion and they were carried forward into an evaluation of sediment cleanup levels and background levels.

G.5.2 Sediment Direct Contact

Identification of a risk-based threshold for direct contact exposure to COPCs in sediment was performed by comparing maximum sediment chemical concentrations at the site to MTCA Method B unrestricted soil screening levels, and to sediment cleanup levels (CULs) developed using the tribal RME clamming scenario and MTCA Method B procedures. In other words, the exposure parameter values (e.g., body weight, averaging time, exposure frequency, exposure duration) for the tribal RME clamming scenario were used with the MTCA procedure for calculating tribal clamming direct contact scenario cleanup levels for sediment.

Only subtidal sediment chemical data are available for Port Gamble Bay; however, subtidal sediment concentrations are not directly comparable to MTCA human health risk-based soil criteria because exposure to subtidal sediment tends to be more limited than to soil or to intertidal sediment (i.e., sediment depth is between 20 and 60 feet below the surface for most of Port Gamble Bay and intertidal samples were not collected). Therefore, Method B direct contact criteria was assumed to provide a conservative comparative screening level below which adverse effects would not be anticipated. MTCA Method B screening criteria and maximum surface sediment concentrations for noncarcinogens and carcinogenic COPCs detected in shellfish tissue samples are presented in Tables G-3 and G-4, respectively. The maximum concentrations of all surface sediment metal, cPAH, total PCBs as Aroclors, and dioxin/furan TEQs are below MTCA Method B criteria for direct contact (incidental ingestion).

Sediment CULs developed for the tribal clamming scenario are compared with maximum surface sediment concentrations for noncarcinogens and carcinogens in Tables G-3 and G-4, respectively. Maximum concentrations of all surface sediment metal, cPAH, total PCBs as Aroclors, and dioxin/furan TEQs are below the CULs developed for the tribal RME clamming scenario for incidental ingestion and dermal contact.

G.6 Background Concentrations for COPCs

G.6.1 Sediment

Concentrations of COPCs in Port Gamble Bay surface sediments were compared with representative background concentrations to evaluate cleanup levels for the protection of tribal shellfish ingestion. This approach was based on the assumption that sediment chemical concentrations would represent the source of chemicals detected in shellfish collected from Port Gamble Bay. Comparison of the sediment levels to background and identifying sediment cleanup levels based on background concentrations is consistent with the MTCA requirement that the cleanup level be set at the highest of three values: the concentration representing a 1 x 10^{-6} risk level, background, or PQL.

Background sediment data were taken from the Puget Sound background sediment database developed from the EPA Bold survey (EPA 2009). Fifteen stations were selected from the Bold survey dataset as reasonably representative of local background conditions for Port Gamble Bay. The following set of stations selected for background are a mix of stations in Hood Canal, Dabob Bay, and Admiralty Inlet:

- Hood Canal – HC_0, HC_1, HC_2, HC_3, and HC_6
- Dabob Bay - R_DAB_0, R_DAB_1, R_DAB_2, R_DAB_5, and R_DAB_7_C
- Admiralty Inlet - AI_1, AI_5_C, AI_11_C, AI_13_C, and AI_20_C_GS

Statistical comparisons between Port Gamble Bay and local Puget Sound background were made for sediment concentrations of COCs identified for the tribal shellfish ingestion scenario. Analyses were performed using EPA's ProUCL (EPA 2007) software. The ProUCL statistical methods were used in place of MTCAStat for data evaluation [WAC 173-340-720 (9)] because the default lognormal assumption in MTCAStat overestimates site upper confidence levels (UCLs) when non-detects are present,. For site data, upper 95 percent confidence limits (UCLs) on the mean were determined from ProUCL. Since ProUCL calculates the 95 percent UCL by several methods, the value recommended by ProUCL was selected. Since dioxin/furan TEQs and cPAH TEQs are calculated from multiple chemical values, the TEQs were calculated using one-half the detection limit for non-detected congeners and individual PAHs in the original data.

As described in MTCA for comparing site with background data, the 95 percent UCLs on the mean of site data for COPCs were compared with local Puget

Sound background 90th percentile values. ProUCL was used to evaluate the background data distribution characteristics, and the reported distribution in ProUCL was used as the basis for the statistical metrics. ProUCL determines the distribution of the data, similar to the calculation of the UCL above, and calculates 90th percentile values for all distribution types that the data fit. However, ProUCL does not recommend a specific distribution or 90th percentile value when the data fit multiple types of distributions. The ProUCL user guide (EPA 2010) recommends against using lognormal distributions for calculating descriptive statistics such as percentiles, due to potential bias that can result in high values. For the 90th percentile values presented herein, those recommended by ProUCL for normal distribution are used preferentially if the data are found to be normally distributed, followed sequentially by the values for lognormal distribution if only lognormal 90th percentiles are provided or they are not higher than the 90th percentile value for gamma distribution, followed by gamma distribution, and finally non-parametric values where a distribution was not discernible.

Summary statistics for site and background sediment data comparisons for metals, dioxin/furans, and total PCBs are presented in Tables G-6 through G-9. Data are expressed in units of dry weight. Conclusions are summarized below:

- Arsenic data could not be statistically evaluated since all Port Gamble Bay sediment sample results were non-detect. The practical quantitation limits (PQLs) were slightly higher than those for the Puget Sound Bold study dataset though still below the SMS criterion. The median bay-wide detection limit was 8 mg/kg compared to a local Puget Sound background median concentration of 6 mg/kg. The Puget Sound background 90th percentile concentration is 10.9 mg/kg with a lognormal distribution (Table G-6). Overall, despite the lack of statistical analysis, the range of undetected arsenic in Port Gamble Bay sediment based on detection limits appears to be within the range of local background concentrations for Puget Sound.

- Copper in sediment in Port Gamble Bay appears to be within background concentrations, with a Port Gamble Bay 95 UCL of 29.2 mg/kg falling below the local Puget Sound background 90th percentiles of 58.0 mg/kg for the gamma distribution (Table G-6).

- Cadmium concentrations in Port Gamble Bay were statistically slightly higher than those in Puget Sound background samples. Port Gamble median and 95 percent UCL on the mean concentrations were 0.75 and 1.5 mg/kg, respectively, while local Puget Sound background median and 90th percentile concentrations were 0.18 and 1.1 mg/kg, respectively. Despite these differences, the maximum concentration of cadmium in Port Gamble

Bay sediment of 2.3 mg/kg was equal to the maximum concentration in background Puget Sound sediment (Table G-6). The highest background station, HC_2, had a cadmium concentration of 2.3 mg/kg, about two times that of the next lowest background station.

- For dioxins/furans with non-detects set equal to one-half the detection limits, Port Gamble median and 95th percentile concentrations were 0.82 and 1.48 ng/kg TEQ, respectively, while local Puget Sound background median and 90th percentile concentrations were 1.06 and 1.58 ng/kg TEQ, respectively (Table G-7). The published Bold Survey value for Puget Sound background dioxin was 4 ng/kg TEQ; however, that value was calculated as the 90 percent upper confidence level on the 90th percentile of the data distribution based on a lognormal data distribution.

- For PCB Aroclors, site and Puget Sound background sediment concentrations could not be calculated since both datasets had greater than 90 percent non-detected values (Table G-8).

- PCB congeners could not be compared, since congeners were not analyzed in Port Gamble sediment samples.

- Carcinogenic PAH TEQs in sediment in Port Gamble Bay, with a 95 UCL of 23.5 µg/kg, exceeds the 90th percentile background TEQ of 6.04 µg/kg for lognormal distribution (Table G-9).

G.6.2 Shellfish Tissue

Concentrations in shellfish tissue from reference locations, which may be considered background values if collected from EPA or Ecology-recognized background locations, were identified for select COCs, where data were available. Reference data were identified for dioxins/furans in crabs, and arsenic in clams and crabs. Although health risks were evaluated for the inorganic form of arsenic in shellfish, the comparison with reference data was evaluated using data on total arsenic. Data are also available in the Ecology EIM database for reference levels of dioxin/furan TEQs in clams, as identified in a DMMP (2009) issue paper; however, all congeners and homolog groups for dioxins/furans were non-detect in clams and oysters from Port Gamble Bay. Therefore, dioxins/furans in clam tissues were not evaluated for reference comparison. PAHs in tissues were not compared with reference tissue levels since background data could not be found.

The following datasets were used for the reference tissue concentrations, with tissue data in wet weight units:

- Data on dioxin TEQs in crabs were available for background locations from the Rayonier Site RI (Dungeness Bay, Freshwater Bay). Data, summarized in Tables G-10 and G-11 consist of 23 crab samples.

- Data on total arsenic in clams collected from background locations were taken from an EPA and Ecology-approved data report for the RI for the LDW site (Windward 2005a). Clams were collected from a bay of Bainbridge Island, and data from a total of six composite samples were available, each composite consisting of 20 individual clams of mixed species. The background data on clams collected from areas that may have been influenced by the ASARCO plume were not used. Data are presented in Table G-12.

- Data on total arsenic in crabs from background locations were taken from an EPA and Ecology-approved data report for the RI for the LDW site (Windward 2005b). Crabs were collected from Blake Island and East Passage; data from a total of 12 composite samples were available, six of Dungeness crab and six of slender crab. Arsenic concentrations are reported for both edible meat and hepatopancreas tissue.

Summary statistics for site and reference tissue data comparison are presented in Tables G-12 through G-14. Conclusions are summarized below:

- The 90th percentile value for dioxin/furan TEQ concentrations in the 23 reference crab muscle samples was 0.37 ng/kg, Two samples collected from Hat Island and Sammish Island had slightly elevated TEQs compared to other background locations however, no rationale could be found for removing these two samples as potential outliers. The Port Gamble Bay single crab muscle TEQ concentration was 0.37 ng/kg, which is identical to the reference 90th percentile values (Table G-14). For reference crab hepatopancreas, the 90th percentile dioxin TEQ was 0.94 ng/kg for the lognormal distribution for the 23 samples. In comparison, the Port Gamble Bay single crab hepatopanceas TEQ was 0.94 ng/kg, which is the same as the reference value.

- Concentrations of total arsenic in reference clams were found to fit a normal distribution, whereas the Port Gamble Bay data were not found to fit a discernible distribution. The 90th percentile value for total arsenic in the reference clams was 2.81 mg/kg, which is higher than the total arsenic 95 UCL of 1.77 mg/kg for Port Gamble Bay clams (Table G-15).

- The 90th percentile for arsenic in 12 reference composite crab meat samples was 10.9 mg/kg, with a mean of 8.4 mg/kg. The concentration of arsenic in the single sample of crab meat from Port Gamble Bay at 7 mg/kg is below these reference values (Table G-16). For crab hepatopancreas, the 90th percentile for arsenic in four composite crab hepatopancreas samples was 11.6 mg/kg, with a mean of 7.9 mg/kg. The concentration of arsenic in the single sample of crab hepatopancreas from Port Gamble Bay at 4 mg/kg is below these reference values.

G.6.3 Summary of the Background Comparisons

Based on the above analysis, concentrations of dioxin/furan TEQs and PCB Aroclors in sediment of Port Gamble Bay were no different from those in background sediment in Puget Sound. The dioxin/furan TEQs in crab meat and hepatopancreas from the bay are within background reference levels, although site data are limited to single composite samples.

For arsenic in sediment, which were all non-detect, the range of detection limits for Port Gamble Bay sediment falls within the range of concentrations in background Puget Sound sediment. Thus, it is uncertain whether arsenic in Port Gamble Bay sediment is within background concentrations. For tissues, arsenic appears to be below reference values for crab meat and hepatopancreas from background locations, although site data are limited to single composite samples. Arsenic in clams from Port Gamble Bay is below reference values from background locations in Puget Sound.

For cadmium, the range of detected concentrations in Port Gamble Bay sediment falls within the range of concentrations in background Puget Sound sediment, but statistically the Port Gamble Bay sediment concentrations exceed background. Copper in Port Gamble Bay sediment clearly is within background.

The cPAH concentrations detected in Port Gamble Bay sediment exceed background concentrations.

G.7 Sediment Cleanup Levels

Sediment cleanup levels are designed to integrate both protection of human health and benthic organisms.

G.7.1 Protection of Human Health

For protection of human health, MTCA requires establishing cleanup levels that are the highest of the following:

- Risk-based concentration corresponding to less than an excess cancer risk of 1 x 10^{-6} or an HQ of 1;

- Practical Quantitation Limit (PQL); or

- Background.

A summary of preliminary cleanup screening levels is presented in Table G-17. Based on the statistical evaluation of risk drivers in the preceding section, the following sediment cleanup levels have been established:

- PAHs – While sediment cPAH concentrations are below MTCA Method B direct contact risk-based concentrations, cPAHs present an excess cancer risk to tribal shellfish ingestion and their concentrations in Port Gamble Bay sediment exceed local background. The selected cleanup level is set at the 90th percentile background cPAH TEQ in sediment of 6.04 µg/kg based on the assumption that shellfish are accumulating their body burdens from the sediments. Since cPAH PQLs for sediment samples collected from Port Gamble Bay were approximately 10 times higher than PQLs for samples collected from background locations, substitution of one-half the PQL has a significant contribution to bay wide sediment TEQ calculations. Therefore, additional sediment PAH analysis using lower detection limits is recommended during long-term monitoring.

- Arsenic – The interim cleanup level for arsenic in sediment is the higher of the PQL or the lognormal 90th percentile background value of 10.9 mg/kg, since arsenic was not detected in Port Gamble Bay sediment samples at detection limits above the 90th percentile background level. Because the range of detection limits for the bay sediment (6 mg/kg to 20 mg/kg) was within the range of detected background values (2.2 mg/kg to 21 mg/kg), whether arsenic in Port Gamble Bay exceeds background is uncertain. Additional sediment arsenic analysis using lower detection limits is recommended during long-term monitoring so that comparisons can be made to Puget Sound background.

- Cadmium – While sediment cadmium concentrations are below MTCA Method B direct contact risk-based concentrations, cadmium presents an excess risk to tribal shellfish ingestion and their concentrations in Port Gamble Bay sediment exceed local background. The selected cleanup level is set at the local Puget Sound 90th percentile background sediment concentration of 1.1 mg/kg based on the assumption that shellfish are accumulating their body burdens from the sediment.

- Dioxins/Furans – Dioxins/furans were eliminated as COCs since statistical evaluation demonstrated that there is no difference between Port Gamble Bay sediment dioxin TEQ concentration and the Puget Sound 90th percentile background concentration of 1.58 ng/kg TEQ; dioxin/furan TEQs in the single crab sample from the bay was below the average background crab tissue concentration; and all dioxin/furan congeners were non-detect in all clam and oyster samples from the Bay. Sediment dioxin analysis may be helpful in establishing trends in long-term monitoring.

- PCB Aroclors – PCBs were eliminated as COCs for the bay wide area since the only Aroclor detections were in two tissue samples collected from the Mill Area. This area will undergo active remediation and PCBs will be removed as part of that cleanup.

G.7.2 Protection of Benthic Organisms

The SMS criteria (chemical and biological toxicity) are deemed to be protective of benthic invertebrates. As described in Section 6.5 of the RI report, only three locations in Port Gamble Bay exceeded SQS chemical criteria and no locations exceeded CSL chemical criteria. Therefore, Port Gamble sediment cleanup for protection of benthic organisms is based on CSL failures from biological toxicity testing.

G.8 Uncertainty Identification

The following uncertainties in the human health risk evaluation have been identified:

- The risk assessment was based on data from various shellfish organisms that were collected from intertidal and subtidal locations in the bay. The lack of collocated sediment and tissue data on organisms from intertidal locations presents uncertainty in the exposure estimates compared to background locations for tribal members who may collect and ingest shellfish from the intertidal areas.

- The crab samples from the bay consisted of a single sample consisting of five organisms, and three geoduck samples consisting of three organisms each. Because of these limited numbers of samples, the exposure estimates for chemicals in crab and geoduck are uncertain.

- The analyses of dioxin/furans in clam and oyster tissues from Port Gamble Bay were limited to two samples and all congeners in both samples were non-detect. Because of the limited number of samples of clams and oysters, it is uncertain if the data are representative of conditions in the bay.

- Survey data on the ingestion of shellfish by the Port Gamble S'Klallam Tribe are unavailable; shellfish ingestion rates were based on the Suquamish Tribe survey and were developed in consultation with the Port Gamble S'Klallam Tribe. Although the applicability of the ingestion rates to the Port Gamble S'Klallam Tribe may entail some uncertainty, they are considered to be sufficiently health protective of potential tribal exposures at Port Gamble Bay.

- Limited tissue analysis data are available for organisms collected from background or reference locations within Puget Sound. For those COCs with limited data, there is uncertainty as to whether Port Gamble Bay tissue concentrations are elevated compared to background areas and, consequently, whether there is increased risk from ingestion of shellfish collected from Port Gamble Bay compared to other areas. Available reference tissue data from background locations suggests that dioxin/furan TEQs in crabs from the bay are comparable to those identified as background crab data, including data reported in muscle tissue (0.3 ng/kg) and hepatopancreas (1.6 ng/kg) of Dungeness crabs collected from Dungeness Bay (PTI 1991). In addition, comparison of arsenic levels in clams and crabs from the bay with reference tissue data from background locations that were collected to support the RI at the LDW site suggests that arsenic is within background. These results suggest that the risks due to arsenic exposure in the shellfish ingestion scenario for the site are at background levels.

- Although statistical analysis following the MTCA method indicated that the Port Gamble Bay sediment 95 UCL concentration of cadmium exceeded 90th percentile background in sediment, the range of detected cadmium concentrations in Port Gamble Bay sediment was within the range of detected concentrations in the background dataset. Additional sediment cadmium analysis is recommended during long-term monitoring.

- Background tissue data for cadmium and copper in shellfish tissue are not readily available and, therefore, it is unknown if ingestion of shellfish from Port Gamble Bay presents an elevated risk compared to shellfish from background locations.

- While tissue samples were analyzed for both Aroclors and PCB congeners, sediment was only analyzed for Aroclors and the number of detections was too low for background analysis following the MTCA method. Therefore, comparison with Puget Sound background PCBs concentrations could not be performed reliably.

- While inorganic arsenic concentrations in shellfish resulted in excess cancer risk greater than 1×10^{-6} for tribal shellfish ingestion, total arsenic was not detected in surface sediment samples (median reporting limit = 8 mg/kg) of Port Gamble Bay and, therefore, a statistical comparison with Puget Sound background sediment arsenic concentrations was not possible. Because the range of detection limits for total arsenic was within the range of detected arsenic in the background dataset, there is uncertainty whether arsenic in Port Gamble Bay sediment is within background. Additional sediment arsenic analysis using lower detection limits is recommended during long-term monitoring so that comparisons can be made to Puget Sound background sediment.

G.9 Summary

In summary, the data collected in shellfish tissues from Port Gamble Bay demonstrate that carcinogenic PAHs present the majority of site-related risks to tribal members who may consume shellfish from the Bay, and they are identified as the risk drivers for the tribal shellfish ingestion scenario. Carcinogenic PAHs are also elevated above background in sediment. Risks associated with other COCs such as cadmium and copper also exceed regulatory thresholds. However, all other COPCs for the site are either:

- Below risk thresholds for shellfish ingestion or sediment contact;

- Within background for sediment (e.g., dioxins/furans, PCBs, copper) or within background reference values for tissue (e.g., dioxins/furans, arsenic); or

- Have reasonable uncertainty as to whether sediment concentrations are greater or less than background (e.g., arsenic).

The primary risk driver for human health risks is identified as cPAHs through shellfish ingestion. However, a large component of the calculated excess risk for cPAHs is due to substitution of one-half the detection limit for non-detected analytes.

G.10 References

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Table G-1 - Summary of Port Gamble S'Klallam Tribe Validated Shellfish Sampling Results - April 2010 Sampling

Task	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**
Station ID	**Mill Site B-1**	**Mill Site B-1**	**Mill Site B-1**	**Mill Site B-2**	**Mill Site B-2**	**Mill Site B-2**	**Mill Site B-3**	**Mill Site B-3**	**Landfill-2**	**Landfill-2**
Sample ID	**B1_C_PGST_100429**	**B1_LN_PGST_100429**	**B1_O_PGST_100429**	**B2_C_PGST_100429**	**B2_O_PGST_100429**	**B3_C_PGST_100429**	**B3_MUS_PGST_100429**	**B3_O_PGST_100429**	**LF2_C_PGST_100429**	**LF2_LN_PGST_100429**
Sample Date	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**
Species	**Cockles**	**Littleneck Clams**	**Oysters**	**Cockles**	**Oysters**	**Cockles**	**Mussels**	**Oysters**	**Cockles**	**Littleneck Clams**
Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Conventional Parameters (pct)										
Lipids	**0.33**	**0.46**	**1.75**	**0.43**	**2.28**	**0.40**	**1.54**	**2.13**	**0.28**	**1.37**
Metals (mg/kg)										
Arsenic	1 U	**2**	**1**	1 U	**1**	1 U	**1**	**2**	1 U	**1**
Cadmium	**0.04**	**0.29**	**1.00**	**0.05**	**1.27**	**0.04**	**0.57**	**1.35**	0.04 U	**0.09**
Chromium	**0.40**	**1.90**	**0.20**	**0.40**	**0.20**	**0.40**	**0.20**	**0.20**	**0.30**	**0.70**
Copper	**1.9**	**25.6**	**9.4**	**5.8**	**12.4**	**3.8**	**42.9**	**33.5**	**1.2**	**3.8**
Lead	0.4 U	**2.0**	0.4 U	**0.5**	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Mercury	0.005 U	**0.006**	**0.012**	**0.005**	**0.010**	0.005 U	**0.005**	**0.010**	**0.006**	**0.008**
Silver	0.06 UJ	0.06 UJ	**0.1 J**	0.06 UJ	**0.11 J**	0.06 UJ	0.06 UJ	**0.15 J**	0.06 UJ	0.06 UJ
Zinc	**13**	**27**	**161**	**16**	**185**	**13**	**23**	**263**	**9**	**13**
Aromatic Hydrocarbons (µg/kg)										
Benzo(a)anthracene	**1.3**	**1.4**	**3.9**	**4.2**	**25.0**	**3.7**	**0.8**	**48.0**	**0.7**	**0.7**
Benzo(a)pyrene	0.5 U	**0.6**	**0.9**	**1.0**	**3.9**	**0.9**	0.5 U	**7.7**	0.5 U	0.5 U
Benzo(b)fluoranthene	0.5 U	**0.7**	**3.0**	**1.6**	**13.0**	**1.2**	**0.9**	**28.0**	0.5 U	**0.7**
Benzo(k)fluoranthene	0.5 U	**0.7**	**3.0**	**1.6**	**13.0**	**1.2**	**0.9**	**28.0**	0.5 U	**0.7**
Chrysene	**1.6**	**1.8**	**8.1**	**5.0**	**41.0**	**5.0**	**1.7**	**62.0**	**1.1**	**1.4**
Dibenzo(a,h)anthracene	0.5 U	0.5 U	0.5 U	0.5 U	**0.5**	0.5 U	0.5 U	**1.1**	0.5 U	0.5 U
Indeno(1,2,3-c,d)pyrene	0.5 U	0.5 U	0.5 U	0.5 U	**0.6**	0.5 U	0.5 U	**1.3**	0.5 U	0.5 U
Total cPAH TEQ (CAL EPA 2005; U = 1/2)	**0.5**	**0.9**	**2.0**	**1.8**	**9.5**	**1.6**	**0.6**	**19.0**	**0.4**	**0.5**
PCB Aroclors (µg/kg)										
Aroclor 1016	4 U	4 U	4 U	3.9 U	3.9 U	3.9 U	4 U	4 U	3.9 U	3.9 U
Aroclor 1221	4 U	4 U	4 U	3.9 U	3.9 U	3.9 U	4 U	4 U	3.9 U	3.9 U
Aroclor 1232	4 U	6 U	4 U	5.9 U	3.9 U	3.9 U	4 U	4 U	3.9 U	3.9 U
Aroclor 1242	4 U	4 U	4 U	3.9 U	**21**	**4.2**	4 U	4 U	3.9 U	3.9 U
Aroclor 1248	4 U	4 U	4 U	3.9 U	3.9 U	3.9 U	4 U	**7.2**	3.9 U	3.9 U
Aroclor 1254	4 U	4 U	6 U	5.9 U	16 U	3.9 U	4 U	8 U	3.9 U	3.9 U
Aroclor 1260	4 U	4 U	4 U	3.9 U	3.9 U	3.9 U	4 U	4 U	3.9 U	3.9 U
Total PCB Aroclors (U = 0)	4 U	6 U	6 U	5.9 U	**21**	**4.2**	4 U	**7.2**	3.9 U	3.9 U

Table G-1 - Summary of Port Gamble S'Klallam Tribe Validated Shellfish Sampling Results - April 2010 Sampling

Task	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**	**PortGambleTissue2010**
Station ID	**Landfill-2**	**Landfill-2**	**Landfill-3**	**Landfill-3**	**Landfill-3**	**Landfill-4**	**Landfill-4**	**Landfill-4**	**Landfill-4**	**Log Site**
Sample ID	**LF2_M_PGST_100429**	**LF2_O_PGST_100429**	**LF3_C_PGST_100429**	**LF3_LN_PGST_100429**	**LF3_M_PGST_100429**	**LF4_C_PGST_100429**	**LF4_LN_PGST_100429**	**LF4_M_PGST_100429**	**LF4_O_PGST_100429**	**LS_C_PGST_100429**
Sample Date	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**
Species	**Manila Clams**	**Oysters**	**Cockles**	**Littleneck Clams**	**Manila Clams**	**Cockles**	**Littleneck Clams**	**Manila Clams**	**Oysters**	**Cockles**
Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Conventional Parameters (pct)										
Lipids	**0.49**	**1.69**	**0.40**	**0.29**	**0.23**	**0.22**	**0.32**	**0.41**	**1.66**	**0.39**
Metals (mg/kg)										
Arsenic	**2**	**1**	1 U	**1**	**2**	1 U	**2**	**1**	**1**	1 U
Cadmium	**0.29**	**1.18**	0.04 U	**0.25**	**0.27**	0.04 U	**0.37**	**0.25**	**1.20**	**0.04**
Chromium	**0.30**	**0.20**	**0.20**	**0.40**	**0.20**	**0.30**	**0.20**	**0.20**	**0.10**	**0.20**
Copper	**2.6**	**8.4**	**0.9**	**6.1**	**3.3**	**1.0**	**4.4**	**4.8**	**8.4**	**1.1**
Lead	0.4 U	0.4 U	0.4 U	**0.4**	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Mercury	**0.008**	**0.011**	**0.005**	**0.006**	**0.009**	**0.006**	**0.009**	**0.010**	**0.014**	0.005 U
Silver	0.06 UJ	**0.13 J**	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	0.06 UJ	**0.1 J**	**0.13 J**	0.06 UJ
Zinc	**10**	**135**	**10**	**16**	**10**	**9**	**14**	**11**	**165**	**10**
Aromatic Hydrocarbons (µg/kg)										
Benzo(a)anthracene	**1.5**	**1.7**	**0.6**	**4.2**	**2.9**	0.5 U	0.5 U	**1.9**	**2.0**	0.5 U
Benzo(a)pyrene	0.5 U	**0.7**	0.5 U	**3.3**	**2.0**	0.5 U	0.5 U	0.5 U	**0.5**	0.5 U
Benzo(b)fluoranthene	0.5 U	**2.3**	0.5 U	**2.0**	**1.2**	0.5 U	0.5 U	0.5 U	**1.9**	0.5 U
Benzo(k)fluoranthene	0.5 U	**2.3**	0.5 U	**2.0**	**1.2**	0.5 U	0.5 U	0.5 U	**1.9**	0.5 U
Chrysene	**1.8**	**4.2**	**0.9**	**4.5**	**3.2**	**0.7**	0.5 U	**2.1**	**4.4**	**0.9**
Dibenzo(a,h)anthracene	0.5 U	0.5 U	0.5 U	**0.6**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Indeno(1,2,3-c,d)pyrene	0.5 U	0.5 U	0.5 U	**1.3**	**0.8**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total cPAH TEQ (CAL EPA 2005; U = 1/2)	**0.5**	**1.4**	**0.4**	**4.4**	**2.7**	**0.4**	0.5 U	**0.6**	**1.2**	**0.4**
PCB Aroclors (µg/kg)										
Aroclor 1016	4 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	4 U
Aroclor 1221	4 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	4 U
Aroclor 1232	4 U	5.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	4 U
Aroclor 1242	4 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	4 U
Aroclor 1248	4 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	6 U	4 U
Aroclor 1254	4 U	9.8 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	9.9 U	4 U
Aroclor 1260	4 U	3.9 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	4 U	4 U
Total PCB Aroclors (U = 0)	4 U	9.8 U	3.9 U	3.9 U	4 U	3.9 U	4 U	3.9 U	9.9 U	4 U

Table G-1 - Summary of Port Gamble S'Klallam Tribe Validated Shellfish Sampling Results - April 2010 Sampling

Task	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010	PortGambleTissue2010
Station ID	**Log Site**	**Log Site**	**Log Site**	**Point Julia Reference**	**Reference Site 1**	**Reference Site 1**	**Reference Site 1**	**South Reservation**	**South Reservation**
Sample ID	**LS_LN_PGST_100429**	**LS_M_PGST_100429**	**LS_O_PGST_100429**	**PJ_O_PGST_100429**	**RS1_C_PGST_100430**	**RS1_M_PGST_100430**	**RS1_O_PGST_100430**	**SRS_C_PGST_100429**	**SRS_O_PGST_100429**
Sample Date	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/29/2010**	**4/30/2010**	**4/30/2010**	**4/30/2010**	**4/29/2010**	**4/29/2010**
Species	**Littleneck Clams**	**Manila Clams**	**Oysters**	**Oysters**	**Cockles**	**Manila Clams**	**Oysters**	**Cockles**	**Oysters**
Sample Type	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
Conventional Parameters (pct)									
Lipids	**0.47**	**0.38**	**1.65**	**2.43**	**0.39**	**0.71**	**1.91**	**0.28**	**2.63**
Metals (mg/kg)									
Arsenic	**3**	**3**	**1**	**2**	1 U	**2**	**2**	1 U	**2**
Cadmium	**0.45**	**0.35**	**1.28**	**1.13**	**0.05**	**0.25**	**1.23**	**0.04**	**1.49**
Chromium	**0.20**	**0.20**	**0.20**	**0.10**	**0.40**	**0.30**	**0.80**	**0.20**	**0.20**
Copper	**3.3**	**6.7**	**9.9**	**6.9**	**1.3**	**9.7**	**8.8**	**1.5**	**9.5**
Lead	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**0.5**	0.4 U	0.4 U	0.4 U
Mercury	**0.008**	**0.008**	**0.011**	**0.010**	**0.009**	**0.010**	**0.012**	0.005 U	**0.012**
Silver	**0.07 J**	**0.08 J**	**0.14 J**	**0.13 J**	**-- R**	**0.09 J**	**0.17 J**	**-- R**	**0.16 J**
Zinc	**13**	**12**	**130**	**139**	**11**	**16**	**100**	**9**	**174**
Aromatic Hydrocarbons (µg/kg)									
Benzo(a)anthracene	0.5 U	**1.1**	**0.9**	**0.9**	0.5 U	0.5 U	0.5 U	0.5 U	**1.3**
Benzo(a)pyrene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.5**
Benzo(b)fluoranthene	0.5 U	0.5 U	**0.8**	**1.1**	0.5 U	0.5 U	0.5 U	0.5 U	**2.0**
Benzo(k)fluoranthene	0.5 U	0.5 U	**0.8**	**1.1**	0.5 U	0.5 U	0.5 U	0.5 U	**2.0**
Chrysene	0.5 U	**1.2**	**2.4**	**2.9**	0.5 U	**0.6**	**1.4**	0.5 U	**3.8**
Dibenzo(a,h)anthracene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Indeno(1,2,3-c,d)pyrene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Total cPAH TEQ (CAL EPA 2005; U = 1/2)	0.5 U	**0.5**	**0.6**	**0.6**	0.5 U	**0.4**	**0.4**	0.5 U	**1.1**
PCB Aroclors (µg/kg)									
Aroclor 1016	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Aroclor 1221	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Aroclor 1232	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Aroclor 1242	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Aroclor 1248	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Aroclor 1254	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Aroclor 1260	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U
Total PCB Aroclors (U = 0)	4 U	4 U	3.9 U	4 U	4 U	4 U	3.9 U	4 U	4 U

Notes:
Bold = Detected result
J = Estimated value
U = Compound analyzed, but not detected above detection limit
UJ = Compound analyzed, but not detected above estimated detection limit
R = Rejected

Table G-2 - Chronic Daily Intake From Seafood Ingestion

CDI = (EPC x IR x FI x EF x ED x CF)/(BW x AT)

EPC = Chemical Specific exposure point concentration (average tissue concentration by species) in mg/kg
IR = Ingestion Rate (499 g/day)
1.0 nal intake from seafood (1.0)
365 - not used ulate on a daily basis or express as a fraction of days exposed per yea
70 duration (70 yrs or 25550 days)
0.001 version factor (0.001 kg/g)
79 = body weight (79 kg)
70 ng time (70 yrs or 25550 days)

Chemical	Geoduck EPC (mg/kg)	Geoduck IR (g/day)	Geoduck EPC x IR	Clam EPC (mg/kg)	Clam IR (g/day)	Clam EPC x IR	Oyster EPC (mg/kg)	Oyster IR (g/day)	Oyster EPC x IR	Crab Hepato EPC (mg/kg)	Crab Hepato IR (g/day)	Crab Hepato EPC x IR	Crab Meat EPC (mg/kg)	Crab Meat IR (g/day)	Crab Meat EPC x IR	Total EPC x IR (mg-g/kg-day)	CDI (mg/kg-day)
Arsenic (inorganic)	0.020	96.8	1.94	0.016	255.9	3.99	0.014	62.4	0.88	0.008	20.975	0.1678	0.014	62.925	0.88	7.86	9.9E-05
Cadmium	0.21	96.8	20.65	0.20	255.9	51.82	1.19	62.4	74.33	0.34	20.975	7.1315	0.04	62.925	2.52	156.4	2.0E-03
Chromium	0.13	96.8	12.91	0.38	255.9	95.96	0.18	62.4	11.09	0.10	20.975	2.0975	0.10	62.925	6.29	128.4	1.6E-03
Copper	4.13	96.8	399.8	6.15	255.9	1,574	11.10	62.4	693	19.20	20.975	402.72	8.65	62.925	544.3	3,613	4.6E-02
Lead	0.20	96.8	19.36	0.32	255.9	80.61	0.20	62.4	12.48	0.20	20.975	4.195	0.20	62.925	12.59	129.2	1.6E-03
Silver	1.18	96.8	114.5	0.04	255.9	11.26	0.12	62.4	7.77	0.50	20.975	10.4875	0.19	62.925	11.96	156.0	2.0E-03
Zinc	20.60	96.8	1,994	12.79	255.9	3,273	159.8	62.4	9,970	15.10	20.975	316.7225	50.20	62.925	3,159	18,713	2.4E-01
Mercury	0.01	96.8	1.29	0.01	255.9	1.52	0.01	62.4	0.69	0.03	20.975	0.62925	0.05	62.925	2.96	7.09	9.0E-05
TCDD TEQ	3.41E-07	96.8	3.30136E-05	3.59E-07	255.9	9.19E-05	3.59E-07	62.4	2.24E-05	9.40E-07	20.975	1.97E-05	3.70E-07	62.925	2.33E-05	1.90E-04	2.41E-09
PCB TEQ	6.23E-08	96.8	6.03479E-06	5.83E-08	255.9	1.49E-05	7.07E-08	62.4	4.41E-06	1.66E-06	20.975	3.47E-05	6.31E-08	62.925	3.97E-06	6.41E-05	8.11E-10
PAH TEQ	1.32E-03	96.8	0.13	0.0010	255.9	0.26	0.0042	62.4	0.26	1.27E-03	20.975	0.0266	1.34E-03	62.925	0.0844	0.76	9.60E-06

Arsenic is assumed to be 1.2% inorganic in clams and oysters, and 0.2% inorganic in crabs (Ecology 2002).
Tissue concentration data are in wet weight.
Non-detects quantified at 1/2 detection limit
CDI = chronic daily intake
EPC = exposure point concentration
IR = ingestion rate
TEQ = Toxic equivalents
Shaded EPCs - Analyte was not detected in any sample. Concentrations are based on substitution of one-half the detection limit.

Table G-3 - Noncarcinogenic Sediment Screening Levels with Incidental Ingestion and Dermal Exposure

	Input parameters											Calculated Sediment Screening Values								
	Haz Quotient	**Average body weight**	**averaging time**	**Unit conversion factor**	**Soil Ingestion Rate**	**Gastro absorption factor**	**Exposure Frequency**	**Exposure duration**	**Dermal surface area**	**Adherence factor**		**Arsenic Ingestion CUL**	**Arsenic Dermal CUL**	**Arsenic concurrent exposure CUL**	**Cadmium Ingestion CUL**	**Cadmium Dermal CUL**	**Cadmium concurrent exposure CUL**	**Copper Ingestion CUL**	**Copper Dermal CUL**	**Copper concurrent exposure CUL**
	Risk	**ABW**	**AT**	**UCF**	**SIR**	**AB1**	**EF**	**ED**	**SA**	**AF**										
		kg	years	mg sed/kg sed	mg sed/day		event/yr	years	cm2	mg/cm2/event		mg/kg sed DW	mg/kg sed DW	mg/kg sed DW	mg/kg sed DW	mg/kg sed DW	mg/kg sed DW	mg/kg sed DW	mg/kg sed DW	mg/kg sed DW
MTCA Method B Unrestricted Use	**1**	**16**	**6**	**1,000,000**	**200**	**1**	**365**	**6**	**2200**	**0.2**		**24.0**	**218**	**21.6**	**80**	**727**	**72**	**2,960**	**2.69E+04**	**2,667**
Tribal intertidal clamming adult	1	81.8	64	1,000,000	100	1	120	64	6040	0.30		**746**	**824**	**391.6**	**2,488**	**2,746**	**1,305**	**92,059**	**101,610**	**48,300**
Maximum Port Gamble Sediment Concentration (HC Bay wide Samples only)														**20 U**			**2**			**40**

$$\text{cleanup standard} = \frac{1}{\dfrac{1}{\text{Ingestion Component}} \quad \text{plus} \quad \dfrac{1}{\text{Dermal Component}}}$$

Incidental ingestion

$$\text{Sediment Cleanup Level (ug/kg)} = \frac{\text{RFDo* Hazard Quotient * ABW * AT * UCF}}{\text{SIR * AB1* EF * ED}}$$

Parameter	Definition	Value
Haz Quotient	Acceptable hazard quotient unitless	1.00E+00
ABW	Average body weight, kg	16
AT	Averaging Time, Years	75
UCF	Unit Conversion Factor, mg/kg	1.00E+06
Ref Dose	Reference Dose, mg/kg-day	Chemical Specific
SIR	Soil Ingestion Rate, mg/day	200
AB1	Gastrointestinal absorption fraction, unitless	1
EF	Exposure Frequency, unitless	1
ED	Exposure Duration, years	6

Chemical - Specific Input Parameters	Reference Dose		
	mg chem/kg day		
	oral (RFDo)	dermal (RFDd)	dermal absorption fraction (ABS)
arsenic	3.00E-04	6.00E-05	0.01
cadmium	1.00E-03	2.00E-04	0.01
copper	3.70E-02	7.40E-03	0.01

Dermal exposure

$$\frac{\text{RFDd* HazQuotient * ABW * AT* UCF1}}{\text{EF * ED * SA * AF * ABS}}$$

Parameter	Definition	Value
Hazard Quotient	Acceptable hazard quotient unitless	1.00E-06
ABW	Average body weight, kg	16
AT	Averaging Time, Years	75
UCF1	Unit Conversion Factor, mg/kg	1.00E+06
UCF2	Unit Conversion Factor, µg/mg	1000
RFDo	Oral Reference Dose, mg/kg-day	Chemical Specific
CPFd	Dermal Cancer Potency Factor, kg-day/mg	Chemical Specific
EF	Exposure Frequency, unitless	1
ED	Exposure Duration, years	6
SIR	Soil Ingestion Rate, mg/day	200
AB1	Gastrointestinal absorption fraction, unitless	1
SA	Dermal Surface Area exposed, cm^2	2200
AF	Soil Adherence Factor, mg/cm^2-day	0.2
ABS	Dermal absorption fraction, unitless	Chemical Specific

Table G-4 - Carcinogenic Sediment Screening Levels for Incidental Ingestion and Dermal Exposure

	Input parameters											Calculated Sediment Screening Values											
	Risk	**Average body weight**	**averaging time**	**Unit conversion factor**	**Soil Ingestion Rate**	**Gastro absorption factor**	**Exposure Frequency**	**Exposure duration**	**Dermal surface area**	**Adherence factor**		**Dioxin TEQ Ingestion CUL**	**Dioxin TEQ Dermal CUL**	**Dioxin TEQ concurrent exposure**	**Total PCB Ingestion CUL**	**Total PCB Dermal CUL**	**Total PCB concurrent exposure**	**cPAH TEQ Ingestion CUL**	**cPAH TEQ Dermal CUL**	**cPAH TEQ concurrent exposure CUL**	**Arsenic Ingestion CUL**	**Arsenic Dermal CUL**	**Arsenic concurrent exposure CUL**
	Risk	**ABW**	**AT**	**UCF**	**SIR**	**AB1**	**EF**	**ED**	**SA**	**AF**													
		kg	years	mg sed/kg sed	mg sed/day		event/yr	years	cm2	mg/cm2/event		pg chem/g sed DW	pg chem/g sed DW	pg chem/g sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW	ug/kg sed DW
MTCA Method B Unrestricted Use	**1.00E-06**	**16**	**75**	**1,000,000**	**200**	**1**	**365**	**6**	**2200**	**0.2**		**7**	**51**	**6**	**500**	**1,315**	**362**	**137**	**426**	**104**	**667**	**426**	**260**
Tribal intertidal clamming adult	1.00E-06	81.8	70	1,000,000	100	1	120	64	6040	0.3		18	15	8	1361	395	306	373	128	95	1814	656	482
Maximum Port Gamble Sediment Concentration (HC Bay wide Samples only)														**2.5**			**16**			**60**			**20 U**

$$\text{cleanup standard} = \frac{1}{\dfrac{1}{\text{Ingestion Component}} \text{ plus } \dfrac{1}{\text{Dermal Component}}}$$

Incidental ingestion

$$\text{Sediment Cleanup Level (ug/kg)} = \frac{\text{Risk * ABW * AT * UCF}}{\text{CPFo* SIR * AB1* EF * ED}}$$

Parameter	Definition	Value
Risk	Acceptable cancer risk level, untiless	1.00E-06
ABW	Average body weight, kg	16
AT	Averaging Time, Years	75
UCF	Unit Conversion Factor, mg/kg	1.00E+06
CPFo	Carcinogenic Potency Factor, kg-day/mg	Chemical Specific
SIR	Soil Ingestion Rate, mg/day	200
AB1	Gastrointestinal absorption fraction, unitless	1
EF	Exposure Frequency, unitless	1
ED	Exposure Duration, years	6

Chemical - Specific Input Parameters	Cancer potency factor		
	mg chem/kg BW/day		
	oral (CPFo)	dermal (CPFd)	dermal absorption
2,3,7,8 TCDD TEF	150,000	300,000	0.03
PCB	2	2.47	0.14
cPAH	7.3	8.20	0.13
arsenic	1.5	1.60	0.13

Dermal exposure

$$\frac{\text{Risk * ABW * AT* UCF1}}{\text{EF * ED * SA * AF * ABS * CPFd}}$$

Parameter	Definition	Value
Risk	Acceptable cancer risk level, untiless	1.00E-06
ABW	Average body weight, kg	16
AT	Averaging Time, Years	75
UCF1	Unit Conversion Factor, mg/kg	1.00E+06
UCF2	Unit Conversion Factor, μg/mg	1000
CPFo	Carcinogenic Potency Factor, kg-day/mg	Chemical Specific
CPFd	Dermal Cancer Potency Factor, kg-day/mg	Chemical Specific
EF	Exposure Frequency, unitless	1
ED	Exposure Duration, years	6
SIR	Soil Ingestion Rate, mg/day	200
AB1	Gastrointestinal absorption fraction, unitless	1
SA	Dermal Surface Area exposed, cm^2	2200
AF	Soil Adherence Factor, mg/cm^2-day	0.2
ABS	Dermal absorption fraction, unitless	Chemical Specific

Table G-5 - Estimated Risks for the Tribal Shellfish Ingestion Scenario

Chemical	Non-cancer RfD (mg/kg-day)	Oral Cancer Slope Factor (kg-day/mg)	Hazard Quotient (HQ)	Excess Cancer Risk
Arsenic (inorganic)	0.0003	1.5	0.3	1.5E-04
Cadmium	0.001		2.0	
Chromium	0.003		0.5	
Copper	0.04		1.1	
Lead				
Silver	0.005		0.4	
Zinc	0.3		0.8	
Mercury	0.0001		0.9	
TCDD TEQ		1.50E+05		3.6E-04[a]
PCB TEQ		1.50E+05		1.2E-04[a]
	0.00002			
PAH TEQ		7.3		7.0E-05[a]
			Total Cancer Risk	**7.0E-04**

RfD = Reference dose
TEQ = Toxic equivalents

a - A large component of the calculated excess risk values for dioxins, PCB congeners, and cPAHs is due to substitution of one-half the detection limit for non-detected analytes.

Table G-6 - Comparison of Port Gamble Bay and Local Puget Sound Background Metal Concentrati

	Port Gamble Bay Sediment			Local Puget Sound Background Sediment		
	As	Cd	Cu	As	Cd	Cu
Raw Statistics						
Number of Samples (discrete)	42	42	42	15	15	15
Minimum	6 U	0.3	3.4	2.2	0.16	4
Maximum	20 U	2.3	40.2	21	2.3	91.2
Mean	8.5 U	1.135	20.9	6.007	0.478	26.65
Median	8 U	0.75	16.8	6.0	0.18	15.7
Standard Deviation	NA	0.66	12.37	4.526	0.645	23.99
ProUCL Statistics	95% UCL of Mean			90th Percentile of Data		
Normal	NA	--	--	--	--	--
Lognormal	NA	--	--	10.89[a]	--	65.12
Gamma	NA	--	--	11.01	--	58.01[b]
Nonparametric	NA	1.491	29.23	13.56	1.097	70.5

NA - Not Avaiable due to limited dataset, all nondetected values.

a - Lognormal distribution used to calculate background arsenic 90th percentile.

b - Gamma distribution used to calculate background copper 90th percentile.

Table G-7 - Comparison of Port Gamble Bay and Local Puget Sound Background Sediment Dioxin Concentrations

	Port Gamble Bay Sediment	Local Puget Sound Background Sediment
	TEQ	TEQ
Raw Statistics		
Number of Samples (discrete)	10	15
Minimum	0.344	0.258
Maximum	2.48	1.848
Mean	1.061	0.946
Median	0.82	1.06
Standard Deviation	0.722	0.497
ProUCL Statistics	95% UCL of Mean	90th Percentile of Data
Normal	1.479	1.583[a]
Lognormal	--	1.661
Gamma	--	1.653
Nonparametric	--	1.813

Values for non-detected congeners were set at 1/2 detection limit.

a - Normal distribution used to calculate background dioxin 90th percentile.

Table G-8 - Comparison of Port Gamble Bay and Local Puget Sound Background Sediment PCB Aroclor Concentrations

	Total PCBs (µg/kg)	
	Port Gamble Bay	Local Puget Sound Background Sediment
Number of detections	2	0
Maximum detected concentration	16	NA
Minimum detected concentration	4.3	NA
Average	NA	NA
Median	NA	NA
Standard deviation	NA	NA
MTCAStat 90th percentile of Data		NA
ProUCL 95% UCL of Mean	NA	

There were too few detected values to allow statistical evaluation

Table G-9 - Sediment cPAHs TEQ Statistics Summary

	Port Gamble Bay Sediment		Local Puget Sound Background Sediment	
	TEQ (1/2 DL)	TEQ (0 DL)	TEQ (1/2 DL)	TEQ (0 DL)
Raw Statistics				
Number of Samples (discrete)	42	42	15	15
Minimum	14.35	0	1.569	0.278
Maximum	60.44	59.44	8.059	7.809
Mean	21.22	12.74	3.412	2.197
Median	16.2	12.89	2.936	0.986
Standard Deviation	8.849	13.78	1.961	2.932
ProUCL Statistics	95% UCL of Mean		90th Percentile of Data	
Normal	--	--	--	--
Lognormal	--	--	6.04	--
Gamma	--	--	9.05	--
Nonparametric	23.52	16.23	5.7	4.99
MTCA Statistics	95% UCL of Mean		90th Percentile of Data	
Site (Site97.xls)				
95% UCL of Mean (Normal)	--	--		
95% UCL of Mean (Lognormal)	--	--		
95% UCL of Mean (Neither)	23.464	-- [a]		
Background (Background97.xls)				
90th Percentile of Data (Normal)			--	--
90th Percentile of Data (Lognormal)			6.11	--
90th Percentile of Data (Neither - Nonparametric)			--	3.76 (6.55[b])

Notes:

a - Too many censored values (10) to calculate

b - Since the value exceeds the 4 X 50th limit, use 3.76 as the background value.

Table G-10 - Background Dungeness Crab Muscle Tissue Dioxin TEQs

Sampling Site	Sampling Location	Collection Date	Sample ID	Chemical	Units	TEQ ND=1/2DL	TEQ ND=0
Esquimalt Harbour Reference Site	Pedder Bay	9/4/2008	CR08-36DA-F	Total Dioxin TEQ	ng/kg	0.341143	0.340643
Esquimalt Harbour Reference Site	Pedder Bay	9/4/2008	CR08-36DG-K	Total Dioxin TEQ	ng/kg	0.321875	0.00936
Esquimalt Harbour Reference Site	Pedder Bay	9/4/2008	CR08-38DA-F	Total Dioxin TEQ	ng/kg	0.275522	0.064022
RAYONIER-MILL-DB-01-BI	Dungeness Bay	10/2/2006	DB-02-C	Total Dioxin TEQ	ng/kg	0.044454935	0.0080185
RAYONIER-MILL-DB-01-BI	Dungeness Bay	10/2/2006	DB-03-C	Total Dioxin TEQ	ng/kg	0.049786825	0.0048244
RAYONIER-MILL-DB-02-BI	Dungeness Bay	10/2/2006	DB-06-C	Total Dioxin TEQ	ng/kg	0.064764915	0.0339402
RAYONIER-MILL-DB-02-BI	Dungeness Bay	10/2/2006	DB-07-C	Total Dioxin TEQ	ng/kg	0.06742296	0.029968
RAYONIER-MILL-DB-02-BI	Dungeness Bay	10/2/2006	DB-08-C	Total Dioxin TEQ	ng/kg	0.07214801	0.0044035
RAYONIER-MILL-DB-03-BI	Dungeness Bay	10/2/2006	DB-01-C	Total Dioxin TEQ	ng/kg	0.04948451	0.02071991
RAYONIER-MILL-DB-04-BI	Dungeness Bay	10/2/2006	DB-04-C	Total Dioxin TEQ	ng/kg	0.04557149	0.0042541
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-01-C	Total Dioxin TEQ	ng/kg	0.05096256	0.00291
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-02-C	Total Dioxin TEQ	ng/kg	0.02948295	0.00288
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-03-C	Total Dioxin TEQ	ng/kg	0.04365643	0.01326
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-04-C	Total Dioxin TEQ	ng/kg	0.0326878	0.00223
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-05-C	Total Dioxin TEQ	ng/kg	0.027320175	0.00204
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-06-C	Total Dioxin TEQ	ng/kg	0.028159965	0.00233
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-07-C	Total Dioxin TEQ	ng/kg	0.03503907	0.00205
RAYONIER-MILL-FB-01-BI	Freshwater Bay	10/2/2006	FB-08-C	Total Dioxin TEQ	ng/kg	0.051323	0.01555121
Samish Island	Samish Island	5/26/1999	218020	Total Dioxin TEQ	ng/kg	1.34945	0.051
Hat Island	Hat Island	5/26/1999	218021	Total Dioxin TEQ	ng/kg	1.131225	0.049
RAYONR05-FBDC	Freshwater Bay	9/3/2002	FB1DCWA	Total Dioxin TEQ	ng/kg	0.31598425	0.0037735
RAYONR05-FBDC	Freshwater Bay	9/3/2002	FB1DCWB	Total Dioxin TEQ	ng/kg	0.3807499	0.0009915
RAYONR05-FBDC	Freshwater Bay	9/3/2002	FB1DCWC	Total Dioxin TEQ	ng/kg	0.23789225	0.0035032

Table G-11 - Background Dungeness Crab Hepatopancreas Tissue Dioxin TEQs

Sampling Site	Sampling Location	Collection Date	Sample ID	Chemical	Units	TEQ ND=1/2DL	TEQ ND=0
Esquimalt Harbour Reference Site	Pedder Bay	9/4/2008	CR08-36DA-F	Total Dioxin TEQ	ng/kg	0.912695	0.01148
Esquimalt Harbour Reference Site	Pedder Bay	9/4/2008	CR08-36DG-K	Total Dioxin TEQ	ng/kg	0.296173	0.030673
Esquimalt Harbour Reference Site	Pedder Bay	9/4/2008	CR08-38DA-F	Total Dioxin TEQ	ng/kg	0.739128	0.627128
RAYONIER-MILL-DB-01-BI	Dungeness Bay	10/2/2006	DB-02-C	Total Dioxin TEQ	ng/kg	1.4335569	1.4304093
RAYONIER-MILL-DB-01-BI	Dungeness Bay	10/2/2006	DB-03-C	Total Dioxin TEQ	ng/kg	0.33680715	0.319483
RAYONIER-MILL-DB-02-BI	Dungeness Bay	10/2/2006	DB-06-C	Total Dioxin TEQ	ng/kg	0.9853153	0.9822958
RAYONIER-MILL-DB-02-BI	Dungeness Bay	10/2/2006	DB-07-C	Total Dioxin TEQ	ng/kg	1.3500182	1.3499957
RAYONIER-MILL-DB-02-BI	Dungeness Bay	10/2/2006	DB-08-C	Total Dioxin TEQ	ng/kg	0.5328666	0.5013952
RAYONIER-MILL-DB-03-BI	Dungeness Bay	10/2/2006	DB-01-C	Total Dioxin TEQ	ng/kg	1.06150125	1.057774
RAYONIER-MILL-DB-04-BI	Dungeness Bay	10/2/2006	DB-04-C	Total Dioxin TEQ	ng/kg	0.26646012	0.2532046
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-01-C	Total Dioxin TEQ	ng/kg	0.512325715	0.47407
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-02-C	Total Dioxin TEQ	ng/kg	0.265965185	0.22251
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-03-C	Total Dioxin TEQ	ng/kg	0.6051414	0.57405
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-04-C	Total Dioxin TEQ	ng/kg	0.2056532	0.1099751
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-05-C	Total Dioxin TEQ	ng/kg	0.261853605	0.1416
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-06-C	Total Dioxin TEQ	ng/kg	0.182099295	0.085
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-07-C	Total Dioxin TEQ	ng/kg	0.4004299	0.3823565
RAYONIER-MILL-FB-01-BI	Dungeness Bay	10/2/2006	FB-08-C	Total Dioxin TEQ	ng/kg	0.21383405	0.1182518
RAYONR05-FBDC	Freshwater Bay	9/3/2002	FB1DCBA	Total Dioxin TEQ	ng/kg	0.5742511	0.3024
RAYONR05-FBDC	Freshwater Bay	9/3/2002	FB1DCBB	Total Dioxin TEQ	ng/kg	0.44139885	0.2020377
RAYONR05-FBDC	Freshwater Bay	9/3/2002	FB1DCBC	Total Dioxin TEQ	ng/kg	0.7063359	0.6341159

Table G-12 - Background Data for Arsenic in Clams

Clam Tissue				Sediment - Co-located	
Sample	**Arsenic total (mg/kg ww)**	**Arsenic, inorganic (mg/kg ww)**	**Qualifier**	**Sample**	**Arsenic total (mg/kg dw)**
BI-C-T1	2.55	0.074	J	BI-C-S1	1.39
BI-C-T2	2.83	0.085	J	BI-C-S2	1.58
BI-C-T3	1.7	0.069	J	BI-C-S3	1.61
BI-C-T4	2.31	0.446	J	BI-C-S4	1.63
BI-C-T5	2.35	0.044	J	BI-C-S5	1.6
BI-C-T6	1.89	0.331	J	BI-C-S6	1.53
Minimum	1.7				
Maximum	2.83				
Mean	2.27	0.17			1.56
90th Percentile of Data	2.69	0.39			1.62
Standard deviation	0.416961229				

Number of clams per composite sample = 20

Sample species: *Clinocardium nuttallii*
Macoma nasuta
Saxidomus giganteus
Tresus capax
Protothaca staminea

Location: Bainbridge Island; determined to be uninfluenced by the releases of arsenic from the ASARCO plume.
Taken from Table 4-31 of Windward (2005a).

Windward. 2005a. Lower Duwamish Waterway remedial investigation. Data report: Chemical analyses of benthic invertebrate and clam tissue samples and co-located sediment samples. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Table G-13 - Background Data for Arsenic in Crabs

	Meat	Arsenic total (mg/kg ww)	Arsenic inorganic (mg/kg ww)	Hepatopancreas	Arsenic total (mg/kg ww)	Arsenic inorganic (mg/kg ww)
Dungeness crab						
	BL-DC-EM-comp1	6.95	0.03	BL-DC-HP-comp1	7.66	0.34
	BL-DC-EM-comp2	7.6	0.02	EP-DC-HP-comp1	13.1	0.08
	BL-DC-EM-comp3	8.8	0.02			
	EP-DC-EM-comp1	7.31	0.01			
	EP-DC-EM-comp2	8.76	0.01			
	EP-DC-EM-comp3	10.9	0.01			
Slender crab						
	BL-SC-EM-comp1	10.4	0.02	BL-SC-HP-comp1	8.2	0.27
	BL-SC-EM-comp2	10.8	0.02	EP-SC-HP-comp1	2.6	0.08
	BL-SC-EM-comp3	11.3	0.03			
	EP-SC-EM-comp1	7	0.02			
	EP-SC-EM-comp2	5.4	0.02			
	EP-SC-EM-comp3	5.6	0.04			
	Minimum	5.4			2.6	
	Maximum	11.3			13.1	
	Mean	8.4			7.9	
	90th Percentile of Data	10.9			11.6	
	Standard deviation	2.1			4.3	

Dungeness crab data from Table A1-16 (Windward 2005b)
Slender crab data from Table A1-17 (Windward 2005b)
BL = Blake Island
EP = East Passage, potentially influenced by ASARCO

Windward. 2005b. Lower Duwamish Waterway remedial investigation. Data report: Fish and crab tissue collection and chemical analyses. Prepared for Lower Duwamish Waterway Group. Windward Environmental LLC, Seattle, WA.

Table G-14 - Comparison of Port Gamble Bay and Reference Dioxin TEQ Concentrations in Crabs

	Reference Crab Tissue (Muscle)	Reference Crab Tissue (Hepato)	Port Gamble Crab Tissue (Composite Muscle)	Port Gamble Crab Tissue (Composite Hepato)
Raw Statistics				
Number of Samples	23	23	1	1
Minimum	0.0273	0.182	--	--
Maximum	1.349	1.434	--	--
Mean	0.219	0.515	0.370	0.94
Median	0.051	0.4	--	--
Standard Deviation	0.345	0.346	--	--
ProUCL Statistics	90th Percentile of Data			
Normal	--	--	--	--
Lognormal	--	0.94[a]	--	--
Gamma	--	0.951	--	--
Nonparametric	0.373	1.00	--	--

Values for non-detected congeners were set at 1/2 detection limits

a - Lognormal distribution used to calculate reference crab 90th percentile.

Table G-15 - Comparison of Port Gamble Bay and Reference Arsenic Concentrations in Clams

	Arsenic (total) in Clams (mg/kg ww)	
	Port Gamble Bay	Reference[a]
Raw Statistics		
Number of Samples (discrete)	20	6
Minimum	1 (U)	1.7
Maximum	3	2.83
Mean	1.3	2.27
Standard Deviation	0.86	0.42
ProUCL Statistics	95% UCL of Mean	90th Percentile of Data
Normal	--	2.81[b]
Lognormal	--	2.85
Gamma	--	2.99
Nonparametric	1.77	2.69

a - Clam composite samples made of 20 organisms of mixed species
Sample species: *Clinocardium nuttallii*
Macoma nasuta
Saxidomus giganteus
Tresus capax
Protothaca staminea
Locations for reference clam collection were determined to be uninfluenced by the ASARCO plume.
From Table 4-31 of Windward (2005a).
b - Normal distribution used to calculate reference 90th percentile.

Table G-16 - Comparison of Port Gamble Bay and Reference Arsenic Concentrations in Crabs

	Reference Crab Tissue (Muscle)	Reference Crab Tissue (Hepato)	Port Gamble Crab Tissue (Composite Muscle)	Port Gamble Crab Tissue (Composite Hepato)
Raw Statistics				
Number of Samples	12	4	1	1
Minimum	5.4	2.6	--	--
Maximum	11.3	13.1	--	--
Mean	8.4	7.9	7	4
Standard Deviation	2.07	4.29	--	--
	90th Percentile of Data			
90th Percentile of Data	10.9	11.6	--	--

Values for non-detected congeners were set at 1/2 detection limits

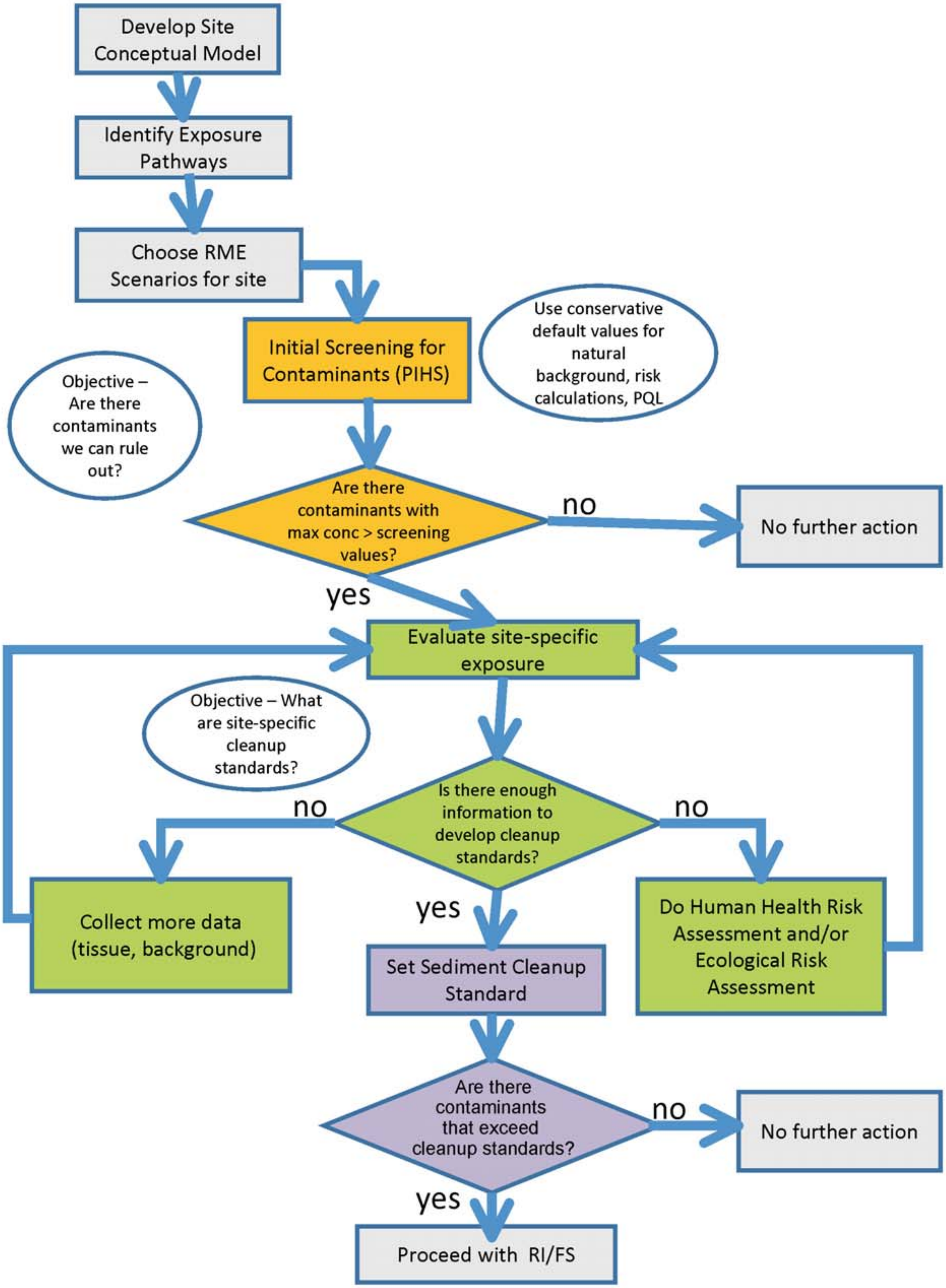
Table G-17 - Preliminary Sediment Cleanup Screening Concentrations

Chemical of Concern	Maximum Port Gamble Sediment Concentration	Risk-based Concentration[a]	Local Puget Sound Background	Estimated Practical Quantitation Limit
Arsenic (carcinogenic)	20 U mg/kg	0.482 mg/kg	**10.9 mg/kg**	0.5 mg/kg (Method 6020)
Cadmium	2 mg/kg	73.5 mg/kg	**1.1 mg/kg**[b]	0.5 mg/kg (Method 6020)
CPAH	60 ug/kg TEQ	95 ug/kg TEQ	**6.04 ug/kg TEQ**[b]	5 ug/kg for each analyte

Bold indicates selected cleanup level

a - Risk based concentration for direct contact

b - Cleanup level based on shellfish ingestion



PIHS - Potential Indicator of Hazardous Substances

Port Gamble Bay
Port Gamble, Washington

Human Health Risk Evaluation Process

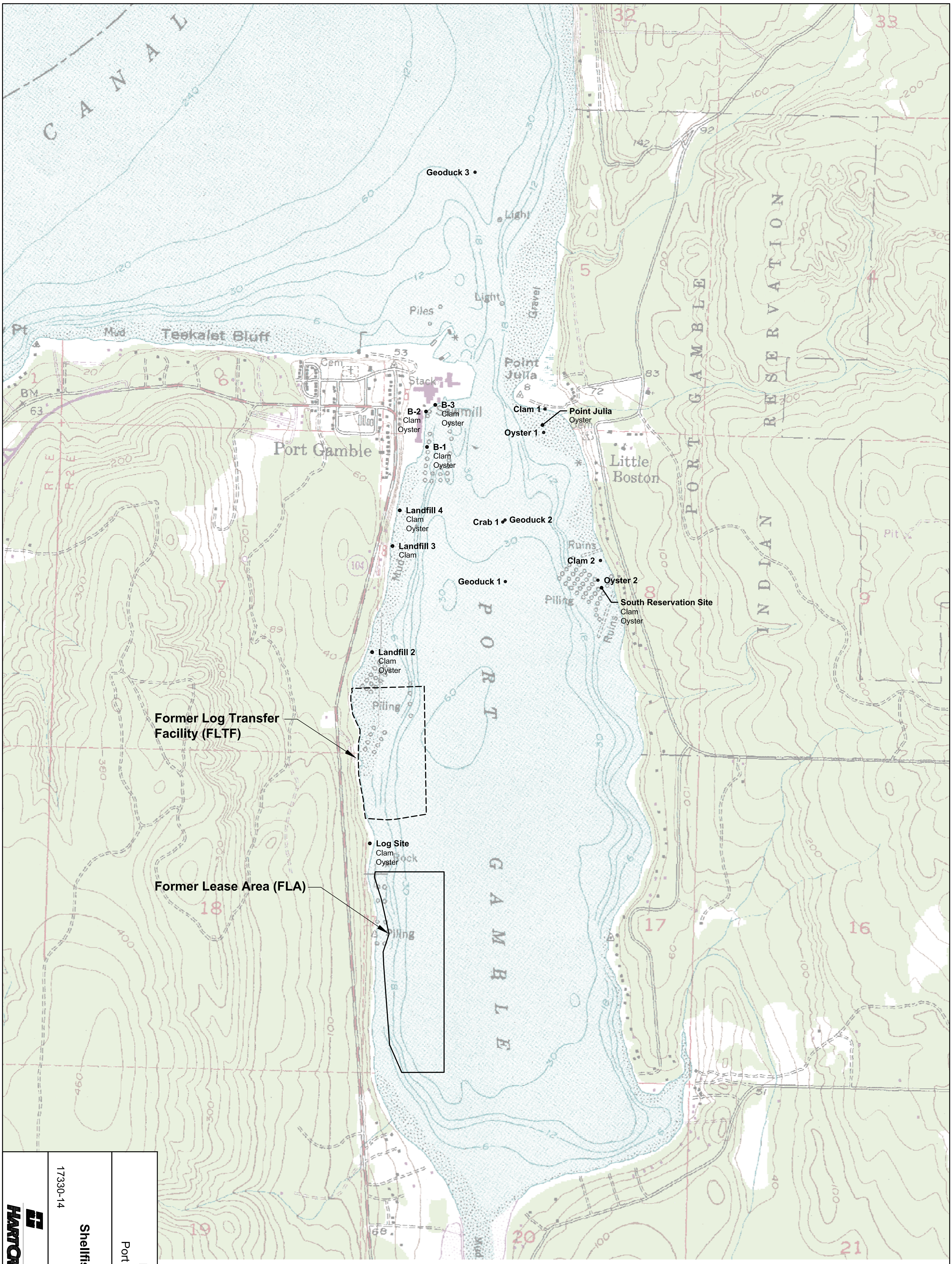
17330-14 2/11

HARTCROWSER

Figure
G-1

EAL 02/11/11 1733014-AG.cdr

JAB 08/01/09 1733014-037.dwg



10 • RI Sampling Grid Location and Number

0 1,500 3,000
Scale in Feet

Source: Base map prepared from USGS 7.5 minute quadrangle map of Port Gamble, WA.

Port Gamble Bay
Port Gamble, Washington

Shellfish Sample Locations

17330-14 2/11

HARTCROWSER

Figure
G-2

APPENDIX H
SEDIMENT BIOASSAY LABORATORY REPORT

BIOLOGICAL TESTING OF SEDIMENT AT FORMER POPE & TALBOT INC. SAWMILL SITE PORT GAMBLE, WASHINGTON

DECEMBER 2008

PREPARED FOR:
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1.0 INTRODUCTION

In support of the remedial investigation at the Former Pope & Talbot Inc. Sawmill Site in Port Gamble, Washington, NewFields conducted toxicity tests with sediment samples collected by Anchor Environmental, LLC. Biological effects were evaluated relative to the biological criteria defined in the Sediment Management Standards (SMS) and Dredged Material Management Program (DMMP). This report presents the results for the toxicity testing portion of the Former Pope & Talbot Inc. Sawmill Site sediment investigation.

2.0 METHODS

This section summarizes the test methods that were followed for this biological characterization. Test methods followed guidance provided by the Puget Sound Estuary Program (PSEP 1995), the WDOE Sampling and Analysis Plan Appendix (SAPA; Ecology 2008), the various updates presented during the Annual Sediment Management Review meetings (SMARM), and the Work Plan and Sampling and Analysis Plan for the Remedial Investigation/Feasibility Study at the Former Pope & Talbot Inc. Sawmill Site prepared by Anchor Environmental, LLC (Anchor 2008). Sediment toxicity was evaluated using three standard PSEP bioassays, the 10-day amphipod test, the 48 to 96-hour benthic larval test, and the Microtox® porewater test. NewFields performed the amphipod and benthic larval tests; the Microtox® test was performed by Nautilus Environmental LLC. The amphipod test species, *Eohaustorius estuarius*, was selected by Ecology based on the predominant grain size distribution of the test sediments.

Because sediment in the vicinity of the former Mill Site is potentially affected by wood waste, there was some concern that the responses in the larval test might be affected by fine flocculent material that can occur at some wood-waste related sites. For samples being considered for dredged material disposal (AS-104 and AS-107), the larval test was also conducted using a screen-tube testing method. The screen-tube test uses a screen tube in each test chamber to expose the larvae to water just overlying the sediment surface. This modification to the larval test allows discrimination between effects from some chemical contaminants and physical factors (Anchor 2008).

2.1 SAMPLE AND ANIMAL RECEIPT

Sixteen test sediments were received by NewFields on September 11 & 12, 2008. Fourteen samples were designated for bioassays and Microtox® testing. Reference sediment was collected from two reference stations in Carr Inlet (CR-1, CR-22) on September 12, 2008 and one reference station in Sequim Bay (SBR-35) on September 16, 2008 by NewFields. Sediment samples were stored in a walk-in cold room at 4 ± 2ºC in the dark. Test sediment was not sieved prior to testing. All tests were conducted within the eight week holding time.

Amphipods (*Eohaustorius estuarius*) were supplied by Northwest Aquatic Sciences in Newport, Oregon. Animals were held in native sediment at 15°C prior to test initiation. *Dendraster excentricus* (sand dollar) broodstock was collected by NewFields staff from Hood Canal, Washington. Adult sand dollars were held in unfiltered seawater from Hood Canal prior to spawning.

Native *Eohaustorius* sediment from Yaquina Bay, Oregon was provided by Northwest Aquatic Sciences for use as control sediments for the amphipod test.

2.2 10-DAY AMPHIPOD BIOASSAY

The 10-day acute toxicity test with *E. estuarius* was initiated on October 10, 2008. This test was conducted with the sediment from the fourteen bioassay stations, the reference stations (CR-1, CR-22, and SBR-35), and the native control. To prepare the test exposures, approximately 175 mL of sediment was placed in clean, acid and solvent-rinsed 1-L glass jars, which were then filled with 775 mL of 0.45-µm filtered seawater at 28 ppt. Seven replicate chambers were prepared for each test treatment, the three reference sediments, and the native control sediment. Five replicates were used to evaluate sediment toxicity while the remaining two replicates were designated as sacrificial surrogate chambers. One surrogate chamber was sacrificed at test initiation to measure porewater and overlying ammonia and sulfides. The remaining surrogate chamber was used for measuring daily water quality throughout the test, as well as porewater and overlying ammonia and sulfides at test termination. Total ammonia as nitrogen was monitored using an Orion meter fitted with an ammonia ion-specific probe. Total sulfides as S^{2-} were monitored using a HACH DR/4000V Spectrophotometer.

Test chambers were placed in randomly assigned positions in a 15°C water bath and allowed to equilibrate overnight. Trickle-flow aeration was provided to prevent dissolved oxygen concentrations from dropping below acceptable levels.

Immediately prior to test initiation, water quality parameters were measured in the surrogate chamber for each treatment. Dissolved oxygen (DO), temperature, pH, and salinity were then monitored in the surrogate chambers daily until test termination. Target test parameters were:

Dissolved Oxygen:	≥5.0 mg/L
pH:	7.8 ± 0.5 units
Temperature:	15 ± 1°C
Salinity:	28 ± 1‰

The tests were initiated by randomly allocating 20 *E. estuarius* into each test chamber, ensuring that each of the amphipods successfully buried into the sediment. Amphipods that did not bury within approximately one hour were replaced with healthy amphipods. The 10-day amphipod bioassay was conducted as a static test with no feeding during the exposure period. At test termination, sediment from each test chamber was sieved through a 0.5-mm screen and all recovered amphipods transferred into a Petri dish. The number of surviving and dead amphipods was recorded. A water-only, 4-day reference-toxicant test was conducted concurrently with the sediment tests, using cadmium chloride. The cadmium reference-toxicant test was used to ensure animals used in the test were healthy and of similar sensitivity to prior tests.

2.3 LARVAL DEVELOPMENTAL BIOASSAY

Test sediment was evaluated using the larval benthic toxicity test with the sand dollar, *D. excentricus*. The sand dollar larval test was initiated on October 3, 2008. A sea-water control, three reference sediments for SMS and two reference sediments for DMMP were tested with the test treatments. To prepare the test exposures, 18 g (±1 g) of test sediment was placed in clean, acid and solvent-rinsed 1-L glass jars, which were then filled to 900 mL with sand-filtered North Hood Canal seawater. Six replicate chambers were prepared for each test treatment, reference sediment, and the native sediment control treatment. Five of the replicates were used to evaluate the test; the sixth replicate was used as a water quality surrogate. Each chamber was shaken for 10 seconds and then placed in predetermined randomly-assigned positions in a water bath at 15°C.

Two samples, 104A and 107A, were evaluated for dredged material disposal. DMMP samples were tested using the Sediment-Water Interface (SWI) (Anderson 2001) method of exposing larvae to water just overlying the sediment surface using a screened tube in a replicate chamber in order to isolate the larvae from flocculent material. For this test, the test chambers were prepared according to PSEP, but seawater volumes and larval stocking densities were decreased to accommodate the screen tube inside the test chamber. By separating the larvae from the lighter floating material, effects from some chemical contaminants and physical factors can be minimized. PSEP larval test protocols were adhered to in preparing the test exposures in addition to the modification to the larval test.

To collect gametes for each test, spawning was induced by injecting 0.5 mL of 0.5M KCl into the coelomic cavity of the sand dollar. Spawning males and females were placed aboral surface down into a beaker with clean seawater. Gametes from at least two males and two females were used to initiate the test. Once sufficient eggs and sperm had been collected, the eggs were rinsed to remove any detritus or feces and a homogenized sperm solution was added to the egg solutions. Egg-sperm solutions were periodically homogenized with a perforated plunger during the fertilization process. Approximately 60 minutes after fertilization, embryo solutions were checked for fertilization rate. Only those embryo stocks with >90% fertilization were used to initiate the tests. Embryo solutions were rinsed free of excess sperm and then combined to create one embryo stock solution. Density of the embryo stock solution was determined by counting the number of embryos in a sub sample of stock solution. This was used to determine the volume of embryo stock solution to deliver approximately 27,000 embryos to each test chamber. The tests were initiated by randomly allocating an aliquot of the embryo stock solution into each test chamber four hours after sediments were shaken and within two hours of egg fertilization. Embryos were held in suspension during initiation using a perforated plunger.

Dissolved oxygen, temperature, pH, and salinity were monitored in water quality surrogates to prevent loss or transfer of larvae by adhesion to water-quality probes. Overlying water ammonia and sulfides were measured on Day 0 and Day 3. Total ammonia as nitrogen was monitored using an Orion meter fitted with an ammonia ion-specific probe. Total sulfides as S^{2-} were monitored using a HACH DR/4000V Spectrophotometer. Target test parameters were as follows:

Dissolved Oxygen:	≥4.8 mg/L
pH:	7.8 ± 0.5 units
Temperature:	15 ± 1°C
Salinity:	28 ± 1‰

The larval developmental tests were terminated approximately 71 hours after initiation when approximately 90% of the control larvae had achieved the pluteus stage. To terminate the test, the overlying seawater was decanted into a clean 1-L jar and mixed with a perforated plunger. From this container, a 10 mL sub sample was transferred to a scintillation vial and preserved in 5% buffered formalin. The number of normal and abnormal larvae was enumerated on an inverted microscope. Normal larvae included all pluteus stage larvae. Abnormal larvae included abnormally shaped pluteus larvae and all early stage larvae. A 72-h water-only reference-toxicant test with copper sulfate was conducted concurrently with each test.

2.4 MICROTOX® TEST

The Microtox® test was performed by Nautilus Environmental LLC. The Microtox testing used the luminescent marine bacterium *Vibrio fischeri* in combination with the Microtox Model 500

Analyzer to measure light output of the bacterium reacting with the test sample at 5 and 15 minutes of exposure. The test compared the change in light output over time between the sample porewater extracts and their relative references with a statistical evaluation of the data upon completion. A complete report on the test is included as Appendix A.

2.5 DATA ANALYSIS AND QA/QC

All water quality and endpoint data were entered into Excel spreadsheets. Water quality parameters were summarized by calculating the mean, minimum, and maximum values for each test treatment. Endpoint data were calculated for each replicate and mean values and standard deviations were determined for each test treatment.

All hand-entered data was reviewed for data entry errors, which were corrected prior to summary calculations. A minimum of 10% of all calculations and data sorting were reviewed for errors. Review counts were conducted on any apparent outliers.

For the larval test, the normalized combined mortality and abnormality endpoint was used to evaluate the test sediment. This was based on the number of normal larvae in the treatment and reference divided by the number of normal larvae in the control, as defined in Ecology (2005).

For SMS suitability determinations, comparisons were made according to Ecology and Fox et al. (2005, 1998). For DMMP suitability determinations, comparisons were made according to the DMMP User's Manual (USACE 2008). Data reported as percent mortality or survival was transformed using an arcsine square root transformation prior to statistical analysis. All data were tested for normality using the Wilk-Shapiro test and equality of variance using Levene's test. Determinations of statistical significance were based on one-tailed Student's t-tests with an alpha of 0.05. A comparison of the larval endpoint, relative to the reference was made using an alpha level of 0.10. For samples failing to meet assumptions of normality, a Mann-Whitney test was conducted to determine significance. For those samples failing to meet the assumptions of normality and equality of variance, a t-test on rankits was used.

3.0 RESULTS

The results of the sediment testing, including a summary of test results and water quality observations are presented in this section. Data for each of the replicates, as well as laboratory bench sheets are provided Appendix B and statistical analyses are provided in Appendix C.

3.1 10-DAY AMPHIPOD BIOASSAY

A summary of test conditions is shown in Table 1. Results for the *E. estuarius* test are presented in Table 2 and a summary of water quality observations is presented in Table 3. Mean percent survival in the control was 90%, which met the ≥90% acceptance criterion. This indicates that the test conditions were suitable for adequate amphipod survival.

The LC_{50} for the cadmium reference-toxicant test was 5.1 mg Cd/L, which is within the control chart limits (3.74 to 12.4 mg Cd/L), indicating that the test organisms used in this study were of similar sensitivity of those previously tested at NewFields.

Dissolved oxygen levels were within acceptable limits throughout the test. Temperature was slightly above (<1°C) the targeted range for all of the treatments on Day 8, but were within the day before and after. pH was slightly above the target range of 8.3 for AS-SEDG-113, but was within 0.3 pH units. Salinity was recorded on Day 1 in each treatment at 26 ppt, but was within the target range for the remainder of the test. These variations are within the tolerance range for this estuarine species and would not be expected to affect the test results as the control sample survival met performance criteria. Initial and final interstitial ammonia concentrations were all below the threshold concentration of 30 mg/L total ammonia (Barton 2002). Initial and final interstitial sulfide concentrations were below 1 mg/L.

Mean mortality in the reference treatments were 16% (CR-1), 7% (CR-22) and 10% (SBR-35) which met the SMS and DMMP performance criteria (<25% mortality) and indicated that the reference sediment was acceptable for suitability determination. Mean percentage mortality in the test treatments ranged between 3% and 12% (Table 2).

Table 1. Test Condition Summary for *Eohaustorius estuarius.*

Test Conditions: PSEP *E. estuarius* (SMS)		
Sample Identification	AS-104-A 0-4, AS-107-A 0-4, AN-SB-101, AN-SB-102, AN-SB-106, AN-SB-108, AN-SB-B15, AS-SEDG-112, AS-SEDG-113, AS-SEDG-B09, AS-SEDG-B11, AS-SEDG-B14, AS-SEDG-B16, AS-SEDG-B18; References CR-1, CR-22, SBR-35	
Date sampled	9/10 & 9/12/2008 test samples; 9/12/2008 CR-1 and CR-22; 9/16/2008 SBREF-35	
Date received at NewFields Northwest	9/11 – 9/12/2008; 9/12/2008; 9/16/2008	
Sample storage conditions	4°C, dark	
Weeks of holding	3-4 weeks	
Source of control sediment	Northwest Aquatic Sciences (Newport, OR)	
Test Species	***E. estuarius***	
Supplier	Northwest Aquatic Sciences	
Date acquired	10/9/2008	
Acclimation/holding time	1 day	
Age class	Adult	
Test Procedures	PSEP 1995 with SMARM revisions	
Regulatory Program	SMS	
Test location	NewFields Northwest Laboratory	
Test type/duration	10-Day static	
Test dates	10/10/08 – 10/20/08	
Control water	North Hood Canal, sand filtered	
Test temperature	Recommended: 15 ± 1 °C	Achieved: 14.1-16.9 °C
Test Salinity	Recommended: 28 ± 1 ppt	Achieved: 26-28 ppt
Test dissolved oxygen	Recommended: > 5.0 mg/L	Achieved: 6.2-8.7 mg/L
Test pH	Recommended: 7.8 ± 0.5	Achieved: 7.3-8.6
SMS control performance standard	Recommended: Control ≤ 10% mortality	Achieved: 10%
SMS reference performance standard	Recommended: Reference mortality < 25%	Achieved: 16% CR-1; 7% CR-22; 10% SBREF-35
SMS pass/fail SQS	Treatment – Reference < 25% mortality = **PASS**	All Pass
SMS pass/fail CSL	Treatment – Reference < 30% mortality = **PASS**	All Pass
Reference Toxicant LC50	5.1 mg/L cadmium	
Acceptable Range	3.74 to 12.4 mg/L cadmium	
Test Lighting	Continuous UV exposure	
Test chamber	1-Liter Glass Chamber	
Replicates/treatment	5 + 2 surrogates (One broken down at test initiation, one use for water quality during the test)	
Organisms/replicate	20	
Exposure volume	175 mL sediment/ 950 mL water	
Feeding	None	
Water renewal	None	
Deviations from Test Protocol	Temperatures in all treatments on Day 8, pH above 8.3 in two treatments on no more than 2 days, Salinity of 26 ppt in all treatments on Day 1.	

Table 2. Test Results for *Eohaustorius estuarius*.

Sample ID	Mean survival (%)	Standard Deviation
Control	90	6.1
CR-1	84	6.5
CR-22	93	4.5
SBR-35	90	10.6
AS-104-A 0-4	88	11.5
AS-107-A 0-4	93	6.7
AN-SB-101	89	8.9
AN-SB-102	89	4.2
AN-SB-106	96	4.2
AN-SB-108	95	5.0
AN-SB-B15	94	4.2
AS-SEDG-112	97	2.7
AS-SEDG-113	90	5.0
AS-SEDG-B09	93	5.7
AS-SEDG-B11	90	5.0
AS-SEDG-B14	94	8.2
AS-SEDG-B16	93	6.1
AS-SEDG-B18	94	6.5

Table 3. Water Quality Summary for *Eohaustorius estuarius*.

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			pH (units)			Salinity (ppt)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	8.2	6.2	8.7	14.9	14.2	16.4	7.9	7.6	8.1	26.6	26.0	27.0
CR-1	8.1	6.8	8.6	14.9	14.2	16.5	7.9	7.8	8.1	27.0	26.0	28.0
CR-22	8.1	6.9	8.5	14.9	14.1	16.5	8.0	7.8	8.2	27.2	26.0	28.0
SBR-35	8.4	8.2	8.7	14.9	14.3	16.4	8.0	7.7	8.2	27.3	26.0	28.0
AS-104-A 0-4	8.4	8.1	8.6	14.9	14.2	16.5	7.9	7.8	8.0	27.2	26.0	28.0
AS-107-A 0-4	8.3	7.1	8.6	14.9	14.2	16.5	7.9	7.7	8.1	27.2	26.0	28.0
AN-SB-101	8.2	7.1	8.4	15.0	14.3	16.6	8.0	7.8	8.2	27.1	26.0	28.0
AN-SB-102	8.0	6.2	8.6	14.9	14.1	16.5	8.0	7.8	8.1	26.8	26.0	28.0
AN-SB-106	8.2	7.0	8.5	14.8	14.2	16.6	8.1	7.8	8.4	27.2	26.0	28.0
AN-SB-108	8.2	7.0	8.6	14.8	14.1	16.5	7.9	7.7	8.1	27.0	26.0	28.0
AN-SB-B15	8.0	7.6	8.4	15.2	14.4	16.5	7.9	7.3	8.2	27.1	26.0	28.0
AS-SEDG-112	8.2	8.0	8.4	14.9	14.2	16.3	7.9	7.8	8.0	27.3	26.0	28.0
AS-SEDG-113	7.9	6.5	8.4	15.0	14.3	16.9	8.0	7.8	8.6	27.2	26.0	28.0
AS-SEDG-B09	8.1	6.3	8.6	14.8	14.1	16.5	7.9	7.8	8.0	27.0	26.0	28.0
AS-SEDG-B11	8.3	8.2	8.5	15.0	14.3	16.5	7.9	7.6	8.0	27.1	26.0	28.0
AS-SEDG-B14	8.0	6.4	8.6	14.9	14.1	16.4	7.9	7.8	8.1	27.3	26.0	28.0
AS-SEDG-B16	8.0	6.8	8.6	14.8	14.2	16.4	8.0	7.6	8.1	27.2	26.0	28.0
AS-SEDG-B18	8.3	8.1	8.5	14.9	14.2	16.3	8.0	7.8	8.1	27.2	26.0	28.0

3.2 LARVAL DEVELOPMENT BIOASSAY

Test conditions for the larval development bioassay are shown in Table 4, a summary of the test results from the *D. excentricus* test is presented in Table 5 (SMS) and Table 6 (DMMP) and a summary of water quality observations is shown in Table 7 (SMS) and Table 8 (DMMP). The SMS and DMMP larval tests were validated by 4 and 9% mean combined mortalities in the control treatments, within the acceptability criteria of <30%.

In the PSEP tests, dissolved oxygen was slightly below the recommended range (<4.8 mg/L) on Day 2 of the test. Aeration was applied to the treatments. Temperature was slightly above the recommended range on the day of test initiation in AN-SB-108 (within 1°C), but stabilized to within range the duration of the test. Salinity was slightly below the recommended range, but was within 1 ppt. These deviations should not impact the significance of the test results as water quality parameters were within range on all other days (with the minor exceptions discussed in the paragraph above) and no significant toxicity was observed. The DMMP larval test water quality parameters were within the target limits throughout the 72-hour test.

Ammonia values detected in the test chambers were below the NOEC values for *D. excentricus* on Day 0. The EC_{50} for the copper reference-toxicant test for proportion normal was 13.0 µg Cu/L, within the control chart limits (5.4 to 16.7 µg Cu/L). The results of the reference-toxicant test indicate that the test organisms used in this study were similar in sensitivity to those previously tested at NewFields.

Mean control-normalized normal survival in the SMS reference sediments were 92.4% (CR-1), 95.4% (CR-22) and 90.9% (SB Ref-35). Mean control-normalized normal survival in the DMMP reference sediments were 98.6% (CR-22) and 95.4% (SB Ref-35). Mean normal survival in the SMS test treatments ranged from 53.4% to 97.9%. Mean normal survival in the DMMP test treatments ranged from 96.8% to 98.3%.

Table 4. Test Condition Summary for *Dendraster excentricus*.

Test Conditions: PSEP *D. excentricus* (SMS & *DMMP*)		
Sample Identification	*AS-104-A 0-4* , *AS-107-A 0-4*, AN-SB-101, AN-SB-102, AN-SB-106, AN-SB-108, AN-SB-B15, AS-SEDG-112, AS-SEDG-113, AS-SEDG-B09, AS-SEDG-B11, AS-SEDG-B14, AS-SEDG-B16, AS-SEDG-B18; References CR-1, CR-22, SBR-35	
Date sampled	9/10 & 9/12/2008 test samples; 9/12/2008 CR-1 and CR-22; 9/16/2008 SBREF-35	
Date received at NewFields Northwest	9/11 – 9/12/2008; 9/12/2008; 9/16/2008	
Sample storage conditions	4°C, dark	
Weeks of holding	3-4 weeks	
Test Species	***D. excentricus***	
Supplier	Field collected (North Hood Canal)	
Date acquired	10/01/2008	
Acclimation/holding time	2 days	
Age class	<2-h old embryos	
Test Procedures	PSEP 1995 with SMARM revisions	
Regulatory Program	SMS & DMMP	
Test location	NewFields Northwest Laboratory	
Test type/duration	48-96 Hour static test	
Test dates	10/03/08-10/06/08 – 70 hours	
Control water	Sand-filtered North Hood Canal sea water	
Test temperature	Recommended: 15 ± 1 °C	Achieved: 14.2 - 16.5°C
Test Salinity	Recommended: 28 ± 1 ppt	Achieved: 26 - 29ppt
Test dissolved oxygen	Recommended: > 4.8 mg/L	Achieved: 4.2 - 7.8mg/L
Test pH	Recommended: 7.8 ± 0.5	Achieved: 7.5 - 8.4
Stocking Density	Recommended: 20 – 30 embryos/mL	Achieved: 25 embryos/mL
SMS control performance standard	Recommended: Control normal survival $\geq$ 70%	Achieved: 96%
SMS reference performance standard	Recommended: Reference survival/Control survival $\geq$ 65%	Achieved: CR-1, 92% CR-22, 95% SB Ref-35, 91 %
SMS pass/fail SQS	(Treatment normal/Control Normal)/ (Reference normal/ Control Normal) > 0.85 = **PASS**	The following treatments fail SQS: AN-SB-106, AN-SB-B15, AS-SEDG-112, AS-SEDG-113, AS-SEDG-B09, AS-SEDG-B11, AS-SEDG-B14, AS-SEDG-B16, and AS-SEDG-B18
SMS pass/fail CSL	(Treatment normal/Control Normal)/ (Reference normal/ Control Normal) > 0.70 = **PASS**	AS-SEDG-B11 and AS-SEDG-B14 Fail CSL
DMMP control performance standard	Recommended: Control normal survival $\geq$ 70%	Achieved: 91%
DMMP reference performance standard	Recommended: Reference survival/Control survival $\geq$65%	Achieved: CR-22, 99% SB Ref-35, 95%
DMMP pass/fail 2-Hit	(Treatment normal/Control Normal)/ (Reference normal/ Control Normal) > 0.85 = **PASS**	All pass
DMMP pass/fail 1-Hit	(Treatment normal/Control Normal)/ (Reference normal/ Control Normal) > 0.70 = **PASS**	All pass

Test Conditions: PSEP *D. excentricus* (SMS & *DMMP*)	
Reference Toxicant LC50	12.5 mg/L copper
Acceptable Range	5.4 to 16.7 mg/L copper
Test Lighting	Continuous UV Exposure
Test chamber	1-Liter Glass Chamber
Replicates/treatment	5 + 1 surrogate (used for WQ measurements throughout the test)
Exposure volume	18 g sediment/ 900 mL water
Feeding	none
Water renewal	none
Deviations from Test Protocol	Low DO in multiple treatments by Day 2, high temperature in one treatment on Day 0, low salinity in multiple treatments on Day 3, pH above 8.3 in one treatment on Day 2.

Table 5. Test Results for *Dendraster excentricus* (SMS).

Treatment	Mean Normal Survival (%)[1]	Mean Percent Combined Mortality	Standard Deviation
Control	96.2	3.8	5.4
CR-1	92.4	7.6	6.6
CR-22	95.4	4.6	2.8
SBR-35	90.9	9.1	3.6
AN-SB-101	82.0	18.0	9.1
AN-SB-102	81.6	18.4	7.4
AN-SB-106	69.8	30.2	4.7
AN-SB-108	97.9	2.1	2.4
AN-SB-B15	73.9	26.1	4.4
AS-SEDG-112	73.2	26.8	4.9
AS-SEDG-113	73.4	26.6	8.4
AS-SEDG-B09	71.7	28.3	7.7
AS-SEDG-B11	53.4	46.6	9.0
AS-SEDG-B14	55.1	44.9	9.9
AS-SEDG-B16	69.0	31.0	12.5
AS-SEDG-B18	69.0	31.0	6.3

[1] Reference and treatment normal survivals are normalized to Control normal survival.

Table 6. Test Results for *Dendraster excentricus* (DMMP).

Treatment	Mean Normal Survival (%)[1]	Mean Percent Combined Mortality	Standard Deviation
Control	91.4	8.6	3.7
CR-22	98.6	1.4	3.0
SBR-35	95.4	4.6	4.4
AS-104-A 0-4	98.3	1.7	3.8
AS-107-A 0-4	96.8	3.2	3.0

[1] Reference and treatment normal survivals are normalized to Control normal survival.

Table 7. Water Quality Summary for *Dendraster excentricus* (SMS).

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			pH (units)			Salinity (ppt)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.6	7.4	7.6	15.2	14.7	16.3	7.8	7.8	7.8	27.0	26	28.0
CR-1	5.6	5.1	6.4	14.7	14.4	15.4	8.0	7.7	8.4	27.8	27.0	28.0
CR-22	7.0	6.8	7.2	14.8	14.2	15.6	8.0	7.8	8.3	28.3	27.0	29.0
SBR-35	6.3	6.0	6.8	15.0	14.6	15.3	7.9	7.7	8.1	28.3	28.0	29.0
AN-SB-101	5.8	5.2	6.3	15.2	14.5	16.0	8.0	7.9	8.1	28.3	27.0	29.0
AN-SB-102	5.8	5.3	6.6	15.2	14.5	16.0	7.9	7.8	8.1	28.0	27.0	29.0
AN-SB-106	5.5	5.0	6.5	15.1	14.5	16.0	7.8	7.7	8.0	27.3	26.0	28.0
AN-SB-108	6.3	5.8	6.9	15.4	14.7	16.5	7.9	7.8	8.0	28.3	27.0	29.0
AN-SB-B15	5.3	4.6	6.2	15.0	14.3	15.6	7.8	7.7	7.8	27.3	27.0	28.0
AS-SEDG-112	5.7	4.3	7.8	14.7	14.2	15.2	7.9	7.8	8.1	28.0	28.0	28.0
AS-SEDG-113	5.7	4.6	7.6	15.3	14.3	16.2	7.9	7.8	8.0	27.8	27.0	28.0
AS-SEDG-B09	5.8	4.9	7.2	15.1	14.3	16.3	7.7	7.6	7.8	27.3	26.0	28.0
AS-SEDG-B11	5.4	4.8	6.2	14.5	14.3	14.8	7.7	7.6	7.8	26.8	26.0	27.0
AS-SEDG-B14	5.6	4.6	6.4	15.0	14.3	15.3	7.7	7.6	7.8	27.0	26.0	28.0
AS-SEDG-B16	5.7	5.1	6.0	15.1	14.6	16.3	7.8	7.5	8.0	27.8	27.0	28.0
AS-SEDG-B18	5.1	4.2	5.9	15.1	14.5	15.9	7.9	7.8	8.0	28.0	27.0	29.0
Sediment Control	7.5	7.2	7.8	14.9	14.3	16.0	8.0	7.9	8.1	28.0	27	29.0

Table 8. Water Quality Summary for *Dendraster excentricus* (DMMP).

Treatment	Dissolved Oxygen (mg/L)			Temperature (°C)			pH (units)			Salinity (ppt)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Control	7.2	7.0	7.5	15.2	14.8	15.9	7.9	7.9	8.0	28.5	28.0	29.0
CR-22	7.1	6.9	7.4	15.3	14.8	15.9	7.9	7.9	8.0	28.5	28.0	29.0
SBR-35	7.0	6.7	7.4	15.3	14.8	15.8	7.9	7.9	8.0	28.0	27.0	29.0
AS-104-A 0-4	7.1	6.9	7.4	15.4	14.7	16.4	7.9	7.8	7.9	28.3	27.0	29.0
AS-107-A 0-4	6.7	6.5	7.2	15.2	14.8	15.7	7.9	7.9	7.9	28.3	27.0	29.0

4.0 DISCUSSION

Sediments were evaluated based on the suitability criteria of the Sediment Management Standards (SMS) for the amphipod test and the Dredged Material Management Program (DMMP) for the larval test. The biological criteria are based on both statistical significance (a statistical comparison) and the degree of biological response (a numerical comparison). The SMS and DMMP criteria are derived from the Washington Department of Ecology Sampling and Analysis Plan Appendix (Ecology 2008) and the Dredged Material Evaluation and Disposal Procedures (Users' Manual) (USACE 2008). Comparisons were made for each treatment against each representative reference sample. Two numerical comparisons were made under SMS, the Sediment Quality Standards (SQS) and the Cleanup Standards Limit (CSL), and the DMMP criteria of 2-Hit and/or 1-Hit.

4.1 AMPHIPOD TEST SUITABILITY DETERMINATION

Under the SMS program, a test treatment will fail SQS if mean mortality in the test is >25% more than the mean mortality in the appropriate reference sediment and the difference is statistically significant ($p \leq 0.05$). Treatments fail the CSL if mean mortality in the test treatment >30%, relative to the reference sediment and the difference is statistically significant.

All SMS test treatments meet the SQS and CSL for *E. estuarius* (Table 9).

Table 9. SMS Comparison for *Eohaustorius estuarius*.

Treatment	Mean Mortality (%)	Reference Comparison	Statistically More than Reference?	M_T-M_R	Fails SQS?	Fails CSL?
Control	10					
CR-1	16					
CR-22	7					
SBR-35	10					
AS-104-A 0-4	12	CR-22	No	5	No	No
AS-107-A 0-4	7	SBR-35	No	-3	No	No
AN-SB-101	11	SBR-35	No	1	No	No
AN-SB-102	11	SBR-35	No	1	No	No
AN-SB-106	4	CR-22	No	-3	No	No
AN-SB-108	5	CR-1	No	-11	No	No
AN-SB-B15	6	CR-22	No	-1	No	No
AS-SEDG-112	3	CR-22	No	-4	No	No
AS-SEDG-113	10	CR-1	No	-6	No	No
AS-SEDG-B09	7	CR-22	No	0	No	No
AS-SEDG-B11	10	CR-1	No	-6	No	No
AS-SEDG-B14	6	SBR-35	No	-4	No	No
AS-SEDG-B16	8	SBR-35	No	-3	No	No
AS-SEDG-B18	6	CR-22	No	-1	No	No

SQS: Statistical Significance and M_T-M_R >25%
CSL: Statistical Significance and MT-MR >30%

4.2 LARVAL TEST SUITABILITY DETERMINATION

For the larval test, treatments fail SQS or DMMP 2-Hit criteria if the number of normal larvae in the test treatment is significantly different than that of the reference and that the NMCA in the test treatment is >15% of the NMCA in the reference. Treatments fail CSL or 1-Hit criteria if the NMCA is >30% of the response observed in the reference.

Nine treatments, AN-SB-106, AN-SB-B15, AS-SEDG-112, AS-SEDG-113, AS-SEDG-B09, AS-SEDG-B11, AS-SEDG-14, AS-SEDG-B16 and AS-SEDG-B18, did not meet SQS criteria. Two treatments, AS-SEDG-B11 and AS-SEDG-14 failed CSL criteria (Table 10).

All DMMP test treatments meet both the 2-Hit and 1-Hit criteria for *D. excentricus* (Table 11).

Table 10. SMS Comparison for *Dendraster excentricus*.

Treatment	Mean Normal Survival (%) [1]	Mean Percent Combined Mortality	Standard Deviation	Reference Comparison	Statistically Less than Associated Reference	$(N_T/N_C)/(N_R/N_C)$	Fails SQS?	Fails CSL?
Control	96.1	3.9	5.4					
CR-1	92.4	7.6	6.6					
CR-22	95.4	4.6	2.8					
SBR-35	90.9	9.1	3.6					
AN-SB-101	82.0	18.0	9.1	SBR-35	Yes	0.90	No	No
AN-SB-102	81.6	18.4	7.4	SBR-35	Yes	0.90	No	No
AN-SB-106	69.8	30.2	4.7	CR-22	Yes	0.73	Yes	No
AN-SB-108	97.9	2.1	2.4	CR-1	No	1.06	No	No
AN-SB-B15	73.9	26.1	4.4	CR-22	Yes	0.77	Yes	No
AS-SEDG-112	73.2	26.8	4.9	SBR-35	Yes	0.81	Yes	No
AS-SEDG-113	73.4	26.6	8.4	CR-1	Yes	0.79	Yes	No
AS-SEDG-B09	71.7	28.3	7.7	CR-22	Yes	0.75	Yes	No
AS-SEDG-B11	53.4	46.6	9.0	CR-1	Yes	0.58	Yes	Yes
AS-SEDG-B14	55.1	44.9	9.9	SBR-35	Yes	0.61	Yes	Yes
AS-SEDG-B16	69.0	31.0	12.5	SBR-35	Yes	0.76	Yes	No
AS-SEDG-B18	96.1	3.9	5.4	SBR-35	Yes	0.76	Yes	No

SQS: Statistical Significance and $M_T/M_R < 0.85$
CSL: Statistical Significance and $M_T/M_R < 0.70$

Table 11. DMMP Comparison for *Dendraster excentricus*.

Treatment	Mean Normal Survival (%) [1]	Mean Percent Combined Mortality	Standard Deviation	Reference Comparison	Statistically Less than Associated Reference	$(N_T/N_C)/(N_R/N_C)$	Fails 2-Hit?	Fails 1-Hit?
Control	91.4	8.6	3.7					
CR-22	98.6	1.4	3.0					
SBR-35	95.4	4.6	4.4					
AS-104-A 0-4	98.3	1.7	3.8	CR-22	No	1.00	No	No
AS-107-A 0-4	96.8	3.2	3.0	SBR-35	No	1.02	No	No

4.3 MICROTOX® TEST SUITABILITY DETERMINATION

The SMS program criteria state that a test sediment fails the SQS criteria when the mean light output of the highest concentration of the test sediment is less than 80% of the mean light output of the reference sediment and the two means are statistically different (p ≤ 0.05). No criteria exist for the Microtox® test for CSL.

Grain size is the driving factor in Microtox® testing and for the reference sample CR-22, there was not enough porewater for testing and SBREF-35 was used in lieu of in the test batches referencing CR-22. The laboratory was also unable to extract porewater from AS-104-A. No Microtox® testing was performed on this sample.

All SMS and DMMP test treatments meet the SQS for Microtox® (Tables 12 & 13).

Table 12. SMS Comparison for Microtox®.

Treatment	5-minute reading		15 minute reading		Fails SQS?
	Mean % output	Statistically Less than Reference and > 20% Difference?	Mean % output	Statistically Less than Reference and > 20% Difference?	
<u>Test 1</u>					
Control	96 ± 1		88 ± 2		
SBR-35	99 ± 4		95 ± 5		
AN-SB-106	98 ± 1	No	93 ± 5	No	No
AN-SB-101	97 ± 1	No	94 ± 1	No	No
AS-SEDG-112	99 ± 4	No	94 ± 2	No	No
AS-SEDG-B18	100 ± 1	No	97 ± 1	No	No
<u>Test 2</u>					
Control	92 ± 2		83 ± 2		
SBREF35	102 ± 3		100 ± 2		
AN-SB-B15	100 ± 1	No	94 ± 2[1]	No	No
AS-SEDG-B09	101 ± 1	No	98 ± 3	No	No
AN-SB-102	97 ± 1	No	92 ± 4	No	No
<u>Test 3</u>					
Control	96 ± 4		88 ± 7		
CR-1	102 ± 3		101 ± 7		
AN-SB-108	103 ± 2	No	98 ± 1	No	No
AS-SEDG-113	101 ± 2	No	98 ± 1	No	No
AS-SEDG-B11	102 ± 4	No	100 ± 5	No	No
<u>Test 4</u>					
Control	98 ± 2		90 ± 2		
CR-1	96 ± 2		93 ± 2		
SBREF35	100 ± 4		98 ± 4		
AS-SEDG-B14	98 ± 4	No	92 ± 2[2]	No	No

[1] Significantly different than SBREF-35 (p<0.05).
[2] Significantly different than SBREF-35 but not reference CR-1 (p<0.05).
SQS: > 20% difference and statistically significant difference (p<0.05) relative to the reference.
CSL: No failure criteria for Microtox® under SMS rule.

Table 13. DMMP Comparison for Microtox®.

Treatment	5-minute reading		15 minute reading		Fails SQS?
	Mean % output	Statistically Less than Reference and > 20% Difference?	Mean % output	Statistically Less than Reference and > 20% Difference?	
Test 1					
Control	92 ± 2		83 ± 2		
SBREF35	102 ± 3		100 ± 2		
AS-107-A 0-4	102 ± 2	No	98 ± 3	No	No

SQS: > 20% difference and statistically significant difference ($p<0.05$) relative to the reference.
CSL: No failure criteria for Microtox®under SMS rule.

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