Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures Study
Volume IV: 2-60s Area

Data Gap Investigation Work Plan
Section 1: 2-60s Area Description
Section 2: Data Gap Analysis
Section 3: Data Gap Investigation Methods

Data Gap Investigation Report
Section 4: Data Gap Investigation Results
Section 5: Area-specific Constituents of Concern

Remedy Selection Report

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List of Abbreviations/Acronyms

Abbreviation/Acronym	Definition
AOC	Area of Concern
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and xylene
CMS	Corrective Measures Study
COC	Constituent of concern
cPAHs	Carcinogenic polycyclic aromatic hydrocarbons
DO	Dissolved oxygen
DRPH	Diesel range petroleum hydrocarbons
GRPH	Gasoline range petroleum hydrocarbons
HSA	Hollow-stem auger
IM	Interim measure
LNAPL	Light non-aqueous phase liquid
MTCA	Model Toxics Control Act
NAPL	Non-aqueous phase liquid
NFA	No Further Action
NTU	Nephelometric turbidity unit
OA	Other Area
ORP	Oxidation-reduction potential
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
PTFE	Polytetrafluoroethylene
PID	Photo-ionization detector
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation

Abbreviation/Acronym	Definition
RL	Reporting Limit
SL	Screening Level
SVOC	Semivolatile organic compound
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TD	Total depth
TOC	Total organic carbon
TPH	Total petroleum hydrocarbon
TSCA	Toxic Substances Control Act
TSD	Treatment, storage, and disposal
USEPA	U.S. Environmental Protection Agency
UST	Underground storage tank
VOC	Volatile organic compound
WAC	Washington Administrative Code

Foreword

This Work Plan presents the scope and methodology for a Data Gap Investigation in the 2-60s Area of Boeing Plant 2. The need for this investigative work was identified by The Boeing Company (Boeing) during the preparation of the Uplands Corrective Measures Study (Uplands CMS), well after the completion of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI). The RFI used a RCRA unit-by-unit approach to investigate the site; when corrective measures were being evaluated for groundwater, this approach was found to be inadequate for remedy selection due to the more integrated nature of groundwater contaminant distributions. Boeing, with the concurrence of the United States Environmental Protection Agency (USEPA) and Washington State Department of Ecology (Ecology), has embarked on a series of focused investigations to enable the Uplands CMS to proceed. The results of these investigations will be reported in the CMS Report.

This Data Gap Investigation Work Plan comprises Sections 1 through 3 of Volume IV of the CMS, which covers the 2-60s Area at Boeing Plant 2. Section 4 will present the results of the Data Gap Investigation when they are available; while later sections of Volume IV will evaluate and select the remedies for the 2-60s Area. Similar processes are being implemented simultaneously for the other areas at Boeing Plant 2. This volume (IV) will be proceeded in the CMS report by Volume I – Introduction, Volume II – Cleanup Level Evaluation Technical Memorandum and Volume III – South Yard Area Data Gap Investigation Work Plan. Volume I will contain introductory text explaining Plant 2 history, the RCRA CMS process, the Plant 2 physical conceptual site model, a description of the study areas, and a discussion of the site-wide RCRA and non-RCRA unit accounting process. Volume II will contain the Cleanup Level Evaluation Technical Memorandum and Volume III will contain the South Yard Area Data Gap Investigation Work Plan.

The Work Plan and the CMS are being performed under the Administrative Order on Consent (Order) issued by USEPA to Boeing under the authority of Section 3008(h) of the RCRA of 1976, as amended, (42 USC 6928(h)). This Order (RCRA Docket Number 1092-01-22-3008(h)) became effective on January 18, 1994. The Order specifies activities necessary to correct actual or potential threats to human health and the environment resulting from the release or potential release of hazardous constituents from the Boeing Plant 2 Facility located at 7755 East Marginal Way South, Seattle/Tukwila, Washington.

1.0 2-60s Area Description

1.1 DESCRIPTION AND SETTING

The Boeing Plant 2 Facility (Plant 2) is located on the east bank of the Duwamish Waterway in Seattle and Tukwila, Washington (Figure 1-1). Historically, Plant 2 has specialized in manufacturing aluminum alloy, steel alloy, and titanium alloy parts for airplanes. Plant 2 was built on farmland in the late 1930s, and became a significant manufacturing facility during World War II. In recent years, the character of Plant 2 has shifted toward research and administration.

Plant 2 is bounded on the east by East Marginal Way South, a 4-lane arterial; on the south by Jorgensen Forge, an active steel and aluminum forge; on the north by Slip 4 and Emerald Services, Inc.; and on the west, the Duwamish Waterway. The Duwamish Waterway is a federally-maintained shipping channel of the Duwamish River; Slip 4 is an off-channel extension of the waterway. Plant 2 is served by both truck and rail, and was historically accessible from the waterway. Plant 2 is divided into northern and southern sections by an arterial, 16th Ave S, which services the 16th Ave S Bridge over the Duwamish Waterway.

Plant 2 occupies approximately 109 acres of developed, topographically flat land covered by buildings and paved yards. Most buildings are slab on grade with underground utilities.

The subsurface soils beneath the 2-60s Area consist of four major geologic units within the upper 100 feet. The first 3 to 9 feet of soil is generally a fill layer comprised of a dark gray to brown fill that is a loose to very dense, fine to medium sand and gray to grayish-brown gravel. Much of the fill appears to be alluvial in nature and probably reflects modifications to the Duwamish River channel at the turn of the century; some debris exists within the fill. The fill is underlain by brownish to greenish-gray to black silt and a soft organic silt layer that is approximately 2 feet thick.

Beneath the silt is the shallow portion of the upper aquifer that consists of poorly-graded, dark gray, fine to medium sand with varying amounts of silt. This alluvial unit extends from approximately 10 feet below ground surface (bgs) to 40-50 feet bgs. Underlying this unit are the older Duwamish River alluvial deposits consisting of thick, coarsening-upward sequences of inter-bedded sand and silty sand. These alluvial deposits extend from approximately 40-50 feet bgs to 80 feet bgs.

At approximately 80 feet bgs, historical well logs from Plant 2 describe a distinctive marine silt layer with shell fragments. The contact between the silty sand and the marine silt is sharp and is readily noted in the field. The marine silt layer is underlain by a dense gray glacial till unit. These two low-permeability deposits form an aquitard that isolates the shallow aquifer from the deeper aquifers beneath Plant 2.

Groundwater occurs in the alluvial aquifer starting at 9 to 12 feet bgs. The approximate groundwater flow direction in the 2-60s Area is west through the 2-66 Area towards the Duwamish Waterway. Groundwater from Plant 2 flows directly to the waterway without crossing

other properties, except for limited migration across the southern property line and onto the Jorgensen Forge Facility. Even in that location, the dominant flow direction appears to be roughly parallel to the fence line and towards the Duwamish Waterway (FSM, 2004).

The Duwamish Waterway in the vicinity of Plant 2 is a tidally-controlled marine embayment with a fresh water lens of out-going river water on top of denser (more saline) marine waters. The sediments, while alluvial in nature, have salinities consistent with the marine waters from Elliott Bay. A saltwater lens extends into the Uplands from the river and deeper deposits (greater than 60 feet) show zones of high salinity due to trapped sea water. The water column is brackish ranging from saline at depth to fresh on the top (Boeing, 2003).

1.1.1 CMS Study Areas at Boeing Plant 2

Plant 2 has been divided into seven "CMS Study Areas" to facilitate the development and screening of RCRA corrective measures. These areas are, from south to north:

- South Yard Area
- 2-60s Area
- 2-66 Area
- 2-40s Area
- 2-31 Area
- 2-10 Area
- North Area

These areas are shown in Figure 1-2, Site Plan with CMS Study Areas.

1.1.1.1 The 2-60s Area

The Area north of the South Yard of Boeing Plant 2, referred to as the 2-60s Area consists of approximately 13 acres. The 2-60s Area is bordered by East Marginal Way South to the east, the South Yard Area to the south, the 2-66 Area to the west, and the 2-40s Area to the north. The 2-60s Area contains Buildings 2-48, 2-51, 2-57, 2-64 and part of Building 2-108. Demolition and decommissioning activities have resulted in slabs remaining at former building locations 2-61, 2-62, 2-63, and 2-65. Many of the RCRA Units in the 2-60s Area are referenced to these existing and former buildings.

1.1.2 Previous Investigations

Numerous investigations of Plant 2 have been carried out by Boeing consultants, including Roy F. Weston, Inc. (Weston) and Landau Associates Inc. (Landau). Key site-wide investigations include the following:

- RCRA Facility Investigation Work Plan (Weston 1994a)

- RCRA Facility Investigation – Phase 1A Completion Report Volumes I to II Soil and Groundwater Presentation (Weston 1994c)
- RCRA Facility Investigation - Groundwater Investigation Interim Report (Weston 1996a)
- RCRA Facility Investigation – Soil Investigation Interim Report (Weston 1996b)
- Comprehensive RCRA Facility Investigation Report (Weston 1998a)
- RFI Health Evaluation for Upland Soil (Weston 1998b)
- RFI Groundwater Human Health and Environmental Evaluation (Weston 1998c)
- Technical Memorandum SWMU/AOC/OA-Specific Data Presentation, RCRA Corrective Measures Study Volumes I, II, III (Weston 2000a)
- Draft Phase I Environmental Site Assessment, Boeing Plant 2 (EPI 2002)
- Report of Boeing Plant 2 – Parcel Disposition Phase II Environmental Investigation Report (Golder/EPI 2003)

Investigations specific to the 2-60s Area in addition to Plant 2 site-wide studies are listed in Table 1-1. These documents fall into the following categories: closure documents, Corrective Measures Study (CMS) technical memoranda justifying No Further Action (NFA) decisions on units, and interim measures (IMs) work plans and reports.

1.1.2.1 Scope of Information Available

All of the information gathered above has been combined into a comprehensive database. The information includes all groundwater analytical results since 1988, and all soil analytical results for existing soil. When an IM removed soil from a unit, samples representing the removed materials were identified as “removed” in the database and post-removal confirmatory samples were added to the database.

A total of 27 groundwater monitoring wells have been installed and 34 direct-push probes have been driven in the 2-60s Area. Approximately 50 soil borings have been advanced throughout the 2-60s Area. Constituent groups of interest in the 2-60s Area have included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, and metals, which were analyzed using standard USEPA Methods and total petroleum hydrocarbons (TPH), which were analyzed using a variety of USEPA, American Society for Testing and Materials (ASTM), and Washington State Methods. Attachment A contains maps and tables displaying the groundwater data for groundwater constituents of concern (COCs) in the 2-60s Area; Attachment B contains maps and tables for soil COCs in the 2-60s Area. Please read the introductory sections of both Attachments for an explanation of how the information is presented.

1.2 RCRA UNITS

During the RFI and early stages of the CMS process, Plant 2 was evaluated following the RCRA Order and guidance, which used a unit-by-unit approach. This approach has been extended to an area-by-area approach for consideration of groundwater remedies; however, many of the soil remedies in the CMS will continue to focus on a unit-by-unit approach. Therefore, it is critical that the original RCRA Units continue to be tracked through the process. The following sections, along with Table 1-2, provide a description of each RCRA Unit in the 2-60s Area, including its location, historical use and status, and potential COCs. RFI sampling history, including constituents analyzed and those identified as "requiring further consideration", is also summarized for each unit. The "requiring further consideration" designation most often refers to exceedances of historical Preliminary Media Cleanup Levels (PMCLs). Constituents noted as requiring further consideration in this section are based on comparisons to historical PMCLs, and do not necessarily define COCs as identified via the current data gaps process detailed in Section 2. The data gap identification process uses screening levels developed using current input parameters and toxicity data and also considers additional exposure pathways relative to the historical evaluations presented in Section 1.

Within the 2-60s Area there are 14 identified RCRA Units (see Figure 1-3) that fall in the following categories:

- Ten Solid Waste Management Units (SWMU), a category of units defined in the Order as "any discernable unit at which solid wastes have been placed at any time".

- Two Areas of Concern (AOC), a category of units defined in the Order as "any area of the facility where a release to the environment of a hazardous waste or hazardous constituents has occurred, is suspected to have occurred or may occur".

- Two Other Areas (OA), a category of units not defined within the Order, but which by practice are treated identically as an AOC.

1.2.1 RCRA Units: Closed Units

No RCRA Units have been closed within the 2-60s Area of Plant 2.

1.2.2 RCRA Units Designated for No Further Action (NFA)

There is one RCRA Unit in the 2-60s Area where USEPA has already determined that "no further action" is needed for vadose zone soils. This unit has been granted "NFA status for soils", and soil remedies for this unit will not be evaluated further in the CMS. As discussed below, further evaluation of soil associated with this unit in the CMS is not necessary. This unit is:

- SWMU 77.B (PCB Retention Tank).

1.2.2.1 SWMU 77.B

The SWMU 77.B PCB retention tank was located between Buildings 2-63 and 2-65. The unit included a retention tank, a concrete bermed pad used to house transformers, and associated underground piping running from the pad to the retention tank. The retention tank was a 2,000-gallon steel UST (designated PL-47) beneath Transformer Vault 15. The tank functioned as secondary containment for any potential leaks and storm water runoff. The runoff may have contained TPH and PCBs associated with the transformer equipment. Transformer Vault 15 was installed in 1980. The PCB retention tank was removed in 1986 (Weston, 1999c; 2000c).

Soil samples were collected from one boring (SB-06407), adjacent to the former tank location, approximately 4 to 5 feet away from the tank. Soil samples were taken at depths of 1.5, 8, and 11 feet bgs and analyzed for PCBs and TPH. No COCs were detected in soil at concentrations reported in the RFI as requiring further consideration. As soil concentrations were too low to act as a source for groundwater, groundwater sampling was not required according to the RFI Work Plan.

USEPA has determined that “no further action” is required for vadose zone soil at this unit; therefore soil remedies for this unit will not be evaluated further in the CMS. Groundwater at this unit will be further evaluated in the CMS.

1.2.3 Historical Interim Measures at RCRA Units

Sections of the 2-60s Area have been redeveloped and an interim measure was conducted at RCRA unit SWMU 2-70.55 to accommodate the construction of a new building. The interim measure work focused on soil cleanup and excavating impacted soil and structures associated within the RCRA unit. Groundwater samples were also collected and constituents were not detected at concentrations requiring further consideration. A summary of the interim measure for SWMU 2-70.55 in the 2-60s Area is shown in Table 1-4.

The IM conducted at SWMU 2-70.55 is described in Section 1.2.6.11, along with references to the reports documenting the soil excavation and removal actions as well as sampling results.

1.2.4 Ongoing Interim Measures

Currently there is no ongoing IM in the 2-60s Area.

1.2.5 Planned Interim Measures

Interim measures (IMs) are planned for groundwater impacts at RCRA units OA 9 (Section 1.2.6.3) and OA 12 (Section 1.2.6.4) located within the 2-60s Area. Separate work plans will be developed and implemented for each of these units. See Figure 2-1 for the locations of these RCRA units.

Data gathered during the 2-60s data gap investigation will be used along with existing data to select and design groundwater IMs that are appropriate for the contaminant types and

concentrations, and the specific geologic and geochemical conditions at each planned IM location.

1.2.6 RCRA Units: Remaining for Consideration

Table 1-2 summarizes all remaining RCRA units presented below.

1.2.6.1 AOC 2-62.46 (formerly SPL-062-009)

AOC 2-62.46 was formerly referred to as SPL-062-009 (Golder, 2004). SPL-062-009 was a sump on the south side of Building 2-62, which was removed during demolition in 2003 and resulted in an excavation 50 feet long by 38 feet wide and 4 to 5 feet deep. A 3 to 4 inch metal pipe extended along the south wall of the excavation towards the west, and rust colored staining in the soil was observed when the pipe was exposed.

Three test trenches were excavated in the north, central and south portions of the bottom of the sump excavation to get below the imported gravel fill for soil sampling. Soil samples were collected from the base of each trench. A grab sample was collected from the stained soil adjacent to the exposed pipe, and a composite sample was collected from the south and west walls where staining was noted to the west at approximately 4 feet bgs. Samples were analyzed for VOCs, SVOCs, PCBs, PAHs, TPH, and metals. The following constituents were detected at concentrations reported in the RFI as requiring further consideration: Bis(2-ethylhexyl)phthalate, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, TPH, PCBs, cadmium, mercury, copper, and zinc. Table 1-2 summarizes the available data for AOC 2-62.46.

Groundwater and soil at AOC 2-62.46 will be further evaluated in the CMS.

1.2.6.2 SWMU 78.C

The SWMU 78.C oil/water separator is located between Buildings 2-64 and 2-65. It measures approximately 10 feet long by 5 feet wide and 8 feet deep. The unit's walls and floor are constructed of concrete approximately 6 inches thick. The oil/water separators found throughout the facility have been in operation at Plant 2 since the 1940s. They are used to collect storm water runoff and remove any mixed residual oils and other petroleum hydrocarbons that may have been deposited onto paved areas by motor vehicles and other incidental activities. Remaining storm water from the separator is discharged to the Metro sanitary sewer. Recovered oils are regularly pumped out of the unit and disposed.

Soil samples were collected from depths of 5, 7.5 and 12 feet bgs from one boring (SB-06401), which is located adjacent to the SWMU. Samples were analyzed for VOCs, SVOCs, PCBs, metals, and TPH. No constituents were detected at concentrations reported in the RFI as requiring further consideration. Table 1-2 summarizes the available data for SWMU 78.C.

A NFA decision has been requested from the USEPA (Weston, 1999c; 2001b). At this time, USEPA has requested that groundwater and soil at SWMU 78.C be further evaluated during the CMS.

1.2.6.3 OA 9 (including SWMU 2-78.6)

OA 9 consists of three former 3,333 gallon USTs (PL-16, -17, and -18), located south of Building 2-44 and east of Building 2-51. SWMU 2-78.6 was an oil-water separator that was part of the area encompassed by OA-9. The USTs were installed in 1950 and removed in 1986. Along with the removal of the tanks, approximately 20 cubic yards of impacted soil was removed and disposed of off-site. The potential COCs associated with these tanks are TPH. However, samples were also analyzed for VOCs, SVOCs, PCBs, and metals (Weston, 2000a).

Soil samples were collected from ten borings from November 1993 though March 1995. Samples were collected from depths ranging from 1.5 to 16.5 feet bgs and analyzed for VOCs, SVOCs, PCBs, TPH, and metals. No chlorinated VOCs, SVOCs, PCBs, or metals were detected at concentrations requiring further consideration. TPH and volatile aromatic hydrocarbon constituents were detected in borings PL2-311A, PL2-310A, and SB-04412 at concentrations reported in the RFI as requiring further consideration .

Groundwater samples were collected from four monitoring wells and three direct-push probes near OA 9 from 1993 to 1996. Laboratory analysis included VOCs, SVOCs, PCBs, TPH, and metals. Benzene, ethylbenzene and copper were detected at concentrations requiring further consideration in samples from two monitoring wells adjacent to the former UST location and from one downgradient well. No other SVOCs, PCBs, TPH, or dissolved metals were detected at concentrations reported in the RFI as requiring further consideration. Table 1-2 summarizes the available data for OA 9.

Groundwater and soil at OA 9 will be further evaluated during the CMS.

1.2.6.4 OA 12

The southern portion of Building 2-63 and the area between Buildings 2-63 and 2-65 was designated OA 12 after VOCs, metals, and TPH were detected in groundwater and soil samples under Building 2-63 during a preconstruction investigation that was conducted in 1994 (Weston, 1994a). The origin of the VOCs, TPH, and metals is unknown as no hazardous wastes or process chemicals have been reported to have been handled at Building 2-63. Therefore, VOCs, SVOCs, PCBs, TPH, and metals were all selected as potential constituents of concern.

Soil samples were collected from seven borings (PL2-315A, SB-06301, SB-06302, SB-06407, SB-06501, SB-06502, and SB-06503) in December 1993 and September 1994. Analytes included VOCs, SVOCs, PCBs, TPH, and metals. No VOCs, SVOCs, or PCBs were detected at concentrations reported in the RFI as requiring further consideration. TPH, arsenic, cyanide, nickel and copper were detected in various samples at concentrations reported in the RFI as requiring further consideration.

Groundwater samples were collected from two monitoring wells (PL2-315A and PL2-315B) and three direct-push probe locations (GP-06303, GP-06308, and GP-06309). Groundwater samples were again collected from monitoring wells from December 1993 through March 1995. Samples were collected from direct-push probes in August, September, and October 1994 from depths of 12 to 15 feet bgs and 22 to 25 feet bgs. Tetrachloroethene, trichloroethene, vinyl chloride and copper were present at concentrations reported in the RFI as requiring further consideration. Table 1-2 summarizes the available data for OA 12.

A NFA decision has been requested from USEPA (Weston, 1999c). At this time, USEPA has requested that groundwater and soil at OA12 be further evaluated during the CMS.

1.2.6.5 AOC 2-62.45

The AOC 2-62.45 paint booths and sump began operation around 1945 and were in use until 2003. The unit is located in the northern half of Building 2-62, and consists of six wet paint booths and a sump. The sump is located outside on the west side of the building. All paint booths and the sump have since been removed. The booths were used to paint a variety of airplane parts. Paint over spray was directed into a curtain of recirculated water at the back of each booth, which was contained in above-grade steel reservoirs. Water with dilute oil-based paint and solvents were periodically drained from the reservoirs to the sump and pumped out for disposal. Potential constituents of concern associated with the process solvents and metal containing parts included VOCs, SVOCs, TPH, and metals.

Soil samples were collected from five soil borings (PL2-314A, PL2-316A, SB-06202, SB-06205, and SB-06210) adjacent to and down gradient from the paint booths in December 1993 and February 1995. Samples were collected at depths ranging from 1 to 15 feet bgs and analyzed for VOCs, SVOCs, PCBs, TPH, and metals. No VOCs, PCBs, TPH, or metals were detected at concentrations reported in the RFI as requiring further consideration. Five SVOC constituents were detected in the 2-foot soil sample from boring SB-06205 at concentrations reported in the RFI as requiring further consideration, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene.

Two samples were collected from soils associated with the Acrylic Tank sump located 20 feet east from Paint Booth #3. The excavation resulting from the removal of the sump during building demolition in 2003 measured 8 feet long by 8 feet wide and 4 feet deep. Soil samples were removed from the south wall fill material, and from soil associated with the Acrylic Tank Sump. A final sample was collected from the base of the excavation. One sample was collected from soils associated with the SPL-062-004 sump, located outside the building 2-62 west wall. The excavation resulting from the removal of the sump measured 13 feet long by 8 feet wide and 4.5 feet deep. Although there was no indication of a release in association with the soils excavated, one soil sample was collected from the bottom of the excavation. The samples were analyzed for VOCs, SVOCs, PCBs, gasoline-range petroleum hydrocarbons (GRPH), diesel-range petroleum hydrocarbons (DRPH), total metals and cyanide. Only oil and grease-range TPH was detected at concentrations requiring further consideration (Golder, 2004).

Groundwater samples were collected from ten monitoring points surrounding the unit from December 1993 through August 1996. Analytes included VOCs and metals. The following VOCs and metals were detected at concentrations reported in the RFI as requiring further consideration: PCE, TCE, vinyl chloride, arsenic and copper. Table 1-2 summarizes the available data for AOC 2-62.45.

A NFA decision has been requested from USEPA (Weston, 2001b). At this time, USEPA has requested that groundwater and soil at AOC 2-62.45 be further evaluated during the CMS.

1.2.6.6 SWMU 2-63.47

The SWMU 2-63.47 dilute chrome tank was located in Building 2-63 near column J-3. The tank was used to hold wastewater produced in model-making processes. The original tank was replaced by three smaller, open-process tanks. The original and subsequent tanks were located within a 20 by 10 foot area surrounded by a 6 inch high concrete berm. This SWMU was decommissioned and all tanks were removed in the mid 1990s.

Soil samples were collected from one boring (SB-06305) located in the dilute chrome tank at depths of 2, 8, and 11 feet bgs and analyzed for metals and cyanide. Nickel and mercury were detected at concentrations reported in the RFI as requiring further consideration. High reporting limits (RLs) were associated with cyanide and silver. Table 1-2 summarizes the available data for SWMU 2-63.47.

A NFA decision has been requested from USEPA (Weston, 1999c; 2000c; 2001b). At this time, USEPA has requested that groundwater and soil at SWMU 2-63.47 be further evaluated in the CMS.

1.2.6.7 SWMU 2-64.48

SWMU 2-64.48 consisted of a 1,000-gallon underground tank located between Buildings 2-63 and 2-64 and is also referred to as PL-51. The tank was initially installed as an oil/water separator in 1970. The tank held condensate originating from an air compressor condensate sump (part of SWMU 2-64.49) in Building 2-64. The liquid held in the tank was primarily oily condensate water, although other chemicals associated with the air compressor building may have been in the tank as a result of spills and drips. The underground tank was removed and replaced with an above ground storage tank. Potential constituents of concern included VOCs, PCBs, TPH, and metals.

Soil samples were collected from three soil borings (SB-06403, SB-06405, and SB-06408) up-, down-, and cross- gradient to the underground waste tank. Soil samples were collected in December 1993 and August/September 1994. Samples were collected from depths ranging from 1.5 to 12.5 feet bgs. Analytes included VOCs, SVOCs, PCBs, TPH, and metals. No VOCs were detected at concentrations reported in the RFI as requiring further consideration. Chrysene, Aroclor 1254, copper and silver were detected at concentrations reported in the RFI as requiring further consideration.

Groundwater samples were not collected at this unit because metal analyte concentrations were low and all elevated concentrations mentioned above were limited to the upper soil horizon, indicating that downward migration had not occurred (Weston, 2000a). Table 1-2 summarizes the available data for SWMU 2-64.48.

A NFA decision has been requested from the USEPA (Weston, 2001b). At this time, USEPA has requested that groundwater and soil at SWMU 2-64.48 be further evaluated during the CMS.

1.2.6.8 SWMU 2-64.49

The SWMU 2-64.49 air compressor building sump and accumulation area consists of a system of subgrade trenches and sumps in Building 2-64. The unit area is approximately 100 feet long by 48 feet wide, occupying roughly 65 percent of the building floor space. This unit began operating in 1954; most systems were decommissioned in 2003, and one air compressor remains in use. Air compressor equipment is installed on grated flooring directly above the trenches. The condensate received by the trenches and sump is composed primarily of water, which is transferred to a 1,000-gallon UST (SWMU 2-64.48) located outside the northeastern corner of the building. Additional wastes, including oily rags and paints from routine equipment maintenance are placed in drums in the accumulation area of Building 2-64. Potential constituents of concern include VOCs, SVOCs, PCBs, TPH, and metals.

Twelve soil samples were collected from four soil borings (SB-06401, SB-06402, SB-06405, and SB-06406) in December 1993 and August 1994. SB-06402 and SB-06402 were collected from downgradient positions outside Building 2-64. SB-06405 and SB-06406 were collected within the footprints of the northeastern and northwestern sumps, respectively, beneath the compressed air receiver tanks (Weston, 2000a). Samples were collected at depths ranging from 1.5 to 12.5 feet bgs. No VOCs, SVOCs, PCBs, or TPH were detected at concentrations reported in the RFI as requiring further consideration. Arsenic and mercury were detected at concentrations reported in the RFI as requiring further consideration in the 1.5 feet bgs sample from SB-06406.

Groundwater samples were collected from three direct-push probe locations near the west side of Building 2-64 in August 1994 (GP-06401, GP-06402, and GP-06403). The groundwater samples were collected from 12 to 13 feet bgs and were analyzed for VOCs, PCBs, TPH, and total and dissolved metals. VOCs, PCBs, and TPH were not detected in any groundwater samples. Dissolved arsenic, copper, and nickel were detected at concentrations reported in the RFI as requiring further consideration. Table 1-2 summarizes the available data for SWMU 2-64.49.

A NFA decision has been requested from the USEPA (Weston, 1999c; 2001b). At this time, USEPA has requested that groundwater and soil at SWMU 78.5 be further evaluated during the CMS.

1.2.6.9 SWMU 2-65.50

The SWMU 2-65.50 machine pit was located at the north end of Building 2-65 near column BB-19. The machine pit measured 8 feet long by 6 feet wide by 4 feet deep, and remains in operation. In September 1993 new machinery was installed, including a hydraulic oil tank that was placed inside the machine pit. The pit held coolants, lubricating oils, and hydraulic oils that dripped from an adjacent parts grinding machine. The pit was filled with concrete during demolition to prevent debris and rain accumulation. The potential constituents of concern associated with the process coolants and lubricants include PCBs, TPH, and metals (Weston, 2001b).

In December 1993 soil samples were collected from boring SB-06505, which was located to the northeast of the unit. Samples were collected from depths of 7.5, 10, and 12.5 feet bgs and analyzed for PCBs and TPH. A second boring (SB-06510) was advanced inside the building, within three feet of the northwest corner of the unit. At this boring, samples were collected at 1.5, 8.5, and 12.5 feet bgs and analyzed for PCBs, TPH, and metals. The only constituent detected at concentrations reported in the RFI as requiring further consideration was PCB Aroclor 1254, which was detected in the near surface sample from SB-06510 (Weston, 2001b).

Groundwater samples were not collected at this unit because soil constituent concentrations were low and PCBs were limited to the upper soil horizon, indicating that downward PCB migration had not occurred (Weston, 2000a).

Groundwater and soil at SWMU 2-65.50 will be further evaluated in the CMS.

1.2.6.10 SWMU 2-62.43

The SWMU 2-62.43 tank line consisted of a series of five tanks in an above-grade concrete secondary containment, located in Building 2-62 between columns G/J-11/12. This unit began operation in the early 1980s and has since been decommissioned. Its primary use was for pre-treating metal parts prior to painting. Wastewater from the tank line was collected in the secondary containment sump and rinse water from the cleaning process was pumped to the bulk storage tank adjacent to the tank line. Potential constituents of concern associated with the process chemicals included metals (including hexavalent chromium) and cyanide.

In addition to visual inspection of the secondary containment and blind sump, one soil boring (SB-06209) was advanced through the secondary containment, as close as possible to the sump. Three soil samples were collected at depths of 1.5, 5.5, and 11.0 feet bgs. Samples were analyzed for metals, hexavalent chromium and cyanide. Because all analytes were detected at concentrations reported in the RFI as not requiring further consideration, groundwater sampling was not required. Table 1-2 summarizes the available data for SWMU 2-62.43.

Two soil samples were collected in 2003 from areas associated with the SWMU 2-62.43 sump during excavation as part of the Building 2-62 demolition activities. The excavation resulting from the removal of the sump measured 15 feet long by 10 feet wide and 3 feet deep. A second area of asphalt and piping was removed outside the building in association with the Tank Line

Sump. Blackish brown impacted soil formed a lense 1 to 2 inches thick that extended along the north side of the excavation at a depth of 3 feet bgs. A sample of impacted soil was collected from within the lense, and another was collected in association with the Tank Line Sump. A final sample was collected from the base of the excavation at the contact between fill and native soil at approximately 4 feet bgs. The samples were analyzed for VOCs, SVOCs, PCBs, GRPH, DRPH, total metals, and cyanide. Benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and oil and grease-range TPH were detected at concentrations reported in the RFI as requiring further consideration.

A NFA decision has been requested from the USEPA (Weston, 1999c; 2000c). At this time, USEPA has requested that groundwater and soil at SWMU 2-62.43 be further evaluated during the CMS.

1.2.6.11 SWMU 2-70.55

SWMU 2-70.55 was located at the southeast corner of Building 2-70, and included a steam-clean area (37 by 21 foot area with a concrete slab partly under a canopy) and a 950-gallon underground stainless steel tank (PL-50). The UST was located within a 1,150-gallon concrete secondary containment vault. Steam-cleaning wastewater was collected in a trench drain and flowed to the underground tank, which was originally installed as an oil/water separator in 1981. A stainless-steel liner was installed inside the separator tank (PL-50), during a tank system upgrade, to function as the primary containment vessel.

The tank, secondary containment, and associated soil were removed in March 1998 as part of an interim measure to facilitate new construction (Weston, 2000c). Chemicals associated with the steam cleaning wastewater included oil and industrial detergents. Potential constituents of concern were VOCs, SVOCs, PCBs, TPH, and metals.

After the removal of the containment structure, tank and soil, verification soil samples were collected in February and March 1998 from four locations within the excavation site. The four locations in the excavation area were sidewall or bottom samples (SB-07004, SB-07005, SB-07006, and SB-07007). Samples were also previously collected from two locations (SB-07002 and PL2-317A) in the vicinity of the SWMU in November 1993 and August 1994.

No VOCs, SVOCs, PCBs, or metals were detected at concentrations reported in the RFI as requiring further consideration in soil.

Although groundwater samples were not required, groundwater samples were collected and analyzed for VOCs, SVOCs, TPH, and metals in support of a facility-wide groundwater investigation. In the vicinity of SWMU 2-70.55, VOCs, SVOCs, and TPHs were either undetected or detected at low concentrations reported in the RFI as not requiring further consideration. In lieu of groundwater dissolved metal concentration data, total metals were analyzed for and evaluated. Some total metals were detected, but were not considered a concern since metals were not detected in soil samples at concentrations reported in the RFI as requiring further consideration (Weston, 1999c; 2000c).

A NFA decision has been requested from the USEPA (Weston, 1999c; 2000c). At this time, USEPA has requested that groundwater and soil be further evaluated during the CMS.

1.2.6.12 SWMU 77.A

SWMU 77.A was located south of Building 2-62 and consisted of a 2,000-gallon PCB UST retention tank (PL-46) connected via piping to concrete bermed pads used to house transformers. The retention tank was housed in Transformer Vault 9. The transformer vaults were installed in approximately 1980 and the retention tank for Vault 9 was removed in 1986. The tanks functioned as secondary containment in the event that the transformers leaked, as well as collecting stormwater runoff from the transformer pads. The retained runoff may have included TPH and PCBs associated with the coolant oils used in the transformers. Potential constituents of concern included VOCs, PCBs, and TPH.

Soil samples were collected from depths of 1.5, 8 and 11 feet bgs at one boring immediately adjacent to the PCB retention tank and analyzed for PCBs and TPH (Weston, 1999c). No constituents were detected in soil samples; consequently groundwater samples were not required. Table 1-2 summarizes the available data for SWMU 77.A.

A NFA decision has been requested from the USEPA (WESTON, 1999c). At this time USEPA has requested that groundwater and soil be further evaluated during the CMS.

1.2.7 Non-RCRA Units

Non-RCRA Units are defined as locations at Plant 2 where Boeing has identified a potential subsurface environmental condition. During the CMS Process, data from these locations will be compared to screening criteria. If exceedances of the criteria are found, the location will be proposed as a new RCRA Unit. Non-RCRA units in the 2-60s Area include SPL-049-006 and PL37. Figure 1-3 shows the location of these units. The following sections present a description of SPL-049-006 and PL37.

1.2.7.1 SPL-049-006

SPL-049-006 is a sump that consists of two 500 gallon Zyglo USTs located outside the east side of building 2-49. The sump is reported to have contained Zyglo, and the contaminants of concern include VOCs, SVOCs, PAHs and DRPH (EPI 2002 and Golder/EPI 2003).

Groundwater and soil samples were collected from boreholes DP-4908 and DP-4909. DP-4908 is up-gradient of the sump, and samples were collected from 6, 9 and 15 feet bgs. DP-4909 is adjacent (down-gradient) of the sump; samples were collected from 4, 11 and 15 feet bgs. Low concentrations of DRPH and motor oil-range petroleum hydrocarbons were detected in shallow (3 – 6 feet bgs) soil samples. Di-n-butylphthalate was the only SVOC detected (in the 6 foot sample from DP-4908). Groundwater samples were collected from 13 feet bgs from DP-4908 and DP-4909. No COCs were detected at concentrations requiring further consideration.

Groundwater and soil at SPL-049-006 will be investigated further during the data gaps process as part of the CMS. Its status as a RCRA Unit will be evaluated in Section 4 as part of the data gaps investigation report.

1.2.7.2 PL37

PL37 is a 2000 gallon fuel UST that could not be located during 1986 Plant II UST closure activities. UST files suggest that PL37 was located outside the south wall toward the east end of Building 2-44. The primary COCs associated with PL37 are DRPH and motor oil-range petroleum hydrocarbons, and secondary COCs include BTEX, PCBs, cPAHs and naphthalene.

Groundwater and soil samples were collected to investigate the potential of a release from PL37 prior to removal. Samples were collected from DP-4407 (up gradient) where samples were collected from 5, 10 and 15 feet bgs and DP-4408 (down gradient) where samples were collected from 6, 11, 15 feet bgs. Soil samples analyzed for DRPH through motor oil-range petroleum hydrocarbons only detected minor amounts of DRPH. Groundwater samples were collected from 13 feet bgs (DP-4407) and 11 feet bgs (DP-4408). DRPH was detected at concentrations requiring further consideration.

Groundwater and soil at PL 37 will be investigated further during the data gaps process as part of the CMS. Its status as a RCRA Unit will be evaluated in Section 4 as part of the data gaps investigation report.

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2.0 Data Gap Analysis

2.1 APPROACH

During the CMS remedy selection for groundwater, it became increasingly evident that several key data gaps existed that were limiting the evaluation of corrective measures. These data gaps had not been as evident when the unit-by-unit approach was applied to identify corrective measures for soil. This section is designed to identify those data gaps that are limiting the ability to proceed with the CMS, and to propose investigative solutions to those data gaps. Section 3.0 then outlines the specific field methods, in the form of a Sampling and Analysis Plan, to fill those gaps in a focused manner. This volume of the CMS is limited to the 2-60s Area; other volumes of the CMS will address data gaps, if any, in other areas of Plant 2.

The data gap analysis presented in this section is focused on those data gaps that must be filled to proceed with the corrective measure analysis in the remainder of the CMS. Uncertainties in contaminant extent alone are not considered to be a data gap unless the information is required to select or conceptually design a corrective measure for a RCRA Unit or Remediation Action Area. That is, this information is intended to allow for remedy selection and conceptual design in the CMS, and to support the Statement of Basis for the decision; further information may be necessary for planning a specific remedy in a specific area for final design or for performance monitoring purposes during the Corrective Measures Implementation. Data gaps were identified by considering the following CMS questions:

- **Physical Conceptual Site Model for 2-60s Area:** Is there any area-specific information that is needed to support the physical conceptual site model?
    - **Geologic Data:** Is additional geologic information needed in order to screen or conceptually design remedies?
    - **Hydrogeologic Data:** Is additional hydrogeologic information needed in order to screen or conceptually design groundwater remedies?
- **Current Data:** Are the existing groundwater data sufficiently current to allow for the identification of existing groundwater plumes, a designation of their current extent, and evaluation of whether they are likely to grow, remain steady, or shrink over time? Finally, are there sufficient nature and extent data to screen and conceptually design groundwater remedies?
- **Source Control:** Does sufficient information exist to select source control remedies?
    - **Hot Spots:** Are RCRA units characterized in sufficient detail to select and conceptually design source control remedies?
    - **New Sources:** Have areas of contamination been identified outside of existing RCRA Units that need further definition in order to select and conceptually design source control remedies, and to assign RCRA unit designation, if appropriate?

- **Completed Pathways:** Do sufficient data exist at specific units to determine whether a specific pathway from one media to another is complete? Complete means that the pathway has the potential to impact the affected media above screening levels.
    - What are the physical properties governing transport/migration of the constituent through the subsurface? What is its relative distance from the waterway?
    - Are any other constituents present that may facilitate the migration of the constituent? For example, TPH and other solvents can affect the solubility of PCBs and facilitate their transport through soil and groundwater.
    - **Soil to groundwater pathway:** Are COCs present in soil that impact groundwater above screening levels? Are there corroborating data indicating that groundwater has not been impacted at the location?
    - **Groundwater to surface water pathway:** Are COCs present in groundwater that reaches surface water at levels that are above screening levels?
- **Background Data:** Is sufficient information available to set background concentrations for metals in soil or groundwater for remedy selection and planning?
- **Exceedance of Screening Levels by Analytical RLs:** For the analytical results reported as not detected ("U" qualified) for the individual COCs, do the RLs exceed the screening levels (SLs)? For constituents where RLs for non-detects ("U"qualified results) exceeded the SLs, the following questions were considered on a case-by-case basis to determine whether the circumstances present a data gap for CMS purposes.
    - Is the RL sufficiently close to the SL that soil or groundwater impacts for that COC can be adequately delineated and quantified for CMS purposes? Note that RLs for Total PCBs may be biased high due to the practice of using the highest individual reported Aroclor RL for the Total PCBs RL.
    - Are the soil RLs for non-detected metal constituents below Ecology's (Ecology, 1994) Puget Sound Basin natural background concentrations. For example, the RL for arsenic in soil is above its SL, but is commonly below its Puget Sound natural background concentration.
    - Are there additional data from adjacent locations or subsequent samples from the same location supporting either the presence or absence of the constituent in the groundwater or soil?
    - Are there other analytical results associated with the sample that render further consideration unnecessary? For example, Aroclor 1260 in soil is reported as not detected at an elevated RL (>33 µg/kg), but Aroclor 1254

is detected at a concentration above the screening level in the same sample.

In the 2-60s Area, consideration of these questions resulted in the following data gaps:

- **Physical Conceptual Site Model for the 2-60s Area**
  - **Geologic Data:** No data gaps have been identified.
  - **Hydrogeologic Data:** No data gaps have been identified.
- **Current Data:** Current groundwater data are needed. This data gap is discussed in Section 2.3.1.
- **Source Control**
  - **Hot spots:** All RCRA units in the 2-60s Area were found to be sufficiently characterized therefore no data gaps have been identified.
  - **New sources:** Some data gaps were identified and are discussed in Sections 2.3 and 2.4.
- **Completed Pathways**
  - **Soil to groundwater:** Some data gaps have been identified, and are discussed in Section 2.4.
  - **Groundwater to surface water:** The boundaries of the 2-60s Area do not extend to surface water. Contaminant plumes that cross the boundary between the 2-60s Area and the downgradient 2-66 Area will be evaluated further in Volume V of the CMS.
- **Background Data:** This data gap will be addressed later in the CMS process. When this occurs later in the CMS process, COCs requiring further consideration will be reevaluated.
- **Exceedance of Screening Levels by Analytical Reporting Limits:** Some data gaps associated with elevated RLs have been identified for specific COCs, and are discussed in Sections 2.3 and 2.4.

The 2-60s Area has been the subject of numerous separate investigations of RCRA Units. As a result of these investigations:

- 27 monitoring wells have been installed, of which 26 remain and 1 has been abandoned.
- 34 direct-push probes have been advanced and sampled.

- Approximately 50 soil borings have been advanced and sampled.
- 147 individual groundwater samples have been collected for 2-60s Area groundwater COCs.
- 258 individual soil samples have been collected for 2-60s Area soil COCs.

Samples were analyzed for VOCs, SVOCs, PCBs, TPH, Metals, and Cyanide in both groundwater and soil, but not all at all locations.

The 2-60s Area COCs for both groundwater and soil were identified using the same methodology presented in Volume II of the CMS, but applied to only the data from the 2-60s Area. A 2-60s Area COC for groundwater or soil is defined as any constituent detected at concentrations greater than the lowest screening level. As noted in Volume II of the CMS, screening levels were developed for the following pathways:

Media: Groundwater	**Media: Soil**
Surface Water Pathways	Surface Water Pathways
Ingestion of Aquatic Organisms Protection of Aquatic Organisms	Ingestion of Aquatic Organisms Protection of Aquatic Organisms
Direct Exposure Pathways	Direct Exposure Pathways
No complete pathway exists	Dermal Exposure by Industrial Workers Ingestion Exposure by Industrial Workers Trenching (Direct Exposure during Construction)
Air Exposure Pathways	Air Exposure Pathways
Indoor Air Inhalation by Industrial Workers Outdoor Air Inhalation by Industrial Workers Trenching (Inhalation during construction)	Indoor Air Inhalation by Industrial Workers Outdoor (including Fugitive Dust) Air Inhalation Trenching (Inhalation during construction)

The above risk-based exposures were then grouped by general pathway applicable at Plant 2: Surface Water, Direct Contact, and Air. This grouping greatly clarifies the CMS evaluation by grouping discussions regarding fate and transport, points of compliance, remedy selection, and compliance monitoring according to respective pathways. For the COC analysis, the lowest screening level for a specific exposure is used as the screening level for the general pathway to ensure that the analysis is complete. As indicated in Volume II of the CMS, one adjustment made to risk calculations to arrive at screening levels has included increasing individual COC screening levels to laboratory reporting limits assuming a “clean” matrix. This is considered the practical quantitation limit (PQL), as discussed in Volume II.

The 2-60s Area COCs and screening levels are summarized in Table 2-1. Note that there are COCs representing each of the major analytical groups: VOCs, SVOCs, PCBs, TPH, metals, and cyanide.

To determine whether or not a specific data gap exists, COC concentrations in groundwater and soil are first compared to screening levels. Data gaps are then identified if there were insufficient data to answer any of the general data gap questions outlined previously.

Data gap analysis criteria are applied to each COC for each general pathway for each media to ensure the analysis is complete.

The following sections present this data gap analysis and the results for the 2-60s Area.

2.2 DATA GAPS: PHYSICAL CONCEPTUAL SITE MODEL

Foreword to Section 2.2.1:

This section is identical to Section 2.2.1 Plant 2 Hydrogeologic Description in Volume III of the CMS. In the Draft Final version of the CMS, this section will appear in Volume I of the CMS within the description of the Conceptual Site Model for Plant 2. It is included here to assist the reader who is reviewing Volume IV as a stand alone discussion of investigative data gaps for the 2-60's Area.

2.2.1 Plant 2 Hydrogeologic Description

Plant 2 is located in the central portion of the Duwamish Valley adjacent to the tidally-influenced Duwamish Waterway as noted in Figure 1-1. The Duwamish Valley is bounded to the east by Beacon Hill, rising to an elevation of 300 feet and separating the valley from the Lake Washington drainage basin. The western boundary of the Duwamish Valley is a topographic divide that separates the valley from the Puget Sound.

The historic Duwamish River was dredged and realigned to form the current channel of the Duwamish Waterway. This realignment was completed in approximately 1918 and moved the river from its former location at the present day King County International Airport to its current location to the west (Weston 1996a). Industrial development of the area beginning in the 1930s resulted in pavement or buildings covering a large portion of Plant 2.

The topographic divides that bound the Duwamish Valley to the west and east are composed of sedimentary bedrock of Tertiary age overlain by Quaternary glacial deposits. The Duwamish Valley consists of recent sediments underlain and bounded by older Quaternary glacial deposits and, locally, Tertiary bedrock. The near-surface sediments of the Duwamish Valley are set within the trough of the Duwamish estuary, carved by glacial ice and subsequently in-filled by river sediment. The lower boundary of that trough is reached sporadically by deep borings, particularly in the southern half of the study area. The pattern of those data indicate that the trough lies roughly 200 feet below the modern ground surface along the axis of the valley, generally becoming more shallow to the south and also towards the east and west valley walls. The boundary of these deposits is marked either by bedrock (where present to the south) or by very dense sediment that has been glacially overridden (Booth and Herman 1998).

Above this boundary, the geologic history of the area suggests that a sequence of estuarine deposits, typically fine sands and silts with shells, should be found and should progress up into a more complex interbedded river-dominated sequence of sand, silt, and gravel marking the advance of the sedimentary wedge fed by the Osceola Mudflow and later deposits. The mudflow itself would have been very thin and subaqueous along the Duwamish Valley when first deposited, so the chances of intersecting (and recognizing) that layer by drill cores is probably low. The upper part of the river-deposited sediment should, and does, show the classic signs of continued slow overbank deposition by fine sand and silt, colonization by marshland plants, and occasional erosion and refilling by coarser sediment associated with the main channel of the migrating Duwamish River (Booth and Herman 1998).

The most recent phase of the valley's geologic history includes the filling of tideflats and floodplains, and the subsequent dredging of a straightened channel of the meandering Duwamish River. Completed between approximately 1913 and 1918 by the Duwamish Waterway District, the new channel was 4-1/2 miles in length south from the East and West Waterways. As a result of the waterway development, 12-1/2 miles of old river bed was abandoned. The excavated waterway material was used to fill the old channel areas and the lowlands above flood levels. Subsequent filling for land development purposes has resulted in a surficial layer of fill over most of the lower Duwamish Valley. The heterogeneous nature of fill materials can locally affect both infiltration characteristics and groundwater flow where the water table is below these fill materials. Because much of the thicker fills that occur below the water table are dredged from the Duwamish River, the silts and sands are difficult to distinguish from the native alluvium and have the same general hydrogeologic properties (Booth and Herman 1998).

A generalized cross sectional diagram of the stratigraphy beneath Plant 2 is presented in Volume I of the CMS. The oldest (deepest) sediments encountered during the RFI consist of marine silt (the lower silt unit) deposited on the underlying glacial till unit. These two low-permeability deposits form an aquitard that isolates the shallow aquifer from the deeper aquifers beneath Plant 2. Above the lower silt unit is a thick, water-bearing, coarsening-upward sequence consisting of interbedded sand and silty sand. A thin layer of fill material consisting of coarse sand with varying amounts of silt overlies the naturally-deposited sand that makes up the upper aquifer beneath Plant 2. The shallow portion of the upper aquifer consists of medium sand with varying amounts of silt. This includes an approximate 2 foot thick layer of brownish to greenish-gray to black silt and soft organic silt at depths typically ranging from approximately 4 to 11 feet bgs. This silt layer appears in many boring logs throughout the site, though it appears to vary in thickness and depth.

Shallow wells, generally in the upper 30 feet, are referred to as A-Level wells. Wells installed deeper in this sand unit, (generally from 30 to 60 feet bgs) are referred to as B-Level wells. At approximately 60 feet bgs, the silt content increases in a gradational change that can be distinguished based on field observations (Weston 1996a). The aquifer material below this layer is hereafter referred to as the C-Level of the upper aquifer, and wells installed below 60 feet bgs are referred to as C-level wells. At approximately 80 feet bgs, a distinctive marine silt layer with shell fragments is noted in well logs from Plant 2. The contact between the silty sand and the marine silt is sharp and is readily noted in the field.

The distinction between the upper (A- and B-Levels) and C-Level is supported by increasing silt content and decreasing hydraulic conductivity with depth. The sand unit in the A- and B-Levels is generally more permeable than the deeper silty sand unit by approximately one order of magnitude. Hydraulic conductivity values, based on multiple-well aquifer test data and tracer studies in the A-Level and B-Level wells are generally 10^{-2} to 10^{-1} centimeters per second (200 to 400 feet/day) while measured hydraulic conductivity values in the C-Level wells are generally 10^{-4} cm/s (approximately 0.3 to 2.6 feet/day).

Groundwater in C-Level wells is also distinctly more saline and electrically conductive than water in the A- and B-Level wells. Field data indicate that groundwater becomes more conductive with depth. Groundwater in A-Level wells generally exhibit conductivity values less than 500 microsiemens per centimeter (µS/cm). Conductivity values for most B-Level wells generally range between 1,000 and 4,000 µS/cm, while C-Level wells generally range between 5,000 and 10,000 µS/cm. Wells closer to the Duwamish Waterway are generally more saline and conductive, possibly due to influence from the saline groundwater wedge beneath the Duwamish Waterway.

Vertical hydraulic conductivities in each unit are consistently three to four orders of magnitude less than horizontal hydraulic conductivities, and are generally 10^{-5} cm/s in A- and B-level wells and 10^{-7} cm/s in C-level wells, indicating a high degree of anisotropy in all of the geologic units making up the A, B, and C-Levels of the upper aquifer.

There are two major influences that control much of the groundwater flow beneath Plant 2. These two influences are:

- Tidal influences from the Duwamish Waterway, which is affected by tidal levels in Elliott Bay and Puget Sound.
- Groundwater levels in the ridges flanking the Duwamish Valley.

Groundwater flows from areas of higher hydraulic head to areas with lower hydraulic head. The hydraulic head of groundwater in the Duwamish Valley is less than in the surrounding ridges flanking the valley, but is higher than the net level of the Duwamish Waterway. Groundwater ultimately discharges into the Duwamish Waterway because the waterway has lower hydraulic head than the Duwamish Valley or the ridges flanking the valley. The Duwamish Waterway acts as a long linear groundwater sink along the axis of the valley, causing groundwater at Plant 2 to flow toward the waterway rather than down the valley northward toward Elliott Bay (Weston 1996a).

Recharge to the shallow sand/silty sand aquifer is mainly from the surrounding ridges and direct infiltration in areas that are not paved or covered by buildings. Subsurface flow to valley aquifers from the adjacent uplands is expected to be uniform throughout the valley. Direct recharge to the shallow aquifer beneath Plant 2 is limited due to the high density of buildings and paved surfaces with most runoff directed to storm drains leading to the waterway.

Depth to groundwater at Plant 2 is generally within 9 to 12 feet of ground surface. On an area-wide scale the water table reflects the topography of the Duwamish Valley, with groundwater

flowing toward the Duwamish Waterway. Groundwater close to the waterway is strongly influenced by tidal fluctuations. Tidal influence diminishes with increasing distance from the waterway and is negligible (less than 1 percent) at approximately 800 feet from the waterway. Tidal efficiency characteristics (i.e., the ratio of water level fluctuation in monitoring wells divided by water level fluctuations in the waterway) appear to be similar in both the A- and B-Levels. C-Level tidal efficiency has only been investigated at the south end of Plant 2. Tidal efficiency data from this portion of Plant 2 appear to be similar to the shallower A- and B-Levels.

Groundwater flow at Plant 2 is primarily horizontal with an average calculated velocity range of approximately 490 to 970 feet per year in the upper A- and B-Levels of the aquifer and approximately 4.2 feet per year in the C-Level of the aquifer. The difference in groundwater flow rate is due mainly to differences in hydraulic conductivity, which is lower in the C-Level of the aquifer. Horizontal hydraulic gradients continually change in tidally-influenced areas in response to tidal fluctuation in the Duwamish Waterway. Groundwater flow directions temporarily reverse during high tide in areas immediately adjacent to the waterway. This phenomenon is temporary and does not prevent the eventual discharge of groundwater to the waterway. Groundwater discharge rates from Plant 2 to the waterway have been calculated at approximately 600 gallons per minute (gpm).

Groundwater flow is also influenced by the presence of saline water that has intruded from the Duwamish Waterway. Following the initial dredging and realignment of the waterway in 1918, saline surface water extended back into the waterway and, driven by density differences, intruded downward below the waterway into the aquifer. As a result of this saltwater intrusion, a “saline groundwater wedge” has formed beneath the waterway. The presence of the salt water in the aquifer has been observed in several monitoring wells adjacent to the waterway and in deep wells, as indicated by very high specific conductance measurements and extremely elevated concentrations of dissolved sodium, chloride, bromide, and total dissolved solids (Weston 1996a). Saltwater intrusion has been well documented in other tidally-influenced aquifers, and the same processes are expected to apply in the aquifers underlying Plant 2.

Saline groundwater has also been observed in deeper C-Level monitoring wells at locations that are not immediately adjacent to the waterway. This saline water is similar in composition to seawater; however concentrations of dissolved ions are substantially less than seawater. Isotope studies indicate that tritium was not detected in deeper C-Level groundwater samples, but was detected in the upper A- and B-Levels of the aquifer (Weston 1996a). This study suggests that the saline groundwater in the C-Level of the aquifer may be significantly older than the fresh groundwater found in the upper A- and B-Levels of the aquifer.

The apparent stratification of the aquifer is not likely due to the intrusion of salt water from the Duwamish Waterway. If that were the case, the position of the saltwater/freshwater interface would be closer to the waterway. It is speculated that the saline groundwater found at depth away from the waterway might be remnants of connate water, which was marine water during sedimentation and has remained stratified at depth due to limited mixing with shallower groundwater. Groundwater mixing may be limited by density differences between the deeper, more-saline water and the overlying fresh water and also by the two to three orders of magnitude lower vertical hydraulic conductivity of the C-Level portion of the aquifer relative to the A- and B-Levels.

The presence of a saltwater wedge will affect the movement of groundwater in the vicinity of the waterway with the saline groundwater wedge acting as a dense, stable mass that is in dynamic equilibrium with the surrounding, less-saline and therefore less dense, groundwater. The less dense fresh groundwater that migrates toward the waterway will be forced to move upward over the dense saline wedge. Limited mixing between the saline and fresh groundwater would be expected along this interface.

Data gap analysis associated with the geology and hydrogeology specific to the 2-60s Area are presented in Sections 2.2.2 and 2.2.3 below.

2.2.2 Geology Data Gaps

The geology underlying the 2-60s Area has been investigated and documented in sufficient extent and detail for the purposes of the CMS. Numerous monitoring wells, soil borings, and direct-push probe locations drilled throughout the 2-60s Area provide adequate geologic data coverage, both vertically and laterally, to proceed with the CMS. No additional geologic investigation, other than geologic logging during well and probe installation, is planned for the 2-60s Area Data Gap Investigation.

2.2.3 Hydrogeology Data Gaps

Groundwater flow directions at Plant 2 were investigated as part of the RCRA Facility Investigation (RFI) (Weston 1996a). Groundwater flow directions in the 2-60s Area were shown to flow toward the Duwamish Waterway with the groundwater flow path approximately perpendicular to the Waterway.

The current level of understanding of groundwater flow directions in the 2-60s Area is adequate for the purposes of the CMS. There are no property boundary issues or potential receptors for groundwater from the 2-60s Area other than the Duwamish Waterway through the 2-66 area and additional groundwater flow direction characterization is not warranted.

2.3 GROUNDWATER QUALITY DATA GAPS

The following sections present the data gaps analysis and evaluation for groundwater in the 2-60s Area. The analysis is organized by COC rather than by unit because this allows for a better understanding of area-wide groundwater issues.

2.3.1 Current Data - Data Gap

During the course of site investigation at Plant 2 and in the 2-60s Area, groundwater samples were collected on a unit-by-unit basis. This unit-by-unit approach is consistent with RCRA procedures and works well for soils. The unit-by-unit approach can also work well for groundwater if the groundwater plumes do not commingle. However, in the 2-60s Area, and indeed over much of Plant 2, groundwater plumes commingle and lose their ties to any individual RCRA Unit. In these cases, an area-wide sampling approach provides the data

necessary to gain a current view of groundwater conditions in the area and to more accurately delineate and track the commingled plumes.

Concurrent, area-wide groundwater sampling has not been performed in the 2-60s Area, making the available data difficult to use to delineate groundwater plumes at any point in time or to track whether or not the plumes have grown, shrunk, or have remained at steady state relative to the results of the RFI. One round of groundwater sampling in all available 2-60s Area monitoring wells will be performed to provide the data necessary to make decisions regarding corrective measures for use in the CMS. In addition, three new monitoring wells will be installed near RCRA unit OA 9 (former USTs PL-16, 17, and 18) and 26 direct-push probes will be installed in three transects across OA 12 (Building 2-63 Area) and at locations downgradient of specific soil COC occurrences to further characterize groundwater conditions associated with these units.

Although all existing 2-60s Area wells will be sampled, they will be sampled for different constituents depending on their locations and sampling history. All analyses to be conducted in association with these locations are identified on Table 2-2 and their locations presented on Figure 2-1. Specific analyses to be performed on samples from each well are discussed in Section 3.3.3.

2.3.2 Inorganics

Analytical results for all site-wide metals and cyanide COCs were screened to determine which site-wide constituents are also COCs for the 2-60s Area. The screening levels used for site-wide COCs are summarized in Table A-1 in Attachment A. If a site-wide COC was detected in the 2-60s Area analytical data at concentrations greater than or equal to the respective screening level, the site-wide COC is considered a COC for the 2-60s Area. Resulting 2-60s Area-specific COCs are listed and summarized in Tables 2-1 and A-2. Table A-2 also identifies the number of screening level exceedances for each exposure pathway. Isoconcentration maps and tables of maximum metal concentrations in the 2-60s Area are presented in Attachment A.

Four metals as well as the inorganic compound cyanide are included on the 2-60s Area-specific COC list for groundwater. The metals and inorganic constituents on the 2-60s Area COC list are:

Arsenic	Copper	Cyanide
Manganese	Nickel (soluble salts)	

The occurrence of these metals in the 2-60s Area is evaluated for the surface water exposure pathway in the sections below. In addition, cadmium, mercury, silver, thallium, and zinc are included in the list of COCs for soils in the 2-60s Area (See Section 2.4). Therefore, these metals will also be analyzed in groundwater from wells and probes located near where they have been detected in the soil.

The exposure pathway for air is not evaluated because metals and cyanide are not volatile and will not partition to that media. The direct contact pathway is valid for metals and cyanide, but screening levels calculated for the direct contact pathway are higher than those for surface water and therefore do not drive cleanup.

2.3.2.1 Arsenic

Arsenic was analyzed in 52 2-60s Area groundwater samples and detected in 43 of those samples. All 43 arsenic detections were greater than the surface water screening level of 0.2 µg/L.

Background concentrations have not yet been established for arsenic in groundwater. When background concentrations are established later in the CMS process, the area of the arsenic concentrations requiring further consideration will be reevaluated.

Nevertheless, some of the higher concentrations of arsenic in groundwater are expected to be greater than the background arsenic groundwater concentration. Additionally, historical Plant 2 occurrences of elevated arsenic concentrations (for illustrative purposes, greater than 10 µg/L) have tended to occur in areas with existing organic contamination and with the presence of vinyl chloride. Because vinyl chloride is formed by the dechlorination of chlorinated VOCs such as TCE under reducing conditions, it is likely that areas of reducing conditions exist in groundwater at the 2-60s Area. Reducing groundwater conditions also result in the dissolution of the naturally-occurring arsenic from soil, causing a groundwater plume of dissolved arsenic. This process is well studied and understood at RCRA landfills where reducing groundwater conditions are common (McArthur et al. 2001).

Arsenic is detected at elevated concentrations (again, for illustrative purposes, greater than 10 µg/L) in the A-Level of the aquifer beneath OA 9 (former USTs PL-16, 17, and 18), SWMU 2-64.49 (air compressor building sump and accumulation area), and at sampling location SW-38, immediately east of Building 2-48 but not associated with a RCRA unit. The maximum arsenic concentration was detected at RCRA Unit OA 9 in the 2-60s Area at 44 µg/L. Arsenic was detected in samples from seven of the eight B-level wells analyzed in the 2-60s Area; however, arsenic concentrations are not elevated above 1.0 µg/L in samples from the B-level of the aquifer. A sample from one C-level well (PL2-316C) had an arsenic detection of 8.0 µg/L in 1995. This detected value might have been caused by matrix interferences in the saline groundwater found in the C-level. New data, generated using improved analytical methods, will provide a better assessment of groundwater conditions in the C-level in the 2-60s Area. RCRA units located in or near areas of high arsenic concentrations in groundwater are summarized in Table 2-3. Refer to the isoconcentration maps in Attachment A for sampling locations where arsenic was detected.

Data gaps for arsenic are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the arsenic groundwater plume; therefore, the sampling event discussed in Section 2.3.1 will include this COC

as a constituent. This information will then be combined with historical data to develop inferences regarding whether the arsenic plume has reached steady state. Total organic carbon (TOC) and redox parameters will be added to the constituent list at selected locations to assist in remedy selection for arsenic.

- The RL for arsenic in groundwater samples throughout much of the 2-60s area is 1.0 µg/L which is above the SL of 0.2 µg/L. The RL of 1.0 µg/L is also below the background concentration of 5.0 µg/L used by Ecology in its MTCA Method A tables. This is not a site-specific number and is used here for illustration. However, the RL is sufficiently close to the SL to provide reasonable confidence that areas of arsenic-impacted groundwater are adequately delineated for CMS purposes. Sampling for arsenic during the data gap investigation will yield additional data with an RL of 0.2 µg/L to provide further confidence that arsenic impacts to groundwater are adequately delineated for CMS purposes.

- Background concentrations have not yet been established for arsenic in groundwater at Plant 2. When this occurs later in the CMS process, the area of arsenic concentrations requiring further consideration will be reevaluated.

2.3.2.2 Copper

Copper was analyzed in 52 2-60s Area groundwater samples and detected in 40 of those samples. Twenty-one of the 40 copper detections were greater than the surface water screening level of 3.1 µg/L.

Background concentrations have not yet been established for Copper at Plant 2. When this occurs later in the CMS process, the area of copper concentrations requiring further consideration will be reevaluated.

The occurrence of copper at concentrations greater than the screening level in the A-Level of the aquifer is limited to the vicinity of SWMU 78C (oil/water separator), OA-12 (Building 2-63 area), Sump SPL-049-009, sampling location SW-42, and AOC 2-62.45 (paint booth and sumps). The maximum copper concentration detected in the 2-60s Area was 42 µg/L in a sample collected from RCRA Unit OA 12. Copper was detected at seven locations in the B-Level of the aquifer but all of the values were significantly lower than the screening level. Copper was detected at only one location in the C-Level of the aquifer (PL2-316C) at a concentration lower than the screening level for copper. RCRA units located in or near areas of high copper concentrations in groundwater are summarized in Table 2-3. Refer to the isoconcentration maps in Attachment A for sampling locations where copper was detected.

Data gaps for copper are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the distribution of copper in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the copper distribution has reached steady state.

- Background concentrations have not yet been established for copper in groundwater at Plant 2. When this occurs later in the CMS process, the area of copper concentrations requiring further consideration will be reevaluated.

2.3.2.3 Manganese

Manganese was analyzed in 34 2-60s Area groundwater samples and detected in 31 of those samples. Fifteen of the 31 manganese detections were greater than the surface water screening level of 100 µg/L.

The occurrence of manganese at concentrations greater than the screening level in the A-Level of the aquifer is limited to the vicinity of OA 9 (former USTs PL-16, 17, and 18), OA 12 (Building 2-63 area), and downgradient of UST PL-38 and UST PL-37. The maximum manganese concentration detected in the 2-60s Area was 4,640 µg/L in a sample from RCRA unit OA 9. Manganese was analyzed for in samples from only one B-level and one C-level well and was detected above its screening level in samples from both wells. Both deeper sampling locations are beneath OA-12. Data gaps for manganese are identified using the criteria from Section 2.1 and are summarized below.

Background concentrations have not yet been established for manganese in groundwater. When background concentrations are established later in the CMS process, the area of manganese concentrations requiring further consideration will be reevaluated. Manganese was not historically treated as a RCRA COC at Plant 2, since elevated concentrations are due to the release of naturally-occurring manganese from soil under reducing geochemical conditions.

Nevertheless, the higher concentrations of manganese noted in groundwater are expected to be greater than the background manganese groundwater concentration. Additionally, historical occurrences of manganese concentrations greater than 1,000 µg/L have tended to occur in areas with existing organic contamination, with the presence of vinyl chloride, and with elevated arsenic concentrations. Because vinyl chloride is formed by the dechlorination of chlorinated VOCs such as TCE under reducing conditions, it is likely that areas of reducing conditions exist in groundwater at the 2-60s Area. Reducing groundwater conditions also result in the dissolution of the naturally-occurring manganese from soil, causing a groundwater plume of dissolved manganese. This process is well studied and understood at RCRA landfills where reducing groundwater conditions are common (McArthur et al. 2001).

RCRA units located in or near areas of high manganese concentrations in groundwater are summarized in Table 2-3. Refer to the isoconcentration maps in Attachment A for sampling locations where manganese was detected.

Data gaps for manganese are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the manganese groundwater plume; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the plume has reached steady state. TOC and redox parameters will be added to the constituent list to assist in remedy selection for manganese.

- Background concentrations have not yet been established for manganese in groundwater at Plant 2. When this occurs later in the CMS process, the area of manganese concentrations requiring further consideration will be reevaluated.

2.3.2.4 Nickel

Nickel was analyzed in 52 2-60s Area groundwater samples and detected in 20 of those samples. Two of the 20 nickel detections were greater than the surface water screening level of 8.2 µg/L.

The occurrence of nickel at concentrations greater than the screening level in the A-Level of the aquifer is limited to the vicinity of SWMU 2-62.43 (tank line), and SWMU 78C (oil/water separator). The maximum concentration of nickel in the 2-60s Area was 35.7 µg/L in a sample collected near RCRA Unit SWMU 2-62.48. Nickel was detected in samples from eight B-level sampling locations at concentrations well below its screening level. Nickel was detected above its screening level in a sample from one C-level well (PL2-316C) which is located in OA 12 (Building 2-63 area).

Data gaps for nickel are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the distribution of nickel in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as an analyte. This information will then be combined with historical data to develop inferences regarding whether the nickel distribution has reached steady state.

- The RL for nickel in groundwater samples throughout the 2-60s area is 10 µg/L which is above the SL of 8.2 µg/L. However, the detection limit is sufficiently close to the SL to provide reasonable confidence that areas of nickel-impacted groundwater are adequately delineated for CMS purposes when combined with the new data. Sampling for nickel during the data gap investigation will yield additional data with an RL of 0.5 µg/L to provide further confidence that nickel impacts to groundwater are adequately delineated for CMS purposes.

2.3.2.5 Cyanide

Cyanide was analyzed in 12 2-60s Area groundwater samples and detected in two of those samples. Both of the cyanide detections were greater than the surface water screening level of 71 µg/L.

The occurrence of cyanide at concentrations greater than the screening level in the A-Level of the aquifer is limited to the vicinity of OA-12 (Building 2-63 area). Cyanide was not analyzed for in the B or C levels of the aquifer in the 2-60s Area. The maximum cyanide concentration detected in the 2-60s Area was 18 µg/L.

Data gaps for cyanide are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the distribution of cyanide in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the cyanide distribution has reached steady state.

2.3.3 Semivolatile Organic Compounds and Polychlorinated Biphenyls

Analytical results for all site-wide SVOC and PCB COCs were screened to determine which site-wide constituents are also COCs for the 2-60s Area. The screening levels used for site-wide COCs are summarized in Table A-1. If a site-wide COC was detected in the 2-60s Area analytical data at concentrations greater than or equal to the respective screening level, the site-wide COC is considered a COC for the 2-60s Area.

Low concentrations of SVOCs and PCBs in soil are not significant sources to groundwater. In addition, the maximum groundwater concentrations for SVOCs and PCBs did not exceed the screening levels. For these reasons, based on the existing data, there are no SVOC or PCB COCs in groundwater for the 2-60s Area.

2.3.4 Volatile Organic Compounds

Analytical results for all site-wide volatile organic compounds (VOC) COCs were screened to determine which site-wide constituents are also COCs for the 2-60s Area. The screening levels used for site-wide COCs are summarized in Table A-1. If a site-wide COC was detected in the 2-60s Area analytical data at concentrations greater than or equal to the respective screening level, the site-wide COC is considered a COC for the 2-60s Area. Resulting 2-60s Area-specific COCs are listed and summarized in Table 2-1. Isoconcentration maps and tables of maximum VOC concentrations in the 2-60s Area are presented in Attachment A.

Seven VOCs are included on the 2-60s Area-specific COC list based on their occurrence greater than screening levels for the protection of surface water or air. VOCs that are COCs for the 2-60s Area are:

Benzene	Trichloroethene	Methylene Chloride
Ethylbenzene	1,1-Dichloroethene	
Tetrachloroethene	Vinyl Chloride	

The occurrence of these constituents in the 2-60s Area is evaluated for the surface water and air exposure pathways in the sections below. The direct contact pathway is valid for VOCs but screening levels calculated for the direct contact pathway are significantly higher than those for surface water or air and therefore do not drive cleanup.

2.3.4.1 Benzene

Benzene was analyzed in 119 2-60s Area groundwater samples and detected in six of those samples. Five of the six detected values for benzene were greater than the surface water screening level of 4.48 µg/L and two of the detected benzene concentrations were greater than the air screening level of 1,400 µg/L.

The occurrence of benzene at concentrations greater than the surface water and air screening levels in the A-Level of the aquifer are limited to the OA 9 area (former USTs PL16, 17, and 18). The maximum benzene concentration detected in the 2-60s Area was 6,200 µg/L in a sample collected in RCRA Unit OA 9. Benzene was not detected in samples from the B or C levels of the aquifer in the 2-60s Area.

Data gaps for benzene are identified using the criteria from Section 2.1 and results of the analysis are summarized below.

- The existing data are insufficient to give a current view of the distribution of benzene in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the benzene distribution has reached steady state.

- New monitoring wells PL2-604A, PL2-605A, and PL2-606A will be installed and sampled to delineate benzene impacts to groundwater associated with OA 9.

2.3.4.2 1,1-Dichloroethene

1,1-Dichloroethene was analyzed in 115 2-60s Area groundwater samples and detected in two of those samples. Both detected concentrations of 1,1-dichloroethene are in samples taken at well PL2-315A, and both are greater than the surface water screening level of 0.382 µg/L. Neither of the two detected 1,1-dichloroethene concentrations is greater than the air screening level of 42.3 µg/L.

Well PL2-315A is within RCRA Unit OA 12 (building 2-63 area), which is characterized by a chlorinated VOC plume. The maximum 1,1-dichloroethene concentration detected in the 2-60s Area was 1.4 μg/L.

Data gaps for 1,1-dichloroethene are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the 1,1-dichloroethene distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the 1,1-dichloroethene distribution has reached steady state.

- Probe locations 2-60-DP-1 through 2-60-DP-16 will be installed and sampled to delineate chlorinated VOC impacts to the groundwater associated with OA 12.

- The RL for 1,1-dichloroethene in groundwater samples throughout the 2-60s area is 1.0 µg/L which is above the SL of 0.382 µg/L. However, the detection limit is sufficiently close to the SL to provide reasonable confidence that areas of 1,1-dichloroethene-impacted groundwater are adequately delineated for CMS purposes when combined with the new data. Sampling for 1,1-dichloroethene during the data gap investigation will yield additional data with an RL of 0.2 µg/L to provide further confidence that 1,1-dichloroethene impacts to groundwater are adequately delineated for CMS purposes.

2.3.4.3 Ethylbenzene

Ethylbenzene was analyzed in 119 2-60s Area groundwater samples and detected in five of those samples. One of the five detected values for ethylbenzene was greater than the surface water screening level of 2,100 µg/L. None of the detected ethylbenzene concentrations were greater than the air screening level of 9,500 µg/L.

The occurrence of ethylbenzene at concentrations greater than the surface water screening level in the A-Level of the aquifer are limited to samples from well PL2-310A which is located in RCRA unit OA-9 (former USTs PL16, 17, and 18). The maximum ethylbenzene concentration detected in the 2-60s Area was 2,300 μg/L in a sample collected in RCRA Unit OA 9. Ethylbenzene was not detected in samples collected from wells installed in the B or C levels of the aquifer in the 2-60s Area.

Data gaps for ethylbenzene are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the distribution of ethylbenzene in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined

with historical data to develop inferences regarding whether the ethylbenzene distribution has reached steady state.

- New monitoring wells PL2-604A, PL2-605A, and PL2-606A will be installed and sampled to delineate ethylbenzene impacts to groundwater associated with OA 9.

2.3.4.4 Methylene Chloride

Methylene chloride was analyzed in 115 2-60s Area groundwater samples and detected in six of those samples. One of the six detected concentrations of methylene chloride was greater than the surface water screening level of 190 µg/L. None of the detected methylene chloride concentrations were greater than the air screening level of 44,600 µg/L.

The detected value for methylene chloride above its surface water screening level is from a sample location within OA 9 (former USTs PL-16, 17, and 18). Methylene chloride was also detected at lower concentrations from sampling locations in RCRA Unit OA 12 (Building 2-63 Area). The maximum methylene chloride concentration detected in the 2-60s Area was 310 µg/L in a sample collected at RCRA Unit OA 9. Methylene chloride was not detected in samples collected from wells installed in the B or C levels of the aquifer in the 2-60s Area.

Data gaps for methylene chloride are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the methylene chloride distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the methylene chloride distribution has reached steady state.

- New monitoring wells PL2-604A, PL2-605A, and PL2-606A will be installed and sampled to delineate methylene chloride impacts to groundwater associated with OA 9.

2.3.4.5 Tetrachloroethene

Tetrachloroethene was analyzed in 115 2-60s Area groundwater samples and detected in 14 of those samples. All 14 detected concentrations for tetrachloroethene are greater than the surface water screening level of 0.822 µg/L. None of the detected tetrachloroethene concentrations are greater than the air screening level of 1,520 µg/L.

Sampling locations at which tetrachloroethene was detected above the surface water screening level are all located within OA 12 (building 2-63 area) which is characterized by a chlorinated VOC plume. The maximum tetrachloroethene concentration detected in a sample from the 2-60s Area was 28 µg/L. Tetrachloroethene was not detected in samples from wells installed in the B or C levels of the aquifer in the 2-60s Area.

Data gaps for tetrachloroethene are identified using the criteria from Section 2.1 and are summarized below.

- The existing data are insufficient to give a current view of the tetrachloroethene distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the distribution has reached steady state.

- Probe locations 2-60-DP-1 through 2-60-DP-16 will be installed and sampled to delineate chlorinated VOC impacts to the groundwater associated with OA 12.

- The RL for tetrachloroethene in groundwater samples throughout the 2-60s area is 1.0 µg/L which is above the SL of 0.822 µg/L. However, the RL is sufficiently close to the SL to provide reasonable confidence that areas of tetrachloroethene-impacted groundwater are adequately delineated for CMS purposes when combined with the new data. Sampling for tetrachloroethene during the data gap investigation will yield additional data with an RL of 0.2 µg/L to provide further confidence that tetrachloroethene impacts to groundwater are adequately delineated for CMS purposes.

2.3.4.6 Trichloroethene

Trichloroethene was analyzed in 115 2-60s Area groundwater samples and detected in 49 of those samples. All 49 of the detected concentrations of trichloroethene are greater than the surface water screening level of 0.302 µg/L. Nine of the detected trichloroethene concentrations were greater than the air screening level of 62 µg/L.

Sample locations at which trichloroethene was detected above its surface water screening level are predominantly located within RCRA unit OA 12 (building 2-63 area) which is characterized by a chlorinated VOC plume. Trichloroethene is also noted downgradient of OA 12 and minor detections are noted at SWMU 78C (oil/water separator) and probe locations GP-06307 and GP-06501 which are not associated with a RCRA unit. The nine occurrences of values for trichloroethene above the air screening level all occurred within and downgradient of RCRA unit OA 12. The maximum trichloroethene concentration detected in the 2-60s Area was 150 µg/L in a sample collected in RCRA Unit OA 12. Trichloroethene was not detected in samples collected from wells installed in the B or C levels of the aquifer in the 2-60s Area.

Data gaps for trichloroethene are identified using the criteria from Section 2.1 and are summarized below.

- Samples from two probe sample locations (GP-06307 and GP-06501) had trichloroethene values exceeding screening levels and are not associated with known RCRA Units. Direct push probes 2-60-DP-9, 2-60-DP-15 and 2-60-DP-16 will be sampled to further characterize the potential source area for TCE detections at the GP-06307 and GP-06501 sample locations.

- Probe locations 2-60-DP-1 through 2-60-DP-16 will be installed and sampled to delineate chlorinated VOC impacts to the groundwater associated with OA 12.

- The existing data are insufficient to give a current view of the trichloroethene distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the trichloroethene distribution has reached steady state.
- The RL for trichloroethene in groundwater samples throughout the 2-60s area is 1.0 µg/L which is above the SL of 0.302 µg/L. However, the detection limit is sufficiently close to the SL to provide reasonable confidence that areas of trichloroethene-impacted groundwater are adequately delineated for CMS purposes when combined with the new data. Sampling for trichloroethene during the data gap investigation will yield additional data with an RL of 0.2 µg/L to provide further confidence that trichloroethene impacts to groundwater are adequately delineated for CMS purposes.

2.3.4.7 Vinyl Chloride

Vinyl chloride was analyzed in 115 2-60s Area groundwater samples and detected in 58 of those samples. Twenty nine of the detected concentrations of vinyl chloride are greater than the surface water screening level of 0.731 µg/L. None of the detected vinyl chloride concentrations were greater than the air screening level of 371 µg/L.

The detected values for vinyl chloride above its surface water screening level are predominantly from sample locations within RCRA unit OA 12 (building 2-63 area) which is characterized by a chlorinated VOC plume. Vinyl chloride is also noted downgradient of OA 12 at sampling location GP-06504 and minor detections are noted at sampling locations downgradient of OA 9 (former USTs PL-16, 17, and 18) and at sampling location GP-06207 along East Marginal Way South, which is not associated with a RCRA Unit. The maximum vinyl chloride concentration detected in the 2-60s Area was 140 µg/L. Vinyl chloride was detected in samples from the B level of the aquifer beneath RCRA unit OA 12 but was not detected in samples from the C level of the aquifer in the 2-60s Area.

Data gaps for vinyl chloride are identified using the criteria from Section 2.1 and are summarized below.

- A sample from location GP-60207 with a vinyl chloride value exceeding its screening level is not associated with a known RCRA Unit. Direct push probes 2-60-DP-1, 2-60-DP-2, and 2-60-DP-3 will be sampled to further characterize the potential source area for vinyl chloride detections at GP-60207.

- Probe locations 2-60-DP-1 through 2-60-DP-16 will be installed and sampled to delineate chlorinated VOC impacts to the groundwater associated with OA 12.

- The existing data are insufficient to give a current view of the vinyl chloride distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this

COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the vinyl chloride distribution has reached steady state.

- The RL for vinyl chloride in groundwater samples throughout the 2-60s area is 1.0 µg/L which is above the SL of 0.731 µg/L. However, the detection limit is sufficiently close to the SL to provide reasonable confidence that areas of vinyl chloride-impacted groundwater are adequately delineated for CMS purposes when combined with the new data. Sampling for vinyl chloride during the data gap investigation will yield additional data with an RL of 0.2 µg/L to provide further confidence that vinyl chloride impacts to groundwater are adequately delineated for CMS purposes.

2.3.5 Petroleum Hydrocarbons

Analytical results for all site-wide petroleum hydrocarbon COCs were screened to determine which site-wide constituents are also COCs for the 2-60s Area. The screening levels used for site-wide COCs are summarized in Table A-1. If a site-wide COC was detected in the 2-60s Area analytical data at concentrations greater than or equal to the respective screening level, the site-wide COC is considered a COC for the 2-60s Area. Resulting 2-60s Area-specific COCs are listed and summarized in Table 2-1. Isoconcentration maps and tables of maximum VOC concentrations in the 2-60s Area are presented in Attachment A.

Two classes of petroleum hydrocarbons are included on the 2-60s Area-specific COC list based on their occurrence greater than screening levels. The petroleum hydrocarbons that are COCs for the 2-60s Area are DRPH and GRPH.

During the time of the RFI, petroleum hydrocarbon testing protocols were changing on a state and national level. The existing RFI data were generated using several different methods, and did not rely on an identification of the specific type of petroleum product present, but on the boiling point range of the material (gasoline-range, diesel-range, or motor oil-range). For this reason, one of the data gaps for petroleum hydrocarbons is an identification of the actual petroleum product present. Data gaps analysis for TPH will use the newer state developed methods NWTPH-G and NWTPH-Dx, and will include identification of the petroleum product present where such identification is possible.

2.3.5.1 Diesel-Range Petroleum Hydrocarbons

DRPH was analyzed in 31 2-60s Area groundwater samples and detected in four of those samples. Two of the four detected concentrations of DRPH were greater than the surface water and air screening levels of 500 µg/L.

The detected values for DRPH above its surface water screening level are located within OA 9 (former USTs PL-16, 17, and 18). The maximum DRPH concentration detected in the 2-60s Area was 4800 µg/L. DRPH was not analyzed in groundwater samples from wells installed in the B or C levels of the aquifer in the 2-60s Area. Because this COC is less dense than water it is not expected to be present below the A level of the aquifer.

Data gaps for DRPH are identified using the criteria from Section 2.1 and are summarized below.

- RCRA Unit OA 9 is not characterized for DRPH adequately for CMS purposes. Three new monitoring wells, PL2-604A, PL2-605A, and PL2-606A, will be installed at OA 9 to provide additional groundwater data for this unit.

- The existing data are insufficient to give a current view of the DRPH distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the DRPH distribution has reached steady state.

2.3.5.2 Gasoline-Range Petroleum Hydrocarbons

GRPH was analyzed in 14 2-60s Area groundwater samples and detected in three of those samples. Two of the three detected concentrations of GRPH were greater than the surface water and air screening levels of 500 µg/L.

The detected values for GRPH above its surface water screening level are from sampling locations within OA 9 (former USTs PL-16, 17, and 18). The maximum GRPH concentration detected in the 2-60s Area was 65000 µg/L. GRPH was not analyzed in groundwater samples from wells installed in the B or C levels of the aquifer in the 2-60s Area. Because this COC is less dense than water it is not expected to be present below the A level of the aquifer.

Data gaps for GRPH are identified using the criteria from Section 2.1 and are summarized below.

- RCRA Unit OA 9 is not characterized for GRPH adequately for CMS purposes. Three new monitoring wells, PL2-604A, PL2-605A, and PL2-606A, will be installed at OA 9 to provide additional groundwater data for this unit.

- The existing data are insufficient to give a current view of the GRPH distribution in groundwater; therefore, the sampling event discussed in Section 2.3.1 will include this COC as a constituent. This information will then be combined with historical data to develop inferences regarding whether the GRPH distribution has reached steady state.

2.3.6 Summary of Investigation Scope for Groundwater Data Gaps

The groundwater data gap investigation of the 2-60s Area will be performed to fill data gaps identified above. The three main work elements associated with the 2-60s Area Data Gap Investigation are summarized below:

Scope Item	Rationale
Installation of three new monitoring wells upgradient and downgradient of RCRA unit OA 9. All three wells will be installed in the A-level of the aquifer	The monitoring wells will be used to delineate the BTEX and TPH plume associated with RCRA unit OA 9.
Groundwater sampling for VOCs and metals at all existing and new monitoring wells as well as at 26 direct push probe locations.	A current groundwater sampling event will clarify many questions discussed above regarding the distribution of groundwater plumes.
Focused sampling at selected monitoring wells and direct-push probe locations in the 2-60s Area for TPH, SVOCs, cyanide, PCBs, and redox parameters.	Current groundwater sampling data around historical isolated groundwater exceedances will clarify whether the exceedances are still present and their extent. Data from this task will also be used to support fate and transport modeling results for selected metals, SVOCs, and PCBs. Data from this task may also be used to develop fate and transport modeling for TPHs for CMS remedy evaluation, if it is needed.

A summary table showing the wells and probes to be sampled, constituent groups analyzed, and which general data gaps will be filled by the sampling is presented in Table 2-2. The rationale for constituent group selection at each of the sampling points is provided in the right hand column of the table.

2.4 SOIL QUALITY DATA GAPS

Analytical results for all site-wide COCs were screened to determine which site-wide constituents are COCs for the 2-60s Area. The screening levels used for site-wide COCs are summarized in Table B-1. If a site-wide COC was detected in the 2-60s Area analytical data at concentrations greater than or equal to the respective screening level, the site-wide COC is considered a COC for the 2-60s Area. Resulting 2-60s Area-specific COCs are listed and summarized in Tables 2-1 and B-2. Table 2-1 lists the 2-60s Area COCs and exposure pathway specific screening levels. Table B-2 lists the 2-60s Area COCs and identifies the number of exceedances for the specific exposure pathway.

Soil samples were collected and analyzed as samples of opportunity in association with demolition of Building 2-62 at the end of 2003. These data are presented in the text for individual COCs and have been subject to the data gaps analysis process as described.

Selected COC soil concentration maps are presented in Attachment B. The maps present the COC concentration data for three intervals (0 to 1 foot bgs, greater than 1 to 6 feet bgs and greater than 6 to 12 feet bgs) within the "vadose zone" soil column from 0 to 12 feet bgs. Data tables summarizing all COC concentrations (including duplicate sample analysis results) in the 2-60s Area are also provided in Attachment B. For soil, all major 2-60s Area COC groups and each COC within those groups are discussed in turn below.

2.4.1 Inorganics

Analytical results contained in the Plant 2 database for all site-wide metals and cyanide COCs were screened to determine which site-wide constituents are COCs in soil for the 2-60s Area. Chemical analysis was conducted for metal constituents on 128 soil samples collected in the 2-60s Area 12 feet bgs or less. Metals analysis covered a total of 13 constituents, including hexavalent chromium (chromium VI), for which screening levels were established. Chemical analysis was also conducted for cyanide on 72 soil samples collected in the 2-60s Area. Cyanide and nine metals are included on the 2-60s Area-specific soil COC list. The metals that are COCs in soil for the 2-60s Area are:

Arsenic	Cadmium	Copper
Manganese	Mercury	Nickel (soluble salts)
Silver	Thallium (soluble salts)	Zinc

Antimony, chromium VI, lead, and selenium were not detected at concentrations greater than the surface water or direct contact pathway screening levels. Therefore, these constituents are not included on the 2-60s Area COC list, though they are considered a site-wide COC.

The occurrence of these metals in the 2-60s Area is evaluated for the surface water and direct contact exposure pathways in the following sections. Data gaps via the surface water pathway

are identified using the criteria presented in Section 2.1. All soil and groundwater sampling locations, in addition to those associated with soil data gaps in the following sections, will be sampled for metals as part of the work plan

The exposure pathway for air is not evaluated for metals or cyanide with the exception of mercury because metals and cyanide are not volatile and will not partition to that media. Therefore, in addition to the surface water pathway, the air pathway is also addressed for mercury. The direct contact pathway is valid for metals, but screening levels calculated for the direct contact pathway are higher than the maximum concentration detected with the exception of one occurrence of arsenic.

2.4.1.1 Arsenic

Arsenic was analyzed in 125 2-60s Area soil samples and detected in 109 of those samples. A table of the analytical results for arsenic and maps presenting sample locations, concentration, and depth are provided in Attachment B. Of those samples where arsenic was detected, 16 were reported at concentrations greater than or equal to the 5.0 mg/kg soil screening level protective of surface water. The concentrations of arsenic detected above this soil screening level ranged from 5.1 to 76 mg/kg, 1.1 to 31.7 times the screening level. The sample with the maximum concentration (76 mg/kg) of arsenic detected within the 2-60s Area was collected from 10 feet bgs between the 2-63 and 2-65 Building slabs. This maximum concentration value also exceeds the direct contact exposure pathway screening level (33.3 mg/kg).

Background concentrations have not yet been established for arsenic at Plant 2. When this occurs later in the CMS process, the area of arsenic concentrations requiring further consideration will be reevaluated. Ecology (1994) calculated a natural background concentration of 7.3 mg/kg for arsenic in the Puget Sound Basin. In addition to the maximum concentration, four samples from the 1 to 6 ft bgs interval were reported with arsenic concentrations above this natural background level. However, arsenic was not detected at or above the background concentration at greater depths at any of these four locations. The analytical data indicate that the surface water pathway is not complete for concentrations of arsenic above background at these locations. Further assessment will be completed when background concentrations for arsenic at Plant 2 are established later in the CMS process.

There were nine samples in which arsenic was not detected, but RLs (6 to 7 mg/kg) slightly exceeded the soil screening level protective of surface water. However, in all cases, the elevated RLs are within the 90th percentile of natural background concentrations of arsenic in the Puget Sound Basin (Ecology, 1994).

Data gaps for arsenic via the soil to surface water and direct contact pathway are evaluated using the criteria from Section 2.1 and results of the analysis are summarized below.

- There was one arsenic hot spot (source) identified in the 2-60s Area. The source was not located in one of the RCRA units. The lateral extent of the arsenic in soil between the south end of Building 2-63 and 2-65 slabs has not been adequately defined. Metals will be analyzed in soil and groundwater at direct-push locations downgradient of this

location. The groundwater data will be necessary to determine if the pathway is complete and groundwater has been impacted by arsenic in the soil.

The data gap for arsenic via the direct contact pathway consists of delineating the lateral extent of impacts to soil in the source area identified in the 2-60s Area. Soil sampling and analysis at the following locations will specifically address the extent of arsenic in soil between the south end of the Building 2-63 and 2-65 slabs:

- 2-60-DP-22
- 2-60-DP-23
- 2-60-DP-24

Groundwater sampling and analysis will also be conducted at these locations, as well as at monitoring well PL2-317AR, to determine whether the soil to groundwater pathway is complete in this area.

These locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The air pathway is not considered viable for arsenic.

2.4.1.2 Cadmium

Cadmium was detected in 17 of the 125 soil samples analyzed for metals in the 2-60s Area. Analytical results for cadmium are provided in Attachment B. Of those samples where cadmium was detected, one contained a concentration greater than or equal to the surface water pathway screening level of 1.01 mg/kg. The maximum concentration of cadmium detected in the 2-60s Area did not exceed the direct contact exposure pathway screening level (667 mg/kg).

The maximum concentration of cadmium detected within the 2-60s Area was 3.4 mg/kg, 3.4 times the screening level protective of surface water. This sample was collected from soil exposed in association with the demolition of Building 2-62 as a sample of opportunity. The sample was taken from approximately 3 feet bgs near the southeast corner of former sump SPL-062-009 (AOC 2-62.46 (Paint Booth Sump)). Cadmium has not been detected in 2-60s Area groundwater, and does not likely pose a risk along the soil to surface water pathway. To verify that the soil to surface water pathway is not complete for cadmium in the 2-60s Area, push probe sampling will be conducted downgradient of this unit.

Background concentrations have not yet been established for cadmium in soil at Plant 2. When this occurs later in the CMS process, the area of cadmium concentrations requiring further consideration will be reevaluated.

Data gaps for cadmium via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- Metals will be analyzed at direct-push locations downgradient of south end of AOC 2-62.46 (Paint Booth Sump); analytical results will be evaluated to define the extent of cadmium in soil and to determine whether it has impacted groundwater in this area.

Soil sampling and analysis at the following locations will specifically address the extent of cadmium in soil at AOC 2-62.46 (Paint Booth Sump):

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Groundwater sampling and analysis will also be conducted at these locations to determine whether the soil to groundwater pathway is complete in the vicinity of AOC 2-62.46 (Paint Booth Sump).

Sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The air pathway is not considered viable for cadmium.

2.4.1.3 Copper

Copper was detected above the soil screening level protective of surface water in all of the 125 soil samples analyzed for metals from the 2-60s Area. Tables presenting the analytical results for copper are provided in Attachment B. The maximum concentration of copper detected in the 2-60s Area (55.3 mg/kg) was detected at SWMU 78.C (Oil/Water Separator). The concentrations of copper detected within the 2-60s Area boundaries that exceeded the surface water pathway screening level (1.38 mg/kg) ranged from 7.2 mg/kg to 55.3 mg/kg, 5.2 to 40.7 times the screening level.

Background concentrations have not yet been established for copper at Plant 2. When this occurs later in the CMS process the area of copper concentrations requiring further consideration will be reevaluated. Ecology (1994) reported that the calculated natural background concentration for copper in the Puget Sound Basin is 36.4 mg/kg, which is greater than the soil screening level protective surface water for copper (1.38 mg/kg).

Three samples with copper concentrations detected above the Puget Sound Basin background concentration were collected approximately 5 feet bgs in association with SWMU 2-64.48 (Underground Waste Tank) and SWMU 78.C (Oil/Water Separator). Copper was not detected at or above background concentration at greater depths in this general area. Copper was also detected (42.4 mg/kg) above background concentration approximately 8 feet bgs at the southeast corner of Building 2-65 slab. The concentration of copper at this location decreased with depth to 7 mg/kg at 10 feet bgs. The analytical data indicate that the surface water pathway is not complete for concentrations of copper above background at these locations. One other occurrence was identified where copper was detected above the Puget Sound Basin background concentration within the 2-60s Area. The sample was collected from soil exposed

in association with the demolition of the 2-62 Building as a sample of opportunity. Copper was detected at a concentration of 47.2 mg/kg, approximately 3 feet bgs near the southeast corner of former sump SPL-062-009 (AOC 2-62.46 (Paint Booth Sump)). Samples were not collected from greater depths at this location.

Data gaps for copper are evaluated using the criteria from Section 2.1 and results of the analysis are summarized below.

- 2-60s Area RCRA Units are adequately characterized with respect to copper in soil for CMS purposes with the exception of AOC 2-62.46 (Paint Booth Sump). The extent of copper detected at concentrations greater than background at AOC 2-62.46 (Paint Booth Sump) is not adequately defined.

- Maximum concentrations of copper detected in soil in areas not associated with RCRA Units are slightly above background concentrations. Copper was detected 8 feet bgs near the southeast corner of the Building 2-65 slab. The extent of copper detected at concentrations greater than background in this area is not adequately defined.

- Metals will be analyzed at direct-push locations downgradient of south end of the Building 2-65 slab and AOC 2-62.46 (Paint Booth Sump), the analytical results will be evaluated to determine if groundwater is impacted by copper in the respective areas.

The data gap resolution for copper via the surface water pathway consists of better defining the extent of copper at the southeast corner of the Building 2-65 slab and AOC 2-62.46 (Paint Booth Sump) and determining if groundwater has been impacted by copper in the respective areas. Soil sampling and analysis at the following locations will specifically address the extent of copper in soil at AOC 2-62.46 (Paint Booth Sump):

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Groundwater sampling and analysis will also be conducted at these locations to determine whether the soil to groundwater pathway is complete in the vicinity of AOC 2-62.46 (Paint Booth Sump).

Soil sampling and analysis at the following locations will specifically address the extent of copper in soil at the southeast corner of the Building 2-65 slab:

- 2-60-DP-22
- 2-60-DP-23
- 2-60-DP-24

Groundwater sampling and analysis will also be conducted at these locations, as well as at monitoring well PL2-317AR, to determine whether the soil to groundwater pathway is complete at the southeast corner of the Building 2-65 slab.

Sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The maximum concentration of copper detected in 2-60s Area soil did not exceed the direct contact pathway. The air pathway is not considered a viable exposure pathway for copper.

2.4.1.4 Manganese

Manganese was detected in all 75 soil samples analyzed for metals in the 2-60s Area; 28 samples contained concentrations greater than or equal to the surface water pathway screening level of 130 mg/kg. Tables of the analytical results for manganese are provided in Attachment B. Concentrations of manganese detected within the 2-60s Area exceeding the screening level ranged between 132 mg/kg and 346 mg/kg, 1.0 to 2.7 times the screening level. The maximum concentration of manganese detected in the 2-60s Area did not exceed the direct contact exposure pathway screening level (187,000 mg/kg).

Background concentrations have not yet been established for manganese at Plant 2. When this occurs later in the CMS process the area of manganese concentrations requiring further consideration will be reevaluated. Ecology (1994) reported the calculated natural background concentration for manganese in the Puget Sound Basin as 1,146 mg/kg. The maximum concentration of manganese detected in the 2-60s Area soil samples (346 mg/kg) is less than one third the Puget Sound Basin natural background concentration (Ecology, 1994).

There are no soil data gaps for manganese in the 2-60s Area. All of the manganese detected in the 2-60s Area is present at concentrations that should be considered natural background levels for the Puget Sound Basin. Further assessment will be completed when background concentrations for manganese at Plant 2 are established later in the CMS process.

2.4.1.5 Mercury

Mercury was detected in 13 of the 125 soil samples analyzed for metals in the 2-60s Area; 12 of the detections were at concentrations greater than or equal to the surface water pathway screening level of 0.05 mg/kg. Tables of the analytical results for mercury and maps presenting sample locations, concentration, and depth are provided in Attachment B. The soil screening level protective of surface water is limited to the analytical laboratory RL (Table B-1).

Background concentrations have not yet been established for mercury at Plant 2. When this occurs later in the CMS process the area of mercury concentrations requiring further consideration will be reevaluated. Ecology (1994) reported the calculated natural background concentration for mercury in the Puget Sound Basin as 0.07 mg/kg. With the exception of seven samples, mercury concentrations reported for 2-60s Area soil samples are within the 90th percentile of natural background concentrations of mercury in the Puget Sound Basin (Ecology,

1994). Further assessment will be completed when background concentrations for mercury at Plant 2 are established later in the CMS process.

Concentrations of mercury detected within the 2-60s Area exceeding the screening level ranged between 0.05 mg/kg and 0.28 mg/kg, 1.0 and 5.6 times the screening level. The maximum concentration of mercury detected in the 2-60s Area did not exceed the direct contact exposure pathway screening level (41.9 mg/kg).

Mercury was detected at concentrations greater than the screening level in soils from 1.5 to 5 feet bgs within or adjacent to OA 12 (Building 2-63 Area) and SWMU 2-64.49 (Air Compressor Building and Accumulation Area). Concentrations in these areas ranged from 0.07 to 0.18 mg/kg (1.4 to 3.6 times the screening level). Mercury was not detected above the Puget Sound natural background concentration (0.07 mg/kg) in soils at greater depths in these locations.

The soil screening level protective of surface water was exceeded in samples collected from approximately 5 feet bgs at the southeast corner of Building 2-65 slab and the west end of UST PL-37 (0.08 mg/kg and 0.16 mg/kg, respectively). The concentration of mercury in these areas decreased to less than 0.06 mg/kg at 10 feet bgs at both locations. The vertical distribution of analytical data indicates that the surface water pathway is incomplete at these locations. Mercury was also detected (0.1 mg/kg) near the east end of Building 2-48 at 10.6 feet bgs. The lateral extent of mercury in this area is not defined, and represents a data gap.

There was one other occurrence of mercury detected above the surface water pathway screening level within the 2-60s Area. The sample was collected from soil exposed in association with the demolition of the 2-62 Building as a sample of opportunity. Mercury was detected at a concentration of 0.16 mg/kg (3.1 times the screening level), approximately 3 feet bgs near the southeast corner former sump SPL-062-009 (AOC 2-62.46 (Paint Booth Sump)). The extent of mercury was not defined at this unit, and represents a data gap.

The analytical data indicate that the surface water pathway is incomplete at these locations previously identified. Mercury has only been detected three times in the 2-60s Area in groundwater samples and has not historically been detected at concentrations greater than the groundwater screening level. Mercury does not likely pose a risk along the soil to surface water pathway. However, mercury was detected (0.28 mg/kg) 11 feet bgs in association with SWMU 2-63.47 (Dilute Chrome Tank) indicating the soil to groundwater and ultimately surface may be complete at this location. Therefore, direct-push probe sampling will be conducted downgradient of this unit.

There were approximately 40 samples in which mercury was not detected, and RLs (0.06 U to 0.07 U mg/kg) slightly exceeded the screening level protective of surface water. However, in all cases, these slight exceedances were within the 90th percentile of natural background concentrations of mercury in the Puget Sound Basin (Ecology, 1994).

Data gaps for mercury via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- Mercury is not adequately characterized in two of the 2-60s Area RCRA Units. The extent of mercury in soil is not defined at depth at SWMU 2-63.47 (Dilute Chrome Tank). This SWMU was characterized by samples analyzed from a single boring. Impacts at AOC 2-62.46 (Paint Booth Sump) were not investigated below 5 feet bgs.

- Mercury was detected above screening levels in soil at the east end of Building 2-48. The extent of mercury is not defined downgradient of this location. Mercury will be analyzed in groundwater and soil samples collected downgradient of Building 2-48 and as samples of opportunity at UST PL-37 since further investigation is warranted in this area in association with trichloroethene (see Section 2.4.3.9).

- Mercury was not a constituent included in the fate and transport model for the 2-60s Area. Mercury will be analyzed in groundwater samples from direct-push locations downgradient of SWMU 2-63.47 (Dilute Chrome Tank), AOC 2-62.46 (Paint Booth Sump) the east end of Building 2-48 and UST PL-37. Analytical results will be evaluated to determine if groundwater is impacted by mercury in the respective areas.

Soil sampling and analysis at the following locations will specifically address the extent of mercury in soil in the vicinity of SWMU 2-63.47 (Dilute Chrome Tank):

- 2-60-DP-8
- 2-60-DP-22

Soil sampling and analysis at the following locations will specifically address the extent of mercury in soil in the vicinity of AOC 2-62.46 (Paint Booth Sump):

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Soil sampling and analysis at the following locations will specifically address the extent of mercury in soil at UST PL-37 and at the east end of Building 2-48, respectively.

- 2-60-DP-17
- 2-60-DP-21

Groundwater sampling and analysis will also be conducted at each of the above locations to determine whether the soil to groundwater pathway is complete in association with SWMU 2-63.47 (Dilute Chrome Tank), AOC 2-62.46 (Paint Booth Sump), at UST PL-37, and the east end of Building 2-48.

All sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

There is no soil data gap in the 2-60s Area for mercury via the direct contact pathway. The air pathway is a viable pathway for mercury and will be further evaluated in the Johnson & Ettinger (J & E) investigation (EPI, 2004).

2.4.1.6 Nickel

Nickel was detected in all 125 soil samples analyzed for metals in the 2-60s Area; 49 samples contained concentrations that exceeded the soil screening level protective of surface water of 10.7 mg/kg. A table of the analytical results for nickel is provided in Attachment B. Concentrations of nickel that exceeded the screening level ranged from 11 mg/kg to 42 mg/kg, 1.1 to 3.9 times the screening level. The maximum concentration of nickel detected in the 2-60s Area did not exceed the direct contact exposure pathway screening level (6,670 mg/kg).

Background concentrations have not yet been established for nickel at Plant 2. When this occurs later in the CMS process the area of nickel concentrations requiring further consideration will be reevaluated. Ecology (1994) reported that the calculated natural background concentration for nickel in the Puget Sound Basin is 47.8 mg/kg. The maximum concentration of nickel reported as detected in the 2-60s Area soil samples was 42.7 mg/kg and is less than the Puget Sound Basin background concentration. All measured nickel concentrations reported for 2-60s Area soil samples are within the 90th percentile of natural background concentrations of nickel in the Puget Sound Basin (Ecology 1994). Further assessment will be completed when background concentrations are established later in the CMS process.

There are no soil data gaps for nickel in the 2-60s Area. All of the nickel detected in the 2-60s Area is present at concentrations that should be considered natural background levels for the Puget Sound Basin. Further assessment will be completed when background concentrations for nickel at Plant 2 are established later in the CMS process.

2.4.1.7 Silver

Silver was detected in four of the 125 soil samples analyzed for metals in the 2-60s Area. A table of the analytical results for silver is provided in Attachment B. All of the concentrations reported for the four samples in which silver was detected exceeded the surface water pathway screening level of 0.32 mg/kg and ranged from 0.4 mg/kg to 0.5 mg/kg, 1.2 to 1.5 times the screening level. The maximum concentration of silver detected in the 2-60s Area did not exceed the direct contact exposure pathway screening level (6,670 mg/kg). In addition, background concentrations have not yet been established for silver at Plant 2. When this occurs later in the CMS process, the area of silver concentrations requiring further consideration will be reevaluated.

Silver was detected at concentrations greater than the surface water pathway screening level in soils at approximately 5 feet bgs within or adjacent to SWMU 77A (PCB Retention Tank) and SWMU 2-64.48 (Underground Waste Tank). Silver was not detected above the surface water pathway screening level in deeper soil samples from these locations. The analytical data indicate that the surface water pathway is not complete at these locations.

To date, silver has not been detected at concentrations greater than the screening level in groundwater in the 2-60s Area; confirming that silver in the 2-60s Area is not a threat to surface water. However, silver was detected above the soil screening level protective of surface water at 10 feet bgs, approximately 25 feet to the east of AOC 2-62.46 (Paint Booth Sump) at 0.5 mg/kg and between the south end of the Building 2-63 and 2-65 slabs at 0.4 mg/kg. The extent of silver was not defined at either location, which represents a data gap.

There were approximately 65 samples in which silver was not detected, and the RLs (0.4 U to 0.5 U mg/kg) were slightly above the screening level protective of surface water. As noted above, silver is not a groundwater COC for the 2-60s Area. In general, metals will be analyzed at the direct push and monitoring well locations sampled in the 2-60s Area. The data will be evaluated to confirm that groundwater has not been impacted by silver in the 2-60s Area.

Data gaps for silver via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- There were two occurrences of silver identified in the 2-60s Area not associated with RCRA units and exceeded the soil screening level protective of surface water. The lateral extent of silver has not been adequately defined at depth both between the south end of Buildings 2-63 and 2-65 slabs and at the location east of AOC 2-62.46 (Paint Booth Sump). Silver has never been detected at concentrations greater than the screening level in groundwater; and is not a risk along this pathway. However, the analytical results from the existing monitoring wells and push probes sampled downgradient of AOC 2-62.46 (Paint Booth Sump) and the area between the south end of the Building 2-63 and 2-65 slabs will be evaluated to determine if groundwater is impacted by silver in the respective areas.

- Fate and transport modeling and groundwater data indicate that silver will not reach the waterway from OA 9 (Former USTs PL-16, -17, -18). It would also take more than 180 years to reach the waterway from OA 12 (Building 2-63 Area). Existing monitoring wells and push probes will be sampled downgradient of these units for metals and will be used to support fate and transport model conclusions. The modeling results will be used to evaluate silver at SWMU 77A (PCB Retention Tank), SWMU 2-64.48 (Underground Waste Tank), the area east of AOC 2-62.46 (Paint Booth Sump) and the area at the south end of Building 2-63 and 2-65 slabs.

- The RLs for 65 soil samples collected in the 2-60s Area slightly exceeded the screening level. Groundwater will be analyzed for silver in the 2-60s Area to confirm that it has not been impacted by silver in soils.

The data gap for silver via the surface water pathway consists of verifying the fate and transport model at OA 9 (Former USTs PL-16, -17, -18) and determining whether groundwater has been impacted by silver in the areas with impacted soils.

Soil sampling and analysis at the following locations will specifically address the extent of silver in soil in the vicinity of AOC 2-62.46 (Paint Booth Sump):

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Soil sampling and analysis at the following locations will specifically address the extent of silver in soil in the area between the south end of the Building 2-63 and 2-65 slabs:

- 2-60-DP-22
- 2-60-DP-23
- 2-60-DP-24

Groundwater sampling and analysis will also be conducted at each of the above locations, as well as at PL2-317AR, to determine whether the soil to groundwater pathway is complete for silver at AOC 2-62.46 and in between the south end of the Building 2-63 and 2-65 slabs.

Groundwater sampling and analysis will be conducted to determine if groundwater has been impacted and to evaluate fate and transport model conclusions at the following locations downgradient of OA 9:

- PL2-310A
- PL2-311A
- PL2-604A
- 2-60-DP-10

Groundwater sampling and analysis will be conducted to determine if groundwater has been impacted and to evaluate fate and transport model conclusions at the following locations downgradient of OA 12:

- PL2-327A
- PL2-328A
- 2-60-DP-4
- 2-60-DP-5
- 2-60-DP-6
- 2-60-DP-7
- 2-60-DP-8
- 2-60-DP-9

In addition, as noted in Section 2.4.1, metals, including silver, will be analyzed in both soil and groundwater from all sampling locations in the 2-60s Area. This data will be used to confirm that silver is not present in soil, and that the soil to groundwater pathway is not complete in those areas where silver RLs were elevated in soil samples.

All sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The maximum concentration of silver detected in 2-60s Area soil did not exceed the direct contact pathway. The air pathway is not considered a viable exposure pathway for silver.

2.4.1.8 Thallium

Thallium was detected in 41 of the 125 soil samples analyzed for metals in the 2-60s Area. A table of the analytical results for thallium is provided in Attachment B. Thallium was detected at a concentration (0.7 mg/kg) greater than the surface water pathway screening level (0.67 mg/kg) in only one sample. This specific occurrence of thallium was located between the north end of the Building 2-63 and 2-62 slabs, at 5 feet bgs. Thallium was also detected at a concentration of 0.28 mg/kg (well below the screening level) in the underlying 10 foot deep sample. The analytical soil data indicate that the surface water pathway is not complete at this location.

There were 19 samples in which thallium was not detected at RLs (0.7 U to 8 U mg/kg) above the screening level protective of surface water. Thallium was not detected in the 2-60s Area samples above the direct contact exposure pathway screening level (86.4 mg/kg). In addition, thallium was never detected at concentrations greater than the screening level in groundwater in the 2-60s Area, indicating that thallium in the 2-60s Area is not a threat to surface water at Plant 2. In general, metals will be analyzed at the direct push and monitoring well locations sampled in the 2-60s Area. This will provide additional data to confirm that groundwater has not been impacted by thallium in the 2-60s Area, particularly in those locations where the thallium RLs significantly exceeded the surface water screening level.

Data gaps for thallium via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- The RLs for 19 soil samples collected in the 2-60s Area exceeded the screening level. Groundwater will be tested in the 2-60s area to confirm that it has not been impacted by thallium.

There are no data gaps for thallium via the direct contact pathway based on the criteria identified in Section 2.1. The air pathway is not considered a viable exposure pathway for thallium.

2.4.1.9 Zinc

Zinc was detected in all of the 125 soil samples analyzed for metals in the 2-60s Area; three samples were reported with concentrations exceeding the soil screening level protective of surface water (101 mg/kg). A table of the analytical results for zinc is provided in Attachment B. The analytical soil data indicate that the surface water pathway is not complete within the 2-60s Area.

Background concentrations have not yet been established for zinc at Plant 2. When this occurs later in the CMS process the area of zinc concentrations requiring further consideration will be reevaluated. Ecology (1994) reported that the calculated natural background concentration for zinc in the Puget Sound Basin is 85.06 mg/kg. Further assessment will be completed when background concentrations for zinc at Plant 2 are established later in the CMS process.

The maximum concentration of zinc detected in 2-60s Area soil was 757 mg/kg in sample SB-06216 at 3 feet bgs in the sump excavation for SPL-062-009 (AOC 2-62.46 Paint Booth Sump). Zinc was also detected at a concentration of 122 mg/kg in an adjacent soil sample from approximately 4 feet bgs. These samples were collected from soil exposed in association with the demolition of the 2-62 Building as samples of opportunity. The extent of zinc was not defined at this unit, which represents a data gap.

Zinc was detected at 402 mg/kg at approximately 5 ft bgs near the southwest corner of SWMU 78.C (Oil/Water Separator). However, zinc was not detected above the screening level in soil from approximately 10 ft bgs at this location, or in any soil sample from adjacent locations. In addition, zinc was never detected at concentrations greater than the screening level in groundwater in the 2-60s Area, indicating that it is not a threat to surface water.

Zinc was not detected in the 2-60s Area samples above the direct contact exposure pathway screening level (400,000 mg/kg).

Data gaps for zinc via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- 2-60s Area RCRA Units are characterized for zinc adequately for CMS purposes with one exception. The extent of zinc was not investigated below five feet at AOC 2-62.46 (Paint Booth Sump).

Soil data gaps for zinc in the 2-60s Area via the surface water pathway are limited to the AOC 2-62.46 (Paint Booth Sump). Soil sampling and analysis at the following locations will specifically address the extent of zinc in soil at AOC 2-62.46:

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Groundwater sampling and analysis will also be conducted at these locations to determine whether the soil to groundwater pathway is complete in the vicinity of AOC 2-62.46.

These locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The maximum concentration of zinc detected in 2-60s Area soil did not exceed the direct contact pathway. The air pathway is not considered a viable exposure pathway for zinc.

2.4.1.10 Cyanide

Cyanide was detected in 15 of the 72 soil samples analyzed for cyanide in the 2-60s Area. A table of the analytical results for cyanide and maps presenting sample locations, concentration, and depth are provided in Attachment B. Of those samples where cyanide was detected, seven were reported with concentrations, which exceeded the soil screening level protective of surface water (0.2 mg/kg). The concentrations of cyanide detected within the 2-60s Area boundaries that exceeded the surface water pathway screening level ranged from 0.24 mg/kg to 1.2 mg/kg, 1.2 to 6 times the screening level.

Cyanide was detected at concentrations greater than or equal to the soil screening level protective of surface water in or adjacent to OA 12 (Building 2-63 Area) from 3 to 5 feet bgs. Concentration in this area ranged from 0.28 mg/kg to 1.2 mg/kg. Cyanide was also detected in soil samples collected from 2 feet bgs and 5 feet bgs (0.99 mg/kg and 0.48 mg/kg respectively) at one location in the southeast corner of the Building 2-62 slab. Cyanide was not detected above the screening level (0.2 mg/kg) in soils at greater depths at any of these locations. The analytical data indicate that the surface water pathway is not complete at these locations.

Cyanide was also detected above the surface water screening level at approximately 10 feet bgs at the southwest corner of the Building 2-65 slab. The extent of cyanide is not defined at this location. The analytical data indicate that the soil to surface water pathway may be complete at this location; additional data are needed to address this data gap.

There was one other occurrence of cyanide detected above the surface water pathway screening level within the 2-60s Area. The sample was collected from soil exposed in association with the demolition of the 2-62 Building as a sample of opportunity. Cyanide was detected at a concentration of 0.26 mg/kg, approximately 5.5 feet bgs at SPL-062-004 (AOC 2-62.45 (Paint Booth Sumps)). The extent of cyanide was not defined at this unit, and represents a data gap.

The maximum concentration (1.2 mg/kg) of cyanide was detected in the 2-60s Area was detected at OA-12 (Building 2-63 Area) but did not exceed the direct contact exposure pathway screening level (26,700 mg/kg).

There were 29 soil samples collected in the 2-60s Area in which cyanide was not detected, with RLs exceeding the screening level protective of surface water (0.21 U to 0.54 U mg/kg). Following evaluation of cyanide RLs based on the criteria outlined in Section 2.1, soil data gaps were identified for cyanide in association with SWMU 2-63.47 (Dilute Chrome Tank) and the area in between the 2-65 and 2-63 Building slabs.

Data gaps for cyanide via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- 2-60s Area RCRA Units are characterized for cyanide adequately for CMS purposes except for AOC 2-62.46 (Paint Booth Sump). The vertical and downgradient extent of cyanide was not defined during the removal of sump SPL-062-004, which is included in AOC 2-62.46 (Paint Booth Sump).

- There was one occurrence of cyanide identified in the 2-60s Area at the southwest corner of the Building 2-65 slab where the extent has not been adequately defined. The analytical results from push probes sampled downgradient of the southwest corner of the Building 2-65 slab will be evaluated to determine if groundwater is impacted by cyanide in this area.

- Cyanide will be analyzed from samples at direct-push locations downgradient of OA-12 units to assess the soil to surface water pathway for cyanide within this area. The results will also be used to evaluate the occurrence of cyanide in the southeast corner of the Building 2-65 slab and AOC 2-62.45 (Paint Booth Sumps).

- There were two areas in which cyanide was not detected in soils, but RLs were slightly elevated above the screening level protective of surface water. These areas are the SWMU 2-63.47 (Dilute Chrome Tank) and in between the Building 2-63 and Building 2-65 slabs. Groundwater will be tested to verify that the soil to groundwater pathway is not complete in these areas.

The data gap for cyanide via the surface water pathway consists of verifying the fate and transport model at OA 12 (Building 2-63 Area) and to determine whether groundwater has been impacted by cyanide in the areas with impacted soil.

Soil sampling and analysis at the following locations will specifically address the extent of cyanide in soil in the vicinity of AOC 2-62.46 (Paint Booth Sump):

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Soil sampling and analysis at the following locations will specifically address the extent of cyanide in soil at the southwest corner of the Building 2-65 slab:

- 2-60-DP-15
- 2-60-DP-16
- 2-60-DP-24

Groundwater sampling and analysis will also be conducted at each of the above locations to determine whether the soil to groundwater pathway is complete at AOC 2-62.46 and the southwest corner of the Building 2-65 slab.

Groundwater sampling and analysis will be conducted to evaluate fate and transport model conclusions at the following locations downgradient of OA 12:

- PL2-327A
- PL2-328A
- 2-60-DP-4

- 2-60-DP-5
- 2-60-DP-6
- 2-60-DP-7
- 2-60-DP-8
- 2-60-DP-9

Groundwater sampling and analysis will be conducted at the following locations to determine whether the soil to groundwater pathway is complete in association with the elevated RLs in the vicinity of SWMU 2.63.47 (Dilute Chrome Tank) and in between the Building 2-65 and Building 2-63 slabs:

- 2-60-DP-22
- 2-60-DP-23

All sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The maximum concentration of cyanide detected in 2-60s Area soil did not exceed the direct contact pathway. The air pathway is not considered a viable exposure pathway for cyanide.

2.4.2 Semivolatile Organic Compounds and Polychlorinated Biphenyls

Analytical results contained in the Plant 2 database for all site-wide SVOC and PCB COCs were screened to determine which site-wide constituents are COCs for the 2-60s Area. Chemical analysis was conducted for SVOC constituents on 95 soil samples collected in the 2-60s Area. Chemical analysis was also conducted on 85 soil samples for PCBs in the 2-60s Area.

In addition to the samples analyzed for SVOCs and PCBs as part of the RFI and Parcel investigation, eight additional samples were collected and analyzed for SVOCs and PCBs. These samples were collected and analyzed as samples of opportunity in association with the sump removal and demolition of Building 2-63. Soil samples were collected from soils exposed during the removal of sumps located within existing RCRA units associated with Building 2-62.

The occurrence of the SVOC and PCB constituents in the 2-60s Area is evaluated for the surface water exposure pathway in their respective sections below. The direct contact pathway is valid for SVOCs and PCBs. However, the maximum concentrations of SVOCs and PCB constituents are less than the respective direct contact screening levels. The exposure pathway for air is not evaluated because SVOCs and PCBs are not volatile and will not partition to that media.

A total of five SVOCs are included on the 2-60s Area-specific soil COC list. Three SVOC COCs (benzo(a)anthracene, benzo(a)pyrene and chrysene) were identified based on the Plant 2 database and are carcinogenic polycyclic aromatic hydrocarbons (cPAHs).

Two additional SVOCs were detected above soil screening levels protective of surface water in the 2-60s Area. Benzo(b)fluoranthene (which is a cPAH) and bis(2-ethylhextyl)phthalate were detected above their respective soil screening levels protective of surface water in association with the 2-62 Building demolition sampling activities.

Total PCBs and two individual Aroclors (1254 and 1260) were identified as COCs for the 2-60s Area based on the historical RFI and Parcel investigation data and sampling conducted in association with the demolition of Building 2-62.

2.4.2.1 Carcinogenic Polycyclic Aromatic Hydrocarbons

A total of 95 soil samples were analyzed for SVOCs and/or PAHs. cPAHs were detected in five separate soil samples above screening levels. Chrysene was detected above screening levels in all five of the samples, benzo(a)anthracene was detected above screening levels in four of the five samples with chrysene. Benzo(a)pyrene was detected above screening levels in two of the samples with chrysene and benzo(a)anthracene.

Samples of opportunity were collected from exposed soils during the demolition activities conducted at Building 2-62. cPAHs were detected in two soil samples collected during the Building 2-62 demolition and sump removals. A total of four cPAHs were detected in samples collected in association with the 2-62 Building demolition. Benzo(a)pyrene and benzo(b)fluoranthene were detected above their respective soil screening levels protective of surface water in only one sample. Chrysene and benzo(a)anthracene were detected above their respective soil screening levels in two samples.

The concentrations of cPAHs detected within the 2-60s Area that exceeded the cPAH soil screening levels protective of surface water ranged from 1.3 to 3.4 times the screening levels. The maximum concentration detected (200 µg/kg) of any cPAH was benzo(a)pyrene at 3 feet bgs at the south end of SPL-062-009 (AOC 2-62.46 (Paint Booth Sump)). The maximum concentration of individual cPAHs detected in the 2-60s Area did not exceed the individual direct contact exposure pathway screening levels. Analytical results for cPAH COCs are provided in Attachment B.

Chrysene was detected at concentrations greater than the soil screening level protective of surface water at SWMU 2-64.48 (Underground Waste Tank) and SWMU 78.C (Oil/Water Separator) at 4 to 5 feet bgs. Benzo(a)anthracene was also detected at 4 to 5 feet bgs at SWMU 78.C (Oil/Water Separator). Neither chrysene nor benzo(a)anthracene were detected at concentrations greater than their respective soil screening levels at greater depths at SWMU 78.C (Oil/Water Separator).

Chrysene, benzo(a)anthracene and benzo(a)pyrene were detected at concentrations greater than the screening levels at approximately 5 feet bgs near the northeast corner of the Building 2-63 slab. CPAHs were not detected at concentrations above the screening level in soil at greater depths.

The analytical data indicate that the surface water pathway is not complete at these locations. In addition, cPAHs have never been detected at concentrations greater than the screening level

in groundwater in the 2-60s Area; confirming that they are not a threat to surface water in the 2-60s Area.

Chrysene, benzo(a)anthracene, benzo(a)pyrene and benzo(b)fluoranthene were detected at 3 feet bgs at AOC 2-62.46 (Paint booth Sump). Deeper soil (>5.5 feet) at AOC 2-62.46 was not sampled, and represents a data gap.

There were approximately 40 samples from various locations throughout the 2-60s Area at which cPAHs were not detected in soil samples, at RLs that were significantly elevated above screening levels. Carcinogenic PAH-specific RLs are reflected in the non-detect (U) results provided on the individual tables in Attachment B. Carcinogenic PAHs were never detected in groundwater within the 2-60s Area, indicating that they do not present a threat to surface water. However, following evaluation of the non-detect data based on the criteria outlined in Section 2.1, soil data gaps were identified for cPAHs in association with SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank) and the southeast and southwest corners of the Building 2-65 slab.

Data gaps for chrysene (cPAHs) via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- 2-60s Area RCRA Units are characterized for cPAHs adequately for CMS purposes with one exception. The extent of cPAH impacts observed in soils at AOC 2-62.46 was not adequately defined. Therefore, the analytical results from direct-push probes sampled at AOC 2-62.46 (Paint Booth Sump) will be used to determine the extent of impacted soils and evaluate whether groundwater has been impacted by cPAHs in the immediate area.

- Fate and transport modeling and groundwater data indicate that cPAHs detected at OA 12 will not reach the waterway. CPAHs will be analyzed from samples at direct-push locations in association with OA-12, and will be used to support fate and transport model conclusions. The modeling results may also be used to evaluate cPAHs for their occurrence at AOC 2-62.46 (Paint Booth Sump).

- There were three areas in which cPAHs were not detected in soils, but RLs were slightly elevated above the screening level protective of surface water. These areas are the SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank) and the southeast and southwest corners of the Building 2-65 slab. Groundwater will be sampled in these areas to verify that the soil to groundwater pathway is not complete in these areas.

The data gap for cPAHs via the surface water pathway consists of verifying the fate and transport model at OA 12 (Building 2-63 Area) and to determine whether groundwater has been impacted by cPAHs in the areas with impacted soil.

Soil sampling and analysis at the following locations will specifically address the extent of cPAHs in soil at AOC 2-62.46:

- 2-60-DP-18

- 2-60-DP-19
- 2-60-DP-20

Groundwater sampling and analysis will also be conducted at these locations to determine whether the soil to groundwater pathway is complete in this area.

Groundwater sampling and analysis will be conducted to support fate and transport model conclusions at the following locations downgradient of OA 12:

- 2-60-DP-4
- 2-60-DP-5
- 2-60-DP-6
- 2-60-DP-7
- 2-60-DP-8
- 2-60-DP-9

Groundwater sampling and analysis will be conducted at the following locations to determine whether the soil to groundwater pathway is complete in association with the elevated RLs in the vicinity of SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank) and the southeast and southwest corners of the Building 2-65 slab:

- 2-60-DP-15
- 2-60-DP-16
- 2-60-DP-24

These locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

There is no soil data gap in the 2-60s Area for cPAHs via direct contact pathway. The air pathway is not considered a viable exposure pathway for cPAHs.

2.4.2.2 bis(2-Ethylhexyl)phthalate

Bis(2-ethylhexyl)phthalate was detected in seven of the 95 samples in which it was analyzed. There was one detection of bis(2-ethylhexyl)phthalate above the surface water pathway screening level (1,570 µg/kg) within the 2-60s Area. The sample was collected from exposed soil in association with the demolition of the 2-62 Building as a sample of opportunity. Bis(2-ethylhexyl)phthalate was detected at a concentration of 1,600 µg/kg, approximately 3 feet bgs at SPL-062-009 (AOC 2-62.46 (Paint Booth Sump)). The extent of bis(2-ethylhexyl)phthalate was not defined vertically or downgradient at this unit, which represents a data gap.

Bis(2-ethylhexyl)phthalate has never been detected at concentrations greater than the screening level in groundwater in the 2-60s Area, which confirms that it is not a threat to surface water in the 2-60s Area. However the extent of bis(2-ethylhexyl)phthalate was not defined

vertically at AOC 2-62.46 (Paint Booth Sump). Therefore, analytical results from push probes sampled in association with AOC 2-62.46 will be evaluated to determine if groundwater is impacted.

Data gaps for bis(2-ethylhexyl)phthalate via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- 2-60s Area RCRA Units are characterized for bis(2-ethylhexyl)phthalate adequately for CMS purposes except at AOC 2-62.46 (Paint Booth Sump). The extent of bis(2-ethylhexyl)phthalate is not adequately defined at AOC 2-62.46 (Paint Booth Sump), and groundwater may have been impacted.

The data gap for bis(2-ethylhexyl)phthalate via the surface water pathway consists of better defining the extent of bis(2-ethylhexyl)phthalate at AOC 2-62.46 (Paint Booth Sump) and determining if groundwater has been impacted in the respective area. Soil sampling and analysis at the following locations will specifically address the extent of bis(2-ethylhexyl)phthalate at AOC 2-62.46:

- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20

Groundwater sampling and analysis will also be conducted at these locations to determine whether the soil to groundwater pathway is complete in this area. Sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

The maximum concentration of bis(2-ethylhexyl)phthalate detected in the 2-60s Area soil did not exceed the direct contact pathway. The air pathway is not considered a viable exposure pathway for bis(2-ethylhexyl)phthalate.

2.4.2.3 Total Polychlorinated Biphenyls

A total of 85 soil samples were analyzed for PCBs in the 2-60s Area. PCB results were reported as individual Aroclors. The sum of Aroclor results within a single sample analysis represents the total PCBs. PCBs were detected at concentrations greater than the surface water pathway screening level (33 µg/kg) in eight samples. The surface water pathway screening level is equal to the laboratory's reported RL for Aroclors.

Tables of the analytical results for individual Aroclors identified as 2-60s Area COCs are provided in Attachment B. A table of the analytical results for individual Aroclors and total PCB maps presenting sample locations, concentration, and depth are also provided in Attachment B. The concentrations of total PCBs detected within the 2-60s Area that exceeded the surface water pathway screening level (33 µg/kg) ranged from 46.2 µg/kg to 510 µg/kg, 1.4 to 15.5 times the screening level. There were a number of samples in which Aroclors were not detected, but the RLs exceeded the surface water screening level. There were no exceedences

of the direct contact pathway screening level for Aroclor 1254 (13,300 µg/kg) by either detected concentrations or elevated RLs.

PCBs were detected at concentrations greater than the surface water screening level in a single sample from 1.5 to 5.5 feet bgs at each of the following RCRA units; SWMU 77A (PCB Retention Tank), SWMU 2-64.48 (Underground Waste Tank), SWMU 2-65.50 (Machine Pit), SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank), and adjacent to OA 12 (Building 2-63 Area). PCBs were not detected at concentrations above the screening level in soils at greater depths in these units. The analytical data indicate that the surface water pathway is not complete at these locations.

PCBs were also detected in AOC 2-62.46 (Paint Booth Sump) at 3 to 4 feet bgs. Deeper soils (> 5.5 feet) at this unit were not sampled, which represents a data gap.

PCBs were also detected at concentrations greater than the surface water pathway screening level at approximately 6 feet bgs at UST PL-37 on the south side of Building 2-44. PCBs were not detected at concentrations above the screening level in soils at greater depths at this location.

RLs for PCBs were above the soil screening level protective of surface water for the majority of soil samples collected within the 2-60s Area. Following evaluation of the Aroclor non-detect data based on the criteria outlined in Section 2.1, soil data gaps were identified for PCBs in association with SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank), SWMU 77.B (PCB Retention Tank) and the southeast corner of the Building 2-65 slab.

In addition, the extent of PCBs was not defined vertically at AOC 2-62.46 (Paint Booth Sump). However, PCBs have never been detected at concentrations greater than the screening level in groundwater in the 2-60s Area, indicating that they are not a threat to surface water. To verify that the groundwater remains unimpacted in the 2-60s Area and the soil to groundwater pathway is incomplete, groundwater will be analyzed for PCBs in selected areas, including AOC 2-62.46.

Data gaps for PCBs via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- 2-60s Area RCRA Units are characterized for PCBs adequately for CMS purposes with one exception. The PCB source areas in the 2-60s Area are isolated in soils except possibly at AOC 2-62.46 (Paint Booth Sump). PCBs were also detected at 3 to 4 feet bgs at this unit and deeper soils (> 5.5 feet) were not sampled and groundwater may have been impacted.

- There are three areas in which PCBs were not detected in soils, but RLs were substantially elevated above the screening level protective of surface water. These areas are the SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank), SWMU 77.B (PCB Retention Tank), and near the southeast corner of the Building 2-65 slab. Groundwater will be sampled to verify that the soil to groundwater pathway is not complete in these areas.

The data gap for PCBs via the soil to groundwater pathway consists of better defining the extent of PCBs at AOC 2-62.46 (Paint Booth Sump) and determining if groundwater has been impacted in that area, as well as verifying that PCBs are not present in areas with elevated RLs. Soil sampling and analysis at the following locations will specifically address the extent of PCBs in soil at AOC 2-62.46:

- 2-60-DP-17
- 2-60-DP-18
- 2-60-DP-19
- 2-60-DP-20
- 2-60-DP-23

Soil sampling and analysis at the following locations will be conducted to confirm that PCBs are not present where RLs were elevated above screening levels at SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank) and near the southeast corner of the Building 2-65 slab:

- 2-60-DP-15
- 2-60-DP-16
- 2-60-DP-24

Groundwater sampling and analysis will also be conducted at each of the above locations to evaluate the soil to groundwater pathway at AOC 2-62.46, SWMU 2-70.55, and near the southeast corner of the Building 2-65 slab.

Groundwater sampling and analysis will be conducted at the following locations to determine whether the soil to groundwater pathway is complete in association with the elevated RLs in the vicinity of SWMU 77.B (PCB Retention Tank).

- PL2-315A
- PL2-329A
- PL2-330A

All sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

There is no soil data gap in the 2-60s Area for PCBs via the direct contact pathway. The air pathway is not considered a viable exposure pathway for PCBs.

2.4.3 Volatile Organic Compounds

Analytical results for all site-wide VOC COCs were screened to determine which site-wide constituents are also COCs for the 2-60s Area. Chemical analysis was conducted for one or

more VOC constituents on up to 138 soil samples collected in the 2-60s Area. VOC analyses included a total of 21 constituents for which screening levels were established. Eleven VOCs were identified as soil COCs in the 2-60s Area:

1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Benzene	Ethylbenzene
Isopropylbenzene	n-Butylbenzene	n-Propylbenzene	sec-Butylbenzene
Tetrachloroethene	Trichloroethene	Naphthalene	

The occurrence of these VOCs in the 2-60s Area is evaluated for the surface water exposure pathway in the sections below except n-butylbenzene, sec-butylbenzene, isopropylbenzene, n-propylbenzene 1,2,4 trimethylbenzene and 1,3,5-trimethylbenzene. These five constituents exceeded the air exposure pathway and not the surface water exposure pathway. The air exposure pathway is viable exposure scenario and requires a data gap evaluation. However, the screening levels for this exposure pathway are not finished being developed and adjustments to the Johnson & Ettinger Model are ongoing. The air pathway will be evaluated and the results presented in an addendum to this work plan. The direct contact pathway is valid for VOCs, but screening levels calculated for the direct contact pathway are higher than the maximum concentration detected for individual VOCs. All soil and groundwater sampling locations, in addition to those associated with data gaps identified in the following sections, will be sampled for VOCs as part of the work plan. In particular, sampling will address locations in and around OA 9, where several VOCs have been detected in soil, although no specific VOC data gaps have been identified.

2.4.3.1 Benzene

A total of 138 soil samples were analyzed for benzene (a component of TPH) in the 2-60s Area. Benzene was detected in six of those samples. A table of the analytical results for benzene is provided in Attachment B. Of those samples where benzene was detected, three were reported at concentrations greater than the soil screening level protective of surface water (25.3 µg/kg). The concentrations of benzene detected within the 2-60s Area that exceeded the soil screening level protective of surface water ranged from 60 µg/kg to 2,000 µg/kg, 2.4 to 79 times the screening level. The 2,000 µg/kg concentration of benzene also exceeds the current proposed air pathway screening level (104 µg/kg). That is the only occurrence of benzene exceeding the air pathway screening level in the 2-60s Area.

The locations where benzene was detected at concentrations greater than the soil screening level protective of surface water were all associated with OA 9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]) which is consistent with benzene occurrences in groundwater. Benzene was detected at 5 feet bgs in two samples within the unit. At one of these two locations, benzene was also detected at 7.5 ft bgs at a lower concentration. Although benzene was not detected in deeper soils (7.5 ft and 10 ft) at the second location, RLs associated with these samples (130 and 16,000 µg/kg, respectively) were significantly elevated above the screening level protective of surface water. At a third location

within the unit, benzene was not detected at depths of 3 and 10 ft bgs, but RLs were well above the surface water screening level (330 and 310 µg/kg, respectively). Benzene was detected at 10 feet bgs adjacent to the unit, and has been detected above screening levels in groundwater samples from the unit, indicating that benzene in the deep soils may have impacted the groundwater at this unit.

Benzene was not detected in samples collected from depths of 6 and 10 ft bgs at one location within SWMU 2-64.48 (Underground Waste Tank), where the RLs (69 U and 62 U µg/kg, respectively) were more than twice the surface water screening level. However, benzene was not detected in recent (2002) groundwater samples from within and immediately downgradient of this location. In addition, in soil samples collected from approximately the same depths at locations adjacent to this unit, benzene was not detected with RLs well below the screening levels.

Based on the criteria from Section 2.1, there are no soil data gaps in the 2-60s Area for benzene via the surface water pathway or the direct contact pathway. However, as identified in Section 2.4.3, VOCs will be analyzed in soil and groundwater from all sampling locations in the 2-60s Area, including those in and adjacent to OA 9. The air pathway is a viable exposure pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.3.2 n-Butylbenzene

n-Butylbenzene, a component of TPH, was detected in two of the 60 soil samples collected from the 2-60s Area that were analyzed for VOCs. The samples with detectable concentrations of n-butylbenzene were collected from one location adjacent to the oil water separator in OA 9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]). A table of analytical results for n-butylbenzene is provided in Attachment B. There was a single occurrence of n-butylbenzene being reported at a concentration greater than the proposed air pathway screening level (4,640 µg/kg); data gaps associated with this pathway will be evaluated in a future work plan addendum. Soil screening levels protective of surface water or direct contact have not been calculated for n-butylbenzene.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for n-butylbenzene.

2.4.3.3 sec-Butylbenzene

sec-Butylbenzene, a component of TPH, was detected in three of the 60 soil samples collected from the 2-60s Area that were analyzed for VOCs. The samples with detectable concentrations of sec-butylbenzene were collected from an area adjacent to the oil water separator in OA-9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]). A table of analytical results for sec-butylbenzene is provided in Attachment B. There was a single occurrence of sec-butylbenzene being reported at a concentration greater than the proposed air pathway screening level (7,860 µg/kg); data gaps associated with this pathway will be evaluated in the work plan addendum. Soil screening levels protective of surface water or direct contact have not been determined for sec-butylbenzene.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for sec-butylbenzene.

2.4.3.4 Ethylbenzene

A total of 138 soil samples were analyzed for ethylbenzene, a component of TPH, in the 2-60s Area, and ethylbenzene was detected in 11 of those samples. A table of analytical results for ethylbenzene is provided in Attachment B. Of those samples where ethylbenzene was detected, two samples were reported at a concentration greater than the soil screening level protective of surface water (18,100 µg/kg). Concentrations of ethylbenzene in the 2-60s Area ranged from 28,100 µg/kg to 100,000 µg/kg, 11 to 40 times the soil screening level. Concentrations of ethylbenzene also exceeded the air pathway screening level (2,520 µg/kg) in three samples.

Ethylbenzene was only detected at concentrations greater than the soil screening level protective of surface water at two adjacent locations associated with OA 9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]). Ethylbenzene was detected above the screening level from 3 to 10 feet bgs between these two sample locations. Ethylbenzene soil data coincides with the ethylbenzene groundwater plume contours.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for ethylbenzene via the surface water pathway or the direct contact pathway. The air pathway is a viable exposure pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.3.5 Isopropylbenzene

Isopropylbenzene, a component of TPH, was detected in two of the 60 soil samples collected from the 2-60s Area and analyzed for VOCs. The samples with detectable concentrations of isopropylbenzene were collected from one location adjacent to the oil water separator in OA 9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]). A table of analytical results for isopropylbenzene is provided in Attachment B. There were two occurrences of isopropylbenzene detected at concentrations greater than the proposed air pathway screening level (1,270 µg/kg). The soil screening level protective of surface water has not been calculated for isopropylbenzene.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for isopropylbenzene via the direct contact pathway. The air pathway is a viable exposure pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.3.6 Naphthalene

A total of 109 soil samples were analyzed for naphthalene in the 2-60s Area. Naphthalene was detected in nine of those samples. A table of analytical results for naphthalene is provided in Attachment B. Of those samples where naphthalene was detected, one sample was reported at a concentration greater than the soil screening level protective of surface water (49,900 µg/kg). The concentration of naphthalene for this sample was reported at 120,000 µg/kg, 2.4 times the

soil screening. This location was associated with OA 9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]). In addition, the naphthalene concentration in this sample and in one other sample from within OA 9 exceeded the proposed air pathway screening level (24,800 µg/kg). The second sample was collected from 10 ft bgs at PL2-311A, and contained a concentration of 31,000 µg/kg.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for naphthalene via the surface water pathway or the direct contact pathway. The air pathway is a viable exposure pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.3.7 n-Propylbenzene

n-Propylbenzene, a component of TPH, was detected in two of the 60 soil samples collected from the 2-60s Area and analyzed for VOCs. The samples with detectable n-propylbenzene were collected from one location adjacent to the oil water separator in OA-9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]). A table of analytical results for n-propylbenzene is provided in Attachment B. A single occurrence of n-butylbenzene was reported at a concentration greater than the proposed air pathway screening level (1,360 µg/kg); data gaps associated with this pathway will be further evaluated in the work plan addendum. Soil screening levels protective of surface water or direct contact have not been calculated for n-propylbenzene.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for n-propylbenzene.

2.4.3.8 Tetrachloroethene

A total of 136 soil samples were analyzed for tetrachloroethene in the 2-60s Area. Tetrachloroethene was detected in 18 of those samples. A table of the analytical results for tetrachloroethene is provided in Attachment B. Of those samples where tetrachloroethene was detected, there was a single occurrence (8.8 µg/kg), where the constituent exceeded the soil screening level protective of surface water (8.72 µg/kg). This specific occurrence of tetrachloroethene that was located within OA 12 (Building 2-63 Area) at 11 feet bgs.

Tetrachloroethene was not detected at concentrations greater than the proposed air pathway screening level (199 µg/kg) or the direct contact screening level (107,000 µg/kg).

In several samples collected from two locations within OA 9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]), tetrachloroethene was not detected, at RLs significantly exceeding both the air and surface water pathway screening levels. However, tetrachloroethene was not detected in soil samples collected from similar depths adjacent to this unit, with RLs less than the surface water and air screening levels. In addition, tetrachloroethene was not detected in groundwater at this unit, indicating that it is not a threat to surface water. As identified in Section 2.4.3, soil and groundwater from all sampling locations in the 2-60s Area will be analyzed for VOCs. These additional data will be used to verify that tetrachloroethene is

not present in soil outside of the areas in which it was actually detected, and that the soil to groundwater pathway is not complete.

Data gaps for tetrachloroethene via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- VOCs are to be analyzed at direct-push and/or monitoring well locations downgradient of OA 12 (Building 2-63 Area) to determine if groundwater is impacted and the pathway is complete.

Groundwater sampling and analysis at the following locations will be used to determine whether the soil to groundwater pathway is complete for tetrachloroethene downgradient of OA12:

- 2-60-DP-4
- 2-60-DP-5
- 2-60-DP-6
- 2-60-DP-7
- 2-60-DP-8
- 2-60-DP-9
- PL2-327A
- PL2-328A

These locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

There is no soil data gap in the 2-60s Area for tetrachloroethene via direct contact or air pathway.

2.4.3.9 Trichloroethene

A total of 136 soil samples were analyzed for trichloroethene in the 2-60s Area. Trichloroethene was detected in 26 of those samples. Analytical results for trichloroethene as well as maps presenting sample locations, concentrations and depth are provided in Attachment B. Of those samples where trichloroethene was detected, 20 were detected at concentrations greater than or equal to the soil screening level protective of surface water (2.0 µg/kg). The concentrations of trichloroethene detected within the 2-60s Area that exceeded the soil to surface water pathway screening level ranged from 2.0 µg/kg to 300 µg/kg, 1.0 to 600 times this screening level.

Trichloroethene was reported at concentrations greater than the proposed air pathway screening level (8.86 µg/kg) in 5 samples; data gaps associated with this pathway will be evaluated further in the J & E Investigation (EPI, 2004).

Trichloroethene was identified within OA 12 (Building 2-63 Area) from 3 to 12 feet bgs at concentrations that exceed the soil screening level protective of surface water. The

concentrations of trichloroethene range from 1.7 µg/kg to 14 µg/kg within OA 12 (Building 2-63 Area). Trichloroethene groundwater plumes generally coincide with locations where trichloroethene was detected in soil within OA 12.

Trichloroethene was identified at SWMU 2-70.55 (East Steam Clean and Underground Bulk Storage Tank) in two samples at 1.5 and 12 feet bgs at concentrations that exceed the soil screening level protective of surface water. The concentrations of trichloroethene were reported at 2.7 µg/kg and 7.9 µg/kg, respectively. Low levels of trichloroethene were detected in groundwater samples from this area.

Trichloroethene was also identified at concentrations that exceed the soil screening level protective of surface water at the south end of and adjacent to OA 12 near Sump SPL-049-006 and PL-12. Trichloroethene was reported in five samples from 5.0 to 12 feet bgs. The concentrations of trichloroethene reported in this area ranged from 2.3 µg/kg to 7.2 µg/kg. Trichloroethene groundwater plumes generally coincide with the locations where trichloroethene was detected in soil within this area.

There was one additional occurrence of trichloroethene being detected in the 2-60s Area above the soil screening level protective of surface water (and above the air pathway screening level). Trichloroethene was detected at 300 µg/kg 10 feet bgs just to the west of PL-37. Trichloroethene groundwater plumes are not documented west of PL-37 in the 2-60s Area.

In several samples collected from depths ranging from 3 to 10 ft bgs at two locations within OA-9 (former USTs PL-16, -17, and -18, including SWMU 2-78.6 [Oil/Water Separator]), trichloroethene was not detected; however, RLs ranged from 130 to 16,000 µg/kg, and are significantly above the surface water screening level, However, trichloroethene was not detected in soil samples collected from similar depths adjacent to this unit, with RLs below screening levels. In addition, trichloroethene was not detected in groundwater within this unit, indicating that it is not a threat to surface water. As identified in Section 2.4.3, soil and groundwater from all sampling locations in the 2-60s Area will be analyzed for VOCs. These additional data will be used to verify that trichloroethene is not present in soil outside of the areas in which it has already been detected, and that the soil to groundwater pathway is not complete.

Data gaps for trichloroethene via the surface water pathway are identified using the criteria from Section 2.1 and are summarized below.

- Sample locations with trichloroethene values exceeding the screening level are located downgradient of AST PL-12, Sump SPL-049-006 and UST PL-37. The extent of the impacts was not adequately defined for CMS purposes.

- VOCs are to be analyzed at direct-push and/or monitoring well locations at OA 12 (Building 2-63 Area) and downgradient of AST PL-12 and UST PL-37 to determine if groundwater remains impacted and the pathway is complete.

Soil sampling and analysis at the following locations will specifically address the extent of trichloroethene in soil in the vicinity of AST PL-12 and Sump SPL-049-006:

- 2-60-DP-25
- 2-60-DP-26

Soil sampling and analysis at the following location will specifically address the extent of trichloroethene in soil at UST PL-37:

- 2-60-DP-17

Groundwater sampling and analysis for VOCs will also be conducted at each of the above locations to determine whether the soil to groundwater pathway is complete in the vicinity of AST PL-12 and Sump SPL-049-006, as well as at UST PL-37.

Groundwater sampling and analysis at the following locations will be used to determine whether the soil to groundwater pathway is complete for trichloroethene downgradient of OA12::

- 2-60-DP-4
- 2-60-DP-5
- 2-60-DP-6
- 2-60-DP-7
- 2-60-DP-8
- 2-60-DP-9
- PL2-327A
- PL2-328A

All sampling locations are presented on Figure 2-1 and their associated analyses are identified on Table 2-2.

There is no soil data gap in the 2-60s Area for trichloroethene via the direct contact pathway. The air pathway is a viable pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.3.10 1,2,4-Trimethylbenzene

1,2,4-Trimethylbenzene (a component of TPH) was detected in three samples of the 60 soil samples collected from the 2-60s Area and analyzed for VOCs. The samples were collected from a location adjacent to the oil water separator in SWMU 2-78.6 (Oil/Water Separator). A table of analytical results for 1,2,4-trimethylbenzene is provided in Attachment B. There were three occurrences where 1,2,4-trimethylbenzene was detected at concentrations greater than the proposed air pathway screening level (2,360 µg/kg). The soil screening level protective of surface water has not been calculated for 1,2,4-trimethylbenzene.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for 1,2,4-trimethylbenzene via the direct contact pathway. The air pathway is a viable exposure pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.3.11 1,3,5-Trimethylbenzene

1,3,5-Trimethylbenzene (a component of TPH) was detected in two samples of the 60 soil samples collected from the 2-60s Area and analyzed for VOCs. The samples were collected from a location adjacent to the oil water separator in SWMU 2-78.6 (Oil/Water Separator). A table of analytical results for 1,3,5-trimethylbenzene is provided in Attachment B. Both detections of 1,3,5-trimethylbenzene were greater than the proposed air pathway screening level (2,470 µg/kg). The soil screening level protective of surface water has not been calculated for 1,3,5-trimethylbenzene.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for 1,3,5-trimethylbenzene via the direct contact pathway. The air pathway is a viable exposure pathway and will be further evaluated in the J & E investigation (EPI, 2004).

2.4.4 Petroleum Hydrocarbons

Analytical results for all site-wide petroleum hydrocarbon COCs were screened to determine which site-wide constituents are COCs for the 2-60s Area. Chemical analysis was conducted for four categories of petroleum hydrocarbons, which consisted of TPH (diesel through oil range), GRPH, DRPH, and motor oil-range petroleum hydrocarbons.

Only one category of petroleum hydrocarbons (GRPH) was identified as a COC for the 2-60s Area. Diesel through oil-range petroleum hydrocarbons, DRPH, and motor oil-range petroleum hydrocarbons are not COCs for the 2-60s Area. GRPH in the 2-60s Area is evaluated for the surface water exposure pathway in the sections below. The direct contact and air pathways are not evaluated specifically for petroleum hydrocarbons. They are however, accounted for by the evaluation of individual constituents that are components of petroleum hydrocarbons. For example benzene is a component of gasoline and is evaluated for the 2-60s Area in Section 2.4.3.1.

2.4.4.1 Gasoline-Range Petroleum Hydrocarbons

A total of 59 soil samples were analyzed for GRPH in the 2-60s Area. GRPH was detected in 11 of those samples. A table of analytical results for GRPH is provided Attachment B. Of those samples where GRPH was detected, 10 were detected at concentrations greater than or equal to the screening level of 30 mg/kg. The concentrations of GRPH detected within the 2-60s Area that exceeded the screening level ranged from 37 mg/kg to 15,000 mg/kg, 1.2 to 500 times the screening level.

GRPH was only detected at concentrations greater than screening levels at two adjacent locations associated with SWMU 2-78.6 (Oil/Water Separator), which coincides with the ethylbenzene and benzene groundwater plume contours. GRPH was detected above the screening level from 3 to 10 feet bgs between this two sample locations.

Based on the criteria from Section 2.1 there are no soil data gaps in the 2-60s Area for GRPH.

2.4.5 Summary of Investigative Scope for Soil Data Gaps

The soil data gap investigation of the 2-60s Area will be conducted to fill the data gaps identified above. The main elements associated with the 2-60s Area Soil Data Gap Investigation consist of:

Scope Item	Rationale
Installation and sampling of direct push probes in the 2-60s Area for additional VOC, SVOC, PCB, metals and cyanide analysis.	Better define the extent of soil impacted by COCs associated with RCRA Units AOC 2-62.46 (Paint Booth Sump), SWMU 2-64.48 (Underground Waste Tank), and SWMU 2-64.49 (Air Compressor Building Sump and Accumulation Area), and soil impacted by cyanide and mercury, trichloroethene and PCBs at AOC 2-63.47 (Dilute Chrome Tank) Better define the extent of impacted soil not associated with existing RCRA units, including arsenic and silver impacts between Building 2-63 and Building 2-65 Slabs; PCBs, mercury and trichloroethene to the west of PL-37; cyanide at the southeast corner of Building 2-65 Slab; and mercury at Building 2-48.
Installation and sampling of direct push probes and selected groundwater monitoring wells to determine if the soil to groundwater portion of the surface water pathway is complete, and to identify whether COCs related to sources in the soil are present in groundwater at concentrations that exceed the applicable surface water pathway screening levels.	Groundwater sampling to support the fate and transport modeling conclusions in association with OA 12 (Building 2-63 Area) and OA-9 (Former USTs PL-16,17,18). Groundwater sampling throughout the 2-60s Area to evaluate whether the soil to groundwater portion of the surface water pathway is complete.

Groundwater and soil sampling will be conducted from 26 direct-push probe locations and selected monitoring wells downgradient of potential source areas, and RCRA Units. Groundwater samples to evaluate soil data gaps will be collected from the A-Level at all locations, and from the B-level at selected locations. Groundwater sampling conducted in support of soil data gap investigations will be coordinated with the groundwater data gap sampling presented in Section 2.1.

A summary table showing the wells and probes to be sampled, constituent groups analyzed, and the general soil data gaps that will be filled by the sampling is presented in Table 2-2. The rationale for sampling at each location is provided in the right hand column of the table.

Locations of existing wells, new probes, and new wells to be sampled as part of both the groundwater and soil 2-60s Area Data Gap Investigation are presented in Figure 2-1.

3.0 Data Gap Investigation Methods

This section specifies investigation methods for sampling groundwater and soil in the 2-60s Area to fill the data gaps discussed in Section 2. In general, the methods cover:

- Installation of three groundwater monitoring wells. Two wells, PL2-605A and PL2-606A located upgradient of RCRA unit OA 9 and one well, PL2-604A, located downgradient of OA 9. The three monitoring wells will be completed in the A level of the aquifer.
- Installation of 26 direct-push probe sampling locations in, adjacent to or downgradient of existing SWMU/AOC/OA units or potentially impacted sites located in the 2-60s Area.
    - Direct-push probes 2-60-DP-1 through 2-60-DP-16, 2-60-DP-25 and 2-60-DP-26 will be used to sample groundwater in both the A and B levels of the aquifer.
    - Direct-push probes 2-60-DP-17 through 2-60-DP-24 will be used to sample groundwater only from the A level of the aquifer.
- Soil sampling where wells or probes are installed. Soil sampling is conducted for one of two purposes, 1) to provide data to support characterization of the extent of impacted soil and 2) to indicate if overlying soils could impact the groundwater samples versus impacts from upgradient sources that the wells/probes are intended to monitor.
- Groundwater sampling of all new and existing monitoring wells and direct-push probes in the 2-60s Area.

Sample Analysis, and Quality Assurance Plans that cover standard operating procedures for environmental sampling and analysis at Plant 2 are referenced from the Compendium of Sampling and Analysis Plans and Quality Assurance Project Plans for Boeing Plant 2, Seattle/Tukwila, Washington (Golder 2003), hereafter referred to as the Compendium.

3.1 MONITORING WELL INSTALLATION

Three groundwater monitoring wells will be installed at locations upgradient and downgradient of RCRA unit OA 9 in the 2-60s Area. All three wells will be installed in the A-Level (upper 30 feet) of the aquifer. The three new well locations are shown on attached Figure 2-1. The wells will be installed using standard hollow-stem-auger (HSA) drilling techniques and will be logged and sampled following the guidance described in Technical Procedure TP-1.2-5, Drilling, Sampling, and Logging of Soils (Golder 1996) referenced in the Compendium .

A summary of locations, screened intervals, and soil sampling requirements for the new monitoring wells is presented in Table 3-1. The wells will be drilled to approximately 21 feet bgs and will be screened from approximately 6 to 21 feet bgs.

The new monitoring wells will be drilled and installed to meet resource protection well construction standards found in WAC 173-160-420, Minimum Standards for Construction and Maintenance of Wells.

Monitoring wells will be installed generally following the guidance documented in Standard Operating Procedure 4.3 in the Compendium. The wells will be constructed of 2-inch diameter, flush-threaded, Schedule 40 PVC well casing and screen in conformance with WAC 173-160-430. Well screen assemblies will consist of 15-foot lengths for A-Level wells. Screens will be 0.01-inch (10-slot), flush-threaded, machine-slotted, Schedule 40 PVC set in a 20-40 CSSI, 2/12 Monterey, or equivalent silica sand filter pack. The well design includes a 0.5 foot-long flush-threaded, Schedule 40 PVC sump with a flush-threaded end cap. Flush-threaded, Schedule 40 PVC well casing extends from the top of the screened interval to approximately 6 inches bgs. A 2-inch diameter, locking, watertight PVC well cap will be installed to secure the well casing. Stainless steel centralizers will be installed immediately above and below the screened interval on A-Level wells.

The sand filter pack will extend from below the screened interval to 1 foot above the top of the screened interval. A minimum 2-foot thick seal of hydrated bentonite chips will be installed in the annular space immediately above the sand filter pack. The remainder of the annular space will be sealed with bentonite grout or hydrated bentonite chips to within approximately one foot of the ground surface. A generalized construction diagram for the wells is presented in Figure 3-1.

The new monitoring wells will be secured with flush-completion steel protective monuments set in concrete. The monuments will be raised approximately 1-inch above the existing grade with a sloping concrete pad to minimize the potential for surface water entering the monument.

All down-hole well components will be either factory-decontaminated and in their original sealed packaging or decontaminated to the satisfaction of the on-site EPI engineer prior to installation. All down-hole drilling equipment will be decontaminated as discussed in Section 3.9.

3.1.1 Monitoring Well Development

New monitoring wells will be developed by the drilling subcontractor using a combination of surging and over-pumping generally following the guidance documented in Standard Operating Procedure 4.4 in the Compendium. Well development will be completed by continuous pumping at a steady rate using a submersible pump, or equivalent. Well development equipment used inside a well will be either new single-use equipment, or will be decontaminated to the satisfaction of the EPI engineer by pressure washing prior to use and between wells.

In general, well development should be performed soon after installation but no sooner than 48 hours after grouting. Information obtained during well development will be recorded by the EPI engineer. Well development will continue until the well is free of sediment and the appropriate water volumes have been removed. Sediment free is considered achieved when turbidity measurement is 5 nephelometric turbidity units (NTUs) or less. For wells where installation is completed without the use of drilling fluid such as water, a minimum of five volumes of standing water in the well (volume of the water inside the well screen and casing plus saturated annulus)

will be removed. For wells where drilling fluid was used, five times the volume of added water shall be removed along with five times the standing water volume in the well.

For instances where groundwater recharge is insufficient to produce water for removal, clean potable water may be introduced into the wells to facilitate sediment removal, at the approval of EPI engineer. An equivalent of five volumes of the water added must be removed to insure that all the water introduced into well has been removed. Wells will be allowed to recover for approximately one week prior to sampling for analytical parameters.

During well development field parameters, including pH, temperature, conductivity, and turbidity will be measured and recorded. Also color changes of water before, during, and after development will be observed. Water removed from wells will be kept in closed containers labeled with well information and date. Characterization and disposal of well water will be completed by Boeing.

3.2 PROBE INSTALLATION

A series of 26 locations will be sampled by direct-push methods. Direct-push sampling points will be located along three transects through the chlorinated VOC plume associated with OA 12 and at locations selected to support fate & transport model conclusions. Direct-push probe locations are shown in Figure 2-1. Groundwater samples will be collected from the A-Level and B-Level depths at probe locations 2-60-DP-01 through 2-60-DP-16, 2-60-DP-25 and 2-60-DP-26 and at the A-level depth only for the remainder of the probe locations (2-60-DP-17 through 2-60-DP-24). Groundwater samples will be collected and analyzed to determine current COC concentrations and to support data analysis of fate and transport modeling conclusions. A summary of locations, sampling intervals, and soil sampling requirements for the probe locations is presented in Table 3-1.

3.3 GROUNDWATER SAMPLING

Three new wells, 26 probe locations, and 26 existing wells will be sampled to provide current COC concentrations in groundwater for the data gap analysis. Groundwater sampling procedures include water level measurements, well purging, collection of field parameter data during purging and sample collection for laboratory analysis.

Sampling procedures that are common for all groundwater sampling events at the site are listed in the Technical Procedure TP-1.2-20 Collection of Groundwater Quality Samples in the Compendium (Golder 2003) and Technical Procedure TP-1.0 provided in Attachment D.

Monitoring wells and probe locations will be purged prior to sampling using low-flow (minimal drawdown) purging procedures. Low-flow purging procedures are used to minimize disturbance associated with turbidity and to provide quicker stabilization time for measured field parameters, including pH, dissolved oxygen (DO), temperature, conductivity and oxidation-reduction potential (ORP). Procedures and guidance for low flow purging and sampling can be found in the document titled Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures (USEPA 1996).

In general, pumping should start at a low flow rate and increase to a rate of approximately 0.5 L/min. The water level in the well will be measured periodically, approximately every 3 to 5 minutes. If drawdown is more than 0.3 foot below the original static water level, the pumping rate will be reduced to stabilize drawdown. Purging will continue until field parameters are stabilized, as discussed in the next section. To the extent possible, wells will not be purged to dryness. However, if a well exhibits very slow water level recovery and is purged to dryness, groundwater samples will be collected upon sufficient recovery. Sufficient recovery is considered as recovery to at least 80 percent of original static water level prior to purging.

Purge water will be temporarily contained in the 5-gallon buckets. After purging, the buckets will be collected for disposition.

Stabilized readings for ORP and DO will be collected at the end of low-flow purging and recorded as part of the redox parameter suite. Meter probes will be housed in a flow-through cell to avoid contamination by atmospheric gases.

Following field parameter stabilization after purging, groundwater samples will be collected following Low-Flow Well Sampling Procedures. For wells that are purged to dryness, sample collection will occur after sufficient recovery to at least 80 percent of the original static water level prior to purging. Procedures for groundwater sampling can be found in the technical document TP-1.2-20 in the Compendium. The appropriate use of field equipment and decontamination protocols will be followed to minimize or eliminate the potential for cross-contamination. Nitrile gloves will be changed, at a minimum, between wells and whenever the potential for cross contamination is suspected.

Groundwater samples from direct-push probes will be field-filtered for metal analyses. In-line 0.45 micron filters will be used to avoid introduction of oxygen into the sample. This will be critical, as ferrous iron is expected to be present in some samples and its precipitation prior to filtering and preservation can result in low bias in metal concentrations due to co-precipitation. Groundwater samples from monitoring wells will use total (unfiltered) samples for metal analyses unless turbidity is present at 5 NTUs or greater. If turbidity above 5 NTUs is present, then both filtered and unfiltered samples will be analyzed. Filtering will be accomplished in the field using the same method as for the direct-push samples.

Groundwater samples will be collected into laboratory-cleaned, pre-labeled sample bottles and preserved as appropriate for the analytical parameters. Table 3-2 lists requirements for sample containers, preservatives, and related handling instructions. Sample bottles should be filled starting with the most sensitive sample aliquot and ending with the least sensitive aliquot. The sample bottles will be filled in the following order:

1. VOCs
2. Inorganic Redox Parameters (sulfide, sulfate, nitrate, nitrite, and ammonia)
3. Ferrous Iron (Field kit)
4. SVOCs
5. PCBs

6. Total Organic Carbon (TOC)
7. Cyanide
8. Total Metals (Antimony, Arsenic, Cadmium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, Vanadium and Zinc)
9. Dissolved Metals (Antimony, Arsenic, Cadmium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, Vanadium and Zinc)

3.3.1 Surveying and Water Level Measurements

After installation, the new groundwater monitoring wells and direct-push probe locations will be surveyed. Monitoring well measuring point elevations will be surveyed in reference to the National Geodetic Datum 1929 (NGVD 1929) or the North American Vertical Datum (NAVD 1988) to an accuracy of within 0.01 foot. Horizontal control accuracy will be within 0.1 foot. Probe sampling locations will only be surveyed for horizontal control.

Groundwater level measurements will be obtained prior to sampling at each well. Technical Procedures for Water Level Measurements are found in TP-1.4-6a in the Compendium and TP-1.4-6b provided in Attachment D.

In general, groundwater levels will be measured to the top of the well casing, a marked measuring point or to the north side of the casing if no measuring point is visible. Water level measurements, with a precision of at least 0.01 foot, will be recorded on EPI's Water Level Measurement Field Record.

3.3.2 Field Parameter Measurements

Temperature, DO, ORP, pH, specific conductance, and the turbidity of the purged water will be measured during purging and recorded in the field notebook every 3 to 5 minutes. In addition, notes will be taken describing the appearance or odor of the water. The purge stabilization criteria are based on three successive readings of the field water quality parameters. The following are the stabilization criteria for low-flow purging:

- pH ± 0.1 pH units
- Specific conductance ± 3 percent
- ORP ± 10 millivolts
- Turbidity ± 10 percent (when turbidity is greater than 10 NTUs)
- Dissolved oxygen ± 0.3 µg/L
- Temperature ± 0.1°C

When the above stabilization criteria have been met, the purge water is stabilized and sample collection can begin. ORP may not always be an appropriate stabilization parameter and its use

as a stabilization parameter will depend on site-specific conditions. The total volume of water purged from each well will be recorded in the field notebook. However, if a well exhibits very slow water level recovery and is purged to dryness, groundwater samples at that well will be collected upon sufficient recovery defined as 80 percent recovery of the pre-purge water column.

Prior to measurements, field instruments will be calibrated according to instructions in the EPI's TP-1.0 Standard Procedures for Field Parameter Measurement found in the Compendium. The probes for DO and redox potential will be housed in a flow-through cell to avoid entrainment of atmospheric gases during measurement.

3.3.3 Groundwater Laboratory Analysis

The proposed constituent groups for chemical laboratory analysis are based primarily on the COCs historically present at the wells and the need to fill data gaps due to the lack of concurrent and recent data. This statement is generally applicable to VOCs and metals. For PCBs, data needs are based on the previously considered likelihood of potential migration pathway to individual well locations.

Table 3-3 provides an overall summary of the groundwater laboratory analyses for this sampling event. In general, VOCs and priority pollutant metals are proposed for all sampled wells and direct push locations. Redox parameters are proposed in approximately one-third of the wells and probes to better define conditions related to the arsenic and manganese plumes and to the degradation of chlorinated VOCs.

SVOCs (including cPAHs and bis(2-ethylhexyl)phthalate), PCBs, and cyanide (see list in Table 3-3) analyses are specified for selected wells to evaluate current conditions and support fate and transport modeling conclusions. Generally, these analyses are limited to areas downgradient of maximum soil concentrations to support fate and transport modeling or, in the case of cPAHs, in areas where previous groundwater reporting limits were inadequate and soil exceedances exist (e.g., AOC 2-62.46 [paint booth sump]).

3.4 SOIL SAMPLING

Soil samples will be collected for laboratory analysis and geologic logging as part of the drilling, well installation, and direct-push sampling task. Soil samples will be obtained using decontaminated split-spoon samplers or equivalent. The sampler will be equipped with new single-use liners unless the samples are intended for geologic logging purposes only. Soil samples intended for geologic logging only can be obtained without the use of liners.

Soil samples obtained for laboratory analysis will be collected from the boreholes for new wells and from direct-push probe locations at three intervals in the vadose zone. Soil sampling intervals will be 0 to 1, 4 to 5 and 9 to 10 feet bgs. The sampler will be decontaminated prior to use and between each sample as discussed in Section 3.8.2. During drilling, the HSA will be advanced to the top of the desired sample interval and the drill rod will be removed. A decontaminated 2.5-inch diameter, 18-inch long steel split-spoon sampler, or equivalent, is then

inserted into the auger. The split-spoon sampler will be driven through the full sample interval using either a down-hole hammer, or a slide hammer attached to drilling rods. Sampling will be continued until the full sample interval is completed or until refusal is encountered (i.e., greater than 50 blows per 6-inch interval). Soil samples collected using the direct-push probe rig will be obtained in a similar manner.

For VOC samples, the bottommost of the intact and relatively undisturbed sample (i.e., generally the bottommost section of liner) will be submitted for laboratory analysis. In those instances when a sand catcher is used in the sampler, the higher of the two liners will be retained for laboratory analysis of VOCs. Samples in liners will be sealed with a sheet of polytetrafluoroethylene (PTFE) and plastic caps secured with electrical tape. Alternatively, samples may be transferred to appropriate sample jars using a decontaminated stainless steel scoop or equivalent. Immediately upon collection, all samples will be labeled and placed in an iced cooler pending submittal to the laboratory, Analytical Resources, Inc., for analysis by USEPA Method 8260B. Sample labeling will follow procedures under the Sample Identification Section of this Work Plan (Section 3.6.1). A portion of the sample, usually the soil retained in the drive shoe of the sampler or the unused portion of the liner will be retained for geologic logging and field screening purposes.

For metals and PCB analysis, soil samples will be collected into 2-oz, 4-oz, and 8-oz wide-mouth borosilicate glass jars. All collected samples will be labeled and stored in a cooler filled with bagged ice until transported to the laboratory. Table 3-2 lists requirements for sample containers, preservatives, and related handling instructions.

3.4.1 Geologic Soil Logging

Soils encountered will be logged in accordance with the Unified Soil Classification System (USCS) visual manual procedures (ASTM 2488D) as documented in Technical Procedure TP1.2-6, in the Compendium. Samples for geologic logging will be taken at 5-foot intervals and/or whenever a change in drilling rate, noise, or drill cuttings signals a possible change in the geology. Samples collected for geologic logging only will be obtained using decontaminated split-spoon samplers without a liner. The HSA bit will be advanced to the top of the desired sample interval and the drill rod will be removed. A decontaminated 2.5-inch diameter, 18-inch long steel split-spoon sampler, or equivalent, is then inserted into the auger stem. The split-spoon sampler will be driven through the entire sampling interval using either a down-hole hammer, or a slide hammer attached to drilling rods. Blow counts will be obtained during soil sampling following ASTM D-1586-99 standards. Observed soil information at each well location will be recorded on a soil log sheet. Soil samples will be collected in a similar manner during probing but without obtaining blow counts as a hammer is not used to advance the sampler during probing.

3.4.2 Field Screening

For all soil samples, the non-slough portion of the soil samples will be field screened to check for indications of the presence of VOCs or separate-phase hydrocarbons. Field personnel will use a photoionization detector (PID) to test for the presence of VOCs. Field personnel will also

use sheen testing to screen for the presence of separate-phase hydrocarbons. The PID will be calibrated with 100 parts per million (ppm) isobutylene calibration gas prior to use each day following the calibration guidelines documented in Quality Procedure QP-11.1, in the Compendium.

For PID screening, a portion of the soil sample will be placed in a sealable plastic bag, disaggregated and allowed to equilibrate for approximately 10 minutes. The PID inlet tube will then be inserted into the bag and the highest observed reading will be recorded.

For sheen testing, a portion of the sample will be placed in a clean PTFE-coated pan, or equivalent, sprayed with a small amount of de-ionized water and a qualitative assessment of any observed sheen or non-aqueous-phase-liquid (NAPL) will be recorded. The results of field screening will be noted in the field logbook and on the boring logs.

3.4.3 Soil Laboratory Analysis

Soil samples will be collected for laboratory analysis at three discrete intervals in the vadose zone at each of the three new A-Level wells and 26 direct-push probes. The three pre-determined soil sampling intervals are 0 to 1, 4 to 5, and 9 to 10 feet bgs. Soil samples will be collected into pre-cleaned laboratory-provided containers. Constituent groups for laboratory analysis of soil samples are VOCs, SVOCs, PCBs, TPH, metals, and cyanide. Refer to Table 3-1 for laboratory methods associated with these constituent groups. Table 3-2 lists the anticipated number of field samples and quality control (QC) samples include equipment blanks, trip blanks, matrix spikes and matrix spike duplicates (MS/MSD).

3.5 QUALITY CONTROL SAMPLES

Quality control (QC) measures will be taken to evaluate laboratory precision, potential matrix interferences, and potential contamination from the ambient air.

Field duplicates, equipment blanks, trip blanks, and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected as part of the field QC program. Each of these sample types is described in the following sections along with their purpose and collection frequency.

3.5.1 Trip Blank Samples

The potential for contamination from the ambient air will be evaluated using trip blank samples. The trip blank will originate at the contract laboratory and be re-labeled upon arrival at the site. Trip blank samples accompany one cooler of samples during sampling and shipping for each day during a sampling event. Trip blank samples will be analyzed for VOCs and GRPH only.

3.5.2 Equipment Blank Samples

The potential for cross contamination from non-dedicated multiple-use sampling devices will be evaluated using equipment blank samples. Some examples of a multiple-use, non-dedicated

sampling devices potentially used for this investigation are the split spoon samplers used to obtain soil samples during drilling or non-dedicated sampling pumps used in monitoring wells. One equipment blank sample will be taken for each type of non-dedicated sampling equipment to evaluate the effectiveness of the decontamination steps. The equipment blank sample will be analyzed for all 2-60s Area groundwater and soil COC constituent groups (VOC, SVOCs, cyanide, total metals, and PCBs).

3.5.3 Duplicate Samples

Laboratory and field sampling precision of the groundwater sampling task will be evaluated by collecting blind field duplicate samples. Field duplicate samples will be collected at a rate of 10 percent or a fraction thereof of the total number of groundwater samples. Field duplicate samples will be collected under conditions as nearly identical as possible to the original sample. Duplicate samples will not be collected for soils because it is not possible to homogenize soil samples sufficiently to produce representative duplicate sample volumes. Duplicate samples will be analyzed for the same constituent groups as the original sample.

3.5.4 Matrix Spike/Matrix Spike Duplicate Samples

Potential interferences from the sample matrix will be evaluated with MS/MSD samples. Triplicate volumes of samples will be collected at locations specified on the sample matrix. One MS/MSD sample will be obtained at a rate of 5 percent, or a fraction thereof, of the total number of samples collected per event. MS/MSD samples will be analyzed for the same constituent groups as the original sample. MS/MSD samples will be collected for both soils and groundwater.

3.6 SAMPLE HANDLING AND SHIPPING

After collection, all samples will be placed in coolers with enough bagged ice to maintain an internal temperature of 4°C for the duration of the sampling and transportation to the laboratory. Samples will be delivered to Analytical Resources, Inc. (ARI) for analysis after each day of sampling following the procedures outlined in TP-1.2-23 of the Compendium. ARI's address is given below.

Analytical Resources, Inc.
4611 South 134th Place
Suite 100
Tukwila, WA 98168
Contact: Ms. Stephanie Lucas, (206) 695-6213

3.6.1 Sample Identification

All groundwater and soil samples collected will be assigned a unique identification code based on a consistent sample designation scheme. A sample tracking record will be kept as each

sample is collected. Monitoring well and Probe groundwater and soil samples will be designated with unique alphanumeric sample identifiers (sample numbers) as follows:

- 2-60-PL2-604A –XX-Z (monitoring well samples)
- 2-60-DP-YY-XX-Z (probe samples)

where:

2-60	2-60s Area (project area)
PL2	Boeing Plant 2 monitoring well
153A	Specific well ID in the project area
XX	Bottom depth of sampler for soil or middle of screened interval for groundwater
DP	Sample collected from a direct-push sampling location
YY	Unique numeric location for a direct-push sampling location
Z	Media code: S for soil, W for water

Sample numbers will be recorded in the field notebook, on sample container labels, and chain-of-custody forms. Other information recorded on the sample container label includes:

- Time and date of sample collection
- Initials of sampler(s)
- Laboratory analyses to be performed
- Preservatives used

More detailed information regarding sample labels, sample handling, chain of custody, custody seals, and sample shipping are documented in Section 7.0 and in Technical Procedure TP1.2-20 in the Compendium.

3.7 LABORATORY ANALYTICAL METHODS

Laboratory analytical methods for soil and groundwater samples collected for the 2-60s Area Data Gap Investigation are listed in Tables 3-1 and 3-3.

In general, laboratory methods are selected based on:

- The media being sampled
- The constituent being analyzed
- The reporting limit necessary for comparison to constituent risk based screening level

Table 3-4 presents a list analytes, which includes all of the COCs that are commonly tested for at Boeing Pant 2 and the associated laboratory reporting limits. The laboratory reporting limits are compared to the lowest risk calculation or applicable background concentration (various metal concentrations in soil) to determine what analysis may be limiting evaluation of the site. Risk calculations were not completed for analytes that were never detected at the site or for

analytes where USEPA or Ecology does not provide toxicological data necessary for the risk calculations (e.g., aluminum and iron).

Based on this analysis, as presented in Table 3-4, the laboratory reporting limit for PCBs (33 µg/kg) was the only set of reporting limits greater than the lowest associated risk based calculation for soil. This reporting limit is the same value as the PQL presented in the Technical Memorandum: *Appropriateness Evaluation Corrective Measure Study*, Boeing Plant 2, completed by Roy F. Weston in March 1999 (Weston, 1999b).

Groundwater reporting limits for arsenic (0.2 µg/L), cyanide (5.0 µg/L), PCBs (0.01 µg/L), various PAHs (0.1 µg/L) and bis(2-ethylhexyl)phthalate (3 µg/L) were greater than the respective lowest risk based calculation. Of these, the arsenic, PCBs, and bis(2-ethylhexyl)phthalate reporting limits are lower than the PQLs presented in the 1999 technical memorandum (Weston 1999b). The arsenic reporting limit is also lower than the expected background concentration for arsenic concentrations in groundwater; therefore, it is not expected to limit the utility of the analyses. The reporting limit used above is the standard reporting limit for PAHs using USEPA Method 8270 as modified for larger sample volumes and lower detection limits.

Table 3-2 lists the estimated number of samples collected for each analytical constituent group and the number of QC samples collected for each constituent group by media (soil or groundwater) along with sample requirements.

3.8 DECONTAMINATION PROCEDURES

Purging and sampling equipment for groundwater that comes into direct contact with sample media, sample containers, or the inside of a monitoring well will ideally be single-use, disposable equipment that is replaced between each sampling event, or will be dedicated equipment, assigned to and used at only one well. If the sampling equipment is not single-use disposable equipment or dedicated equipment, it will be decontaminated between each sampling event using the procedures summarized in Section 3.8.1.

In general, drill augers will be decontaminated between wells by pressure washing. Split spoon samplers and other soil sampling devices will be decontaminated between sampling using the procedures summarized in Section 3.8.2.

3.8.1 Aqueous Sampling Equipment Decontamination

If non-dedicated, multiple-use sampling equipment is used for groundwater sampling it will be decontaminated prior to use and between each sample following the steps noted below. Examples of non-dedicated, multiple-use groundwater sampling equipment include: submersible pumps and bladder pumps.

1. Wash in a solution of Liquinox™ (or equivalent) and potable tap water.
2. Rinse with potable tap water.

3. Rinse with 10 percent nitric acid (trace metal or higher-grade HNO_3).
4. Rinse with distilled water.
5. Rinse with reagent-grade isopropyl alcohol.
6. Rinse with distilled water.

3.8.2 Nonaqueous Sampling Equipment Decontamination

If non-dedicated, multiple-use sampling equipment is used for soil sampling it will be decontaminated prior to use and between each sample according to the steps noted below. Examples of non-dedicated, multiple-use soil sampling equipment include; split-spoon samplers, sample catchers, scoops, spoons, and stainless steel bowls.

1. Wash in solution of Liquinox™ (or equivalent) and potable tap water.
2. Rinse with potable tap water.
3. Rinse with 10 percent nitric acid (trace metal or higher grade HNO_3
4. Rinse with distilled water.

Note: If visual contamination persists, or gross contamination is suspected, the decontamination steps used for aqueous sampling equipment will be used.

Decontamination fluids generated on-site will be retained in DOT-approved steel drums or equivalent, properly labeled and stored on-site pending characterization and disposal.

3.8.3 Decontamination of Workers and Personal Protective Equipment

It is anticipated that all work associated with monitoring well installation and groundwater sampling at the 2-60s Area at Boeing Plant 2 will be conducted in modified Level D protection. Requirements for upgrading to Level C protection are outlined in the Health and Safety Plan, which is provided in Attachment C.

Modified Level D protection includes the following components:

- Cotton or Tyvek™ coveralls
- Steel-toed, steel-shank rubber boots
- Safety glasses or equivalent
- Nitrile inner and outer gloves
- Hearing protection when appropriate (i.e., while drilling, probing, or working around blowers)
- Hard hat (when working around drilling or probe rigs)

Upon completion of each day's activities, personnel will wash and rinse their boots in a solution of Liquinox™ (or equivalent) and potable tap water followed by a tap water rinse. Boot wash containers will contain brushes to facilitate removal of soil and other contaminants. Following the boot wash station sampling personnel will remove their outer gloves, remove their boots, remove their coveralls, and then remove their inner gloves. Personnel will then wash their hands and faces with soap and water prior to eating or leaving the site.

Inner and outer gloves will be discarded as solid waste. Cotton coveralls will be laundered as needed or replaced if excessive contamination is suspected. Hard hats will be washed when visibly dirty or as necessary.

3.8.4 Decontamination of Sample Containers

All sample containers will be laboratory-prepared and pre-cleaned to standards as required under USEPA SW846 protocols found in Section 4 of SW846.

3.9 DISPOSAL OF INVESTIGATION DERIVED WASTE

Drill cuttings and sample spoils will be retained on-site in properly labeled DOT-approved steel drums pending characterization for disposal. Boeing will coordinate characterization of drum contents and disposal according to established procedures. Purge water will be temporarily retained in 5-gallon buckets or equivalent. Boeing will coordinate disposal according to established procedures.

3.10 QUALITY ASSURANCE PROJECT PLAN

Quality assurance procedures and requirements documented in the Approved Laboratory Quality Assurance Plan and Standard Operating Procedures – RFI Work Plan – February 2001 (Weston 2001c) and October 2003 *Quality Assurance Project Plan – Interim Measures for Sheetpile Structures* (EPI 2003) will be followed for the scopes of work related to well installation, and groundwater and soil sampling and analysis at the 2-60s Area. Copies of the QAPP documents can be found in the Compendium.

3.11 DATA VALIDATION AND USABILITY

The data validation review of analytical data packages will be consist of a Level I QC Review. If problems with the data are identified during the Level I review, a more thorough Level II QC Review will be conducted. Level I and Level II QC review requirements are outlined in October 2003 *Quality Assurance Project Plan – Interim Measures for Sheetpile Structures* (EPI, 2003), which can be found in the Compendium.

3.12 HEALTH AND SAFETY PLAN

A copy of the Health and Safety Plan is included in Attachment C.

3.13 SCHEDULE AND DELIVERABLES

USEPA is reviewing this Work Plan in an expedited manner to facilitate an aggressive field schedule designed to collect data necessary for the CMS as quickly as possible. The following schedule and process is intended to support this aggressive schedule:

Task	Due Date
1. 2-60s Area Work Plan Attachments A and B were submitted to USEPA	July 1, 2004 (actual)
2. Draft 2-60s Area Work Plan submitted to USEPA (see notes below)	September 15, 2004 (actual)
3. Meeting to discuss EPA comments on the 2-60s Area Work Plan	October 7, 2004 (actual)
4. Submit revised (Redline Version) Draft 2-60s Area Work Plan to USEPA	March 17, 2005 (anticipated)
5. Receive EPA Conditional Approval	April 15, 2005 (anticipated)
6. Field Mobilization	To begin within 15 work days (3 weeks) after USEPA Approval of Work Plan
7. Completion of Sample Collection	20 work days (4 weeks) after field mobilization is completed
8. Completion of sample analysis, data validation, and database entry	70 work days (14 weeks) after completion of sampling
9. Draft Data Gaps Report and Final 2-60s Area Work Plan (see below for content)	30 work days (6 weeks) after completion of Task 8

Notes:

Task 2: The existing Work Plan for the 2-60s Area comprises Sections 1 through 3 of Volume IV of the Uplands CMS.

Task 10: The Draft Data Gaps Report comprises Sections 1 through 5 of Volume IV, The 2-60s Area, Uplands CMS, as follows:

- A revised draft of Sections 1 through 3 that reflects incorporation of the EPA comments on the Work Plan, as appropriate.

- Draft Section 4 of the CMS Volume IV, which presents the results and findings of the Data Gap Investigation for the area.

- Draft Section 5 of the CMS Volume IV, which presents the revised list of COCs, units, and groundwater plumes for the 2-60s Area that will be carried into the CMS for remedy selection.

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Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Tables

Table 1-1 Previous Investigations
2-60s Area
Boeing Plant 2

Document Title	Date	Consultant
Boeing Plant 2 Building 2-62 Demolition, Exposed Soil and Excavated Sump Investigation Report, Boeing Plant 2, Seattle/Tukwila, Washington	February 2004	Golder Associates Inc.
Compendium of Sampling and Analysis Plans and Quality Assurance Plans for Boeing Plant 2, Seattle / Tukwila, Washington	July 2003	Golder Associates Inc.
Treatment, Storage, and Disposal Facility Closure Certification	January 2003	Roy F. Weston, Inc.
Technical Memorandum Justification for No Further Action # 2SWMUs/AOCs/OAs RCRA Corrective Measures Study	October 2001	Roy F. Weston, Inc.
SWMU 2-87.65 Machine Pit, SWMU 77 PCB Retention Tank, SWMU 78.B Oil/water Separator, and OA 16 Former Hazardous Waste Storage Facility Interim Measures Completion Report	May 2000	Roy F. Weston, Inc.
Technical Memorandum SWMU/AOC/OA, Specific Data Presentation, RCRA Corrective Measures Study Volumes I, II, III	April 2000	Roy F. Weston, Inc.
Technical Memorandum Justification for No Further Action RCRA Corrective Measures Study	April 2000	Roy F. Weston, Inc.
Technical Memorandum Justification for No Further Action SWMUs/AOCs/OAs RCRA Corrective Measures Study	March 1999	Roy F. Weston, Inc.
SWMU 2-70.55 East Steam Clean and Underground Bulk Storage Tank Remedial Action Completion Report	May 1998	Roy F. Weston, Inc.
Pre-construction Environmental Assessment, Zone-1, Boeing Plant2	1994	Roy F. Weston, Inc
Site-wide Studies that Include the 2-60s Area		
Report of Boeing Plant 2 – Parcel Disposition Phase II Environmental Investigation for Boeing Plant 2, Seattle / Tukwila, Washington	July 2003	Golder Associates Inc./Environmental Partners, Inc.
Draft Phase I Environmental Site Assessment Boeing Plant 2, 7755 East Marginal Way, Seattle, Washington	May 2002	Environmental Partners, Inc.
Comprehensive RCRA Facility Investigation Report	August 1998	Roy F. Weston, Inc.
RCRA Facility Investigation – Groundwater Human Health and Environmental Evaluation	August 1998	Roy F. Weston, Inc.

Table 1-1 Previous Investigations
2-60s Area
Boeing Plant 2

Document Title	Date	Consultant
RFI Health Evaluation for Upland Soil	December 1998	Roy F. Weston, Inc.
RCRA Facility Investigation – Groundwater Investigation Interim Report Volumes I to IV	January 1996	Roy F. Weston, Inc.
RCRA Facility Investigation – Soil Investigation Interim Report Volumes I to V	January 1996	Roy F. Weston, Inc.
RCRA Facility Investigation – Phase 1A Completion Report Volumes I to II Soil and Groundwater Presentation	December 1994	Roy F. Weston, Inc.
RCRA Facility Investigation Work Plan	November 1994	Roy F. Weston, Inc.

Table 1-2 Summary of Available Unit Information
2-60s Area
Boeing Plant 2

RCRA Unit	Unit Description	Years of Use	Function	Soil Samples	Groundwater Samples	Analyte Groups
SWMU 77.B	PCB Retention Tank (UST)	1980 - 1986	Secondary containmnet for leaks and storm water runoff	1994: 3 samples from one boring, from 1.5 to 11 feet bgs	None	PCBs, TPH
AOC 2-62.46	Sump on south side of 2-62	Unknown	Unknown	Composite samples from three test trenches, and a grab and composite sample from area surrounding old pipe	None	VOCs, SVOCs, PCBs, PAHs, metals, & TPH
SWMU 78.C	Oil/Water Separator	1940s - 2002	Collect stormwater runoff and remove any mixed residual oils and other petroleum hydrocarbons	Samples from one boring from 5 to 12 feet bgs	None	VOCs, SVOCs, PCBs, metals, & TPH
OA 9 (SWMU 2-78.6)	Former USTs PL-16,-17, and -18	1950 - 1986	Gasoline USTs	1993-1995: samples from ten borings from 1.5 to 16.5 feet bgs	1993-1996: samples from four wells & three Geoprobes	VOCs, SVOCs, PCBs, TPH, and metals.
OA 12	Southern portion of Bld 2-63 and area between buildings 2-63 and 2-65	N/A	Unknown	1993 & 1994: samples from seven borings	1993-1995: samples from two wells 1994: sample from three Geoprobes	VOCs, TPH, As, cyanide and Cu
AOC 2-62.45	Paint Booth and sump	1945 - current	Used to paint a variety of airplane parts.	1993 & 1995: samples from five borings from 1 to 15 feet bgs	1993-1995: samples from ten monitoring points	VOCs, SVOCs, PCBs, TPH, and metals
SWMU 2-63.47	Dilute chrome tank	Unknown-1990s	Hold wastewater produced in model-making processes	Samples from one boring at 2, 8 and 11 feet bgs	None	Metals
SWMU 2-64.48	Underground Waste Tank	1970 - tank removal date unknown	Initially an oil/water separator, then held oily condensate water	1993 &1994: samples from three borings from 1.5 to 12.5 feet bgs	None	VOCs, SVOCs, PCBs, TPH, and metals
SWMU 2-64.49	Air compressor, sump and accumulation area	1954 - system partially inactive at present	Trenches and sump collect air compressor condensate	1993 &1994:twelve samples from four borings from 1.5 to 12.5 feet bgs	1994: samples from three Geoprobe locations from 12 to 13 feet bgs	VOCs, SVOCs, PCBs, TPH, and metals
SWMU 2-65.50	Machine Pit	Prior to 1993 - 2002	Hold coolants, lubricating oils, and hydraulic oils that drip from an adjacent parts grinding machine.	1993: samples from two borings from 1.5 to 12.5 feet bgs	None	PCBs, TPH & metals
SWMU 2-62.43	Tank Line	1980s-decommission date unknown	Pre-treating metal parts prior to painting	Three samples from one boring from 1.5 to 10 feet bgs	None	Metals, including hexavalent chromium and cyanide
SWMU 2-70.55	Steam clean area and steel tank	1981(?) - 1998	Collect steam cleaning wastewater	1993 and 1994: two samples in vicinity 1998: four locations within excavation site	Groundwater analyzed as part of site-wide RFI Work Plan	VOCs, BNAs, PCBs, TPH and metals
SWMU 77.A	PCB Retention Tank (UST)	1980 - 1986	Secondary containment for transformers and stormwater runoff	1999-samples from one boring	None	VOCs, PCBs, and TPH

Notes:

ft bgs	feet below ground surface
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TPHs	Total petroleum hydrocarbons
UST	Underground storage tank
VOCs	Volatile organic comounds

Table 2-1 Screening Levels for Consituents of Concern
2-60s Area
Boeing Plant 2

CAS Number	Sitewide Constituent of Concern	Sitewide Soil COC?	Area Soil COC?	Soil (refer to maximum detect units)						Sitewide GW COC?	Area GW COC?	Groundwater (µg/l)			
				Maximum Detect[1] in 2-60s Area		Minimum Screening Level	Direct Contact Screening Level	Air Screening Level	Surface Water Screening Level			Maximum Detect in 2-60s Area	Minimum Screening Level	Air Screening Level	Surface Water Screening Level
Metals and Cyanide															
7440-36-0	Antimony	X		9.00E+00	mg/kg	3.40E+02	5.33E+02	- -	3.40E+02		Not a Site-Wide COC in Groundwater				
7440-38-2	Arsenic	X	X	**7.60E+01**	mg/kg	5.00E+00 [3]	3.33E+01	3.22E+04	5.00E+00 [3]	X	X	**4.40E+01**	2.00E-01 [3]	- -	2.00E-01 [3]
7440-43-9	Cadmium	X	X	**3.40E+00**	mg/kg	1.01E+00	6.67E+02	7.70E+04	1.01E+00	X		4 U	7.35E+00	- -	7.35E+00
18540-29-9	Chromium (VI)	X		0.28 UJH	mg/kg	1.92E+01	4.00E+03	1.06E+04	1.92E+01		Not a Site-Wide COC in Groundwater				
7440-50-8	Copper	X	X	**5.53E+01**	mg/kg	1.38E+00	4.93E+04	- -	1.38E+00	X	X	**4.20E+01**	3.10E+00	- -	3.10E+00
7439-92-1	Lead	X		9.80E+01	mg/kg	2.50E+02 [4]	2.50E+02 [4]	- -	1.62E+03	X		4.00E+00	8.10E+00	- -	8.10E+00
7439-96-5	Manganese	X	X	**3.46E+02**	mg/kg	1.30E+02	1.87E+05	- -	1.30E+02	X	X	**4.64E+03**	1.00E+02	- -	1.00E+02
7439-97-6	Mercury	X	X	**2.80E-01**	mg/kg	5.00E-02 [3]	4.19E+01	5.00E-02 [3]	5.00E-02 [3]	X		0.1 U	2.50E-02	1.84E+02	2.50E-02
7440-02-0	Nickel (soluble salts)	X	X	**4.27E+01**	mg/kg	1.07E+01	2.67E+04	- -	1.07E+01	X	X	**3.57E+01**	8.20E+00	- -	8.20E+00
7782-49-2	Selenium	X		7.00E+00	mg/kg	7.38E+00	6.67E+03	- -	7.38E+00	X		1.30E+01	7.10E+01	- -	7.10E+01
7440-22-4	Silver	X	X	**5.00E-01**	mg/kg	3.23E-01	6.67E+03	- -	3.23E-01	X		3 UJ	1.90E+00	- -	1.90E+00
7440-28-0	Thallium (soluble salts)	X	X	**7.00E-01**	mg/kg	6.69E-01	8.64E+01	- -	6.69E-01	X		50 U	4.70E-01	- -	4.70E-01
7440-66-6	Zinc	X	X	**7.57E+02**	mg/kg	1.01E+02	4.00E+05	- -	1.01E+02	X		5.50E+01	8.10E+01	- -	8.10E+01
57-12-5	Cyanide	X	X	**1.20E+00**	mg/kg	2.02E-01	2.67E+04	- -	2.02E-01	X	X	**1.80E+01**	5.00E+00 [3]	- -	5.00E+00 [3]
Semivolatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs)															
56-55-3	Benzo(a)anthracene	X	X	**1.30E+02**	µg/kg	4.19E+01	3.42E+03	- -	4.19E+01	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
50-32-8	Benzo(a)pyrene	X	X	**2.00E+02**	µg/kg	1.13E+02	3.42E+03	7.95E+07	1.13E+02	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
205-99-2	Benzo(b)fluoranthene [2]	X	X	**1.60E+02**	µg/kg	1.44E+02	3.42E+03	- -	1.44E+02	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
207-08-9	Benzo(k)fluoranthene	X		1.30E+02	µg/kg	1.44E+02	3.42E+03	- -	1.44E+02	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
117-81-7	bis(2-Ethylhexyl)phthalate [2]	X	X	**1.60E+03**	µg/kg	1.57E+03	1.79E+06	- -	1.57E+03	X		4.1 UJ	3.00E+00 [3]	- -	3.00E+00 [3]
218-01-9	Chrysene	X	X	**1.60E+02**	µg/kg	4.66E+01	3.42E+03	- -	4.66E+01	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
53-70-3	Dibenz(a,h)anthracene	X		4.20E+01	µg/kg	2.10E+02	3.42E+03	- -	2.10E+02	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
105-67-9	2,4-Dimethylphenol	X		2500 U	µg/kg	1.64E+03	1.33E+07	- -	1.64E+03	X		1.60E+01	2.01E+02	- -	2.01E+02
131-11-3	Dimethylphthalate	X		1300 U	µg/kg	1.24E+05	6.67E+08	- -	1.24E+05		Not a Site-Wide COC in Groundwater				
206-44-0	Fluoranthene	X		3.10E+02	µg/kg	3.23E+04	2.67E+07	- -	3.23E+04		Not a Site-Wide COC in Groundwater				
193-39-5	Indeno(1,2,3-cd)pyrene	X		2.10E+02	µg/kg	4.06E+02	3.42E+03	- -	4.06E+02	X		1 U	1.00E-01 [3]	- -	1.00E-01 [3]
-	Aroclor 1016/1242	X		300 U	µg/kg	3.30E+01	4.67E+04	- -	3.30E+01	X		1 U	1.00E-02 [3]	- -	1.00E-02 [3]
11097-69-1	Aroclor 1254	X	X	**5.10E+02**	µg/kg	3.30E+01 [3]	1.33E+04	- -	3.30E+01 [3]	X		1.1 U	1.00E-02 [3]	- -	1.00E-02 [3]
11097-69-1	Aroclor 1260	X	X	**9.40E+01**	µg/kg	3.30E+01 [3]	- -	- -	3.30E+01 [3]	X		1.1 U	1.00E-02 [3]	- -	1.00E-02 [3]
-	Total PCBs	X	X	**5.10E+02**	µg/kg	3.30E+01 [3]	- -	- -	3.30E+01 [3]	X		2.1 UJ	1.00E-02 [3]	- -	1.00E-02 [3]
Volatile Organic Compounds (VOCs)															
71-43-2	Benzene	X	X	**2.00E+03**	µg/kg	2.53E+01	1.36E+06	1.04E+02	2.53E+01	X	X	**6.20E+03**	4.48E+00	1.40E+03	4.48E+00
56-23-5	Carbon Tetrachloride		Not a Site-Wide COC in Soil							X		50 U	5.26E-01	1.52E+02	5.26E-01
74-87-3	Chloromethane		Not a Site-Wide COC in Soil							X		100 U	2.63E+01	2.44E+03	2.63E+01
104-51-8	n-Butylbenzene	X	X	**3.70E+04**	µg/kg	4.64E+03	- -	4.64E+03	- -		Not a Site-Wide COC in Groundwater				
135-98-8	sec-Butylbenzene	X	X	**1.00E+04**	µg/kg	7.86E+03	- -	7.86E+03	- -		Not a Site-Wide COC in Groundwater				
67-66-3	Chloroform	X		6.50E+00	µg/kg	3.96E+01	7.03E+06	3.96E+01	2.98E+02		Not a Site-Wide COC in Groundwater				
75-35-4	1,1-Dichloroethene	X		16000 U	µg/kg	2.73E+00	1.24E+05	1.23E+03	2.73E+00	X	X	**1.40E+00**	3.82E-01	4.23E+01	3.82E-01
107-06-2	1,2-Dichloroethane		Not a Site-Wide COC in Soil							X		50 U	1.17E+01	1.78E+03	1.17E+01
156-59-2	cis-1,2-Dichloroethene	X		1.20E+01	µg/kg	7.94E+02	7.99E+06	7.94E+02	5.66E+03	X		1.20E+02	1.13E+03	1.51E+04	1.13E+03
156-60-5	trans-1,2-Dichloroethene	X		16000 U	µg/kg	8.99E+02	1.31E+07	8.99E+02	5.43E+04		Not a Site-Wide COC in Groundwater				
100-41-4	Ethylbenzene	X	X	**1.00E+05**	µg/kg	2.52E+03	1.45E+08	2.52E+03	1.81E+04	X	X	**2.30E+03**	2.10E+03	9.50E+03	2.10E+03
98-82-8	Isopropylbenzene	X	X	**1.80E+04**	µg/kg	1.27E+03	1.45E+08	1.27E+03	- -		Not a Site-Wide COC in Groundwater				

Table 2-1 Screening Levels for Consituents of Concern
2-60s Area
Boeing Plant 2

CAS Number	Sitewide Constituent of Concern	Sitewide Soil COC?	Area Soil COC?	Soil (refer to maximum detect units)						Sitewide GW COC?	Area GW COC?	Groundwater (µg/l)			
				Maximum Detect[1] in 2-60s Area		Minimum Screening Level	Direct Contact Screening Level	Air Screening Level	Surface Water Screening Level			Maximum Detect in 2-60s Area	Minimum Screening Level	Air Screening Level	Surface Water Screening Level
VOCs (cont'd)															
75-09-2	Methylene Chloride	X		4.70E+02	µg/kg	8.28E+02	9.94E+06	1.89E+03	8.28E+02	X	X	**3.10E+02**	1.90E+02	4.46E+04	1.90E+02
91-20-3	Naphthalene	X	X	**1.20E+05**	µg/kg	4.99E+04	1.44E+07	2.48E+04	4.99E+04			Not a Site-Wide COC in Groundwater			
103-65-1	n-Propylbenzene	X	X	**4.20E+04**	µg/kg	1.36E+04	- -	1.36E+04	- -			Not a Site-Wide COC in Groundwater			
79-34-5	1,1,2,2-Tetrachloroethane	X		16000 U	µg/kg	7.19E+00	2.73E+05	3.48E+02	7.19E+00			Not a Site-Wide COC in Groundwater			
127-18-4	Tetrachloroethene	X	X	**8.80E+00**	µg/kg	8.72E+00	1.07E+06	1.99E+02	8.72E+00	X	X	**2.80E+01**	8.22E-01	1.52E+03	8.22E-01
108-88-3	Toluene	X		7.40E+02	µg/kg	1.90E+04	1.34E+08	1.90E+04	1.09E+05			Not a Site-Wide COC in Groundwater			
71-55-6	1,1,1-Trichloroethane	X		4.80E+00	µg/kg	2.78E+04	4.12E+08	2.78E+04	1.20E+06			Not a Site-Wide COC in Groundwater			
79-00-5	1,1,2-Trichloroethane	X		16000 U	µg/kg	2.78E+01	9.57E+05	2.90E+02	2.78E+01	X		50 U	5.00E+00	3.67E+03	5.00E+00
79-01-6	Trichloroethene	X	X	**3.00E+02**	µg/kg	2.00E+00	1.36E+05	8.86E+00	2.00E+00	X	X	**1.50E+02**	3.02E-01	6.20E+01	3.02E-01
95-63-6	1,2,4,-Trimethylbenzene	X	X	**3.20E+05**	µg/kg	2.36E+03	7.27E+07	2.36E+03	- -			Not a Site-Wide COC in Groundwater			
108-67-8	1,3,5-Trimethylbenzene	X	X	**1.20E+05**	µg/kg	2.47E+03	7.27E+07	2.47E+03	- -			Not a Site-Wide COC in Groundwater			
75-01-4	Vinyl Chloride	X		31000 U	µg/kg	4.59E+00	4.97E+04	1.64E+01	4.59E+00	X	X	**1.40E+02**	7.31E-01	3.71E+02	7.31E-01
Petroleum Hydrocarbons															
-	TPH - Gasoline Range	X	X	**1.50E+04**	mg/kg		3.00E+01			X	X	**6.50E+04**	8.00E+02	8.00E+02	
-	TPH - Diesel Range	X		1.00E+03	mg/kg	2.00E+03	2.00E+03			X	X	**4.80E+03**	5.00E+02	5.00E+02	
-	TPH - Oil Range	X		2.80E+02	mg/kg	2.00E+03	2.00E+03			X		25 U	5.00E+02	5.00E+02	

NOTES:

	All maximum detections for metals in groundwater represent dissolved metals.
-	No CAS Number available
- -	Not calculated (generally, the exposure pathway is incomplete; see CMS Vol II for details)
COC	Consituent of concern for 2-60s area
N/A	Not available or not analyzed
1	In some cases, no detections were reported, therefore the maximum non-detect value is reported with a "U" qualifier (example: 1,1,2,2-Tetrachloroethane at 16000 U µg/kg)
2	Benzo(b)fluoranthene and bis(2-Ethylhexyl)phthalte were identified as COCs for the 2-60s Area based on data collected in association with demolition activites conducted at Building 2-62.
3	Screening level was adjusted to the reporting limit as referenced in Table 3-4.
4	Background was used since no Direct Contact Screening Level for Lead was calculated.

Bold indicates maximum detect exceeds minimum screening level.

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
GROUNDWATER SAMPLING SUMMARY										
Existing Wells										
PL2-310A	9 - 19	8/2/2002	X			Δ		X		SVOCs and PCBs are not COCs for 2-60s Area. Cyanide not detected in vicinity of well.
PL2-311A	8 - 18	8/2/2002	X			Δ		X	X	SVOCs and PCBs are not COCs for 2-60s Area. Cyanide not detected in vicinity of well.
PL2-312A	8 - 18	8/22/2002	X			X				SVOCs and PCBs are not COCs for 2-60s Area. Cyanide not detected in vicinity of well. TPH not detected in well.
PL2-314A	8.5 - 18.5	8/12/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-315A	8.5 - 18.5	8/14/2002	X		O	X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-315B	40 - 50	8/14/2002	X			X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-316A	8 - 18	8/12/2002	X			X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-316B	40 - 50	8/15/2002	X			X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-316C	75 - 85	8/12/2002	X			X				SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well. Cyanide below screening level in B-level paired well.
PL2-317AR	8 - 18	8/27/2002	X			Δ			X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well. Cyanide not detected in vicinity of well.
PL2-319A	8 - 18	3/27/1995	X			X				SVOCs and PCBs are not COCs for 2-60s Area. Cyanide and TPH not detected in vicinity of well.
PL2-325A	8 - 18	8/5/2002	X			X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-325B	40 - 50	8/5/2002	X			X			X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well. Cyanide not expected in B level at this location based on existing data.
PL2-326A	8 - 18	9/6/2002	X			X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-326B	40 - 50	9/6/2002	X			X	X		X	SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-327A	8 - 18	9/3/2002	Δ			Δ	Δ			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-327B	40 - 50	9/3/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-328A	8 - 18	9/5/2002	Δ			Δ	Δ			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-328B	40 - 50	9/5/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-329A	8 - 18	9/4/2002	X		O	X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-329B	40 - 50	9/4/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-330A	8 - 18	9/5/2002	X		O	X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
GROUNDWATER SAMPLING SUMMARY										
PL2-330B	40 - 50	9/5/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-331A	8 - 18	9/3/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in well.
PL2-331B	40 - 50	9/4/2002	X			X	X			SVOCs and PCBs are not COCs for 2-60s Area. TPH not detected in A level paired well.
PL2-332A	8 - 18	8/28/2002	X			X		X		SVOCs and PCBs are not COCs for 2-60s Area. Cyanide not detected in vicinity of well.
New Wells										
PL2-604A	6 - 21	n/a	X			Δ		X	X	Down-gradient (west) of PL2-310A to determine contaminant concentrations and provide a down-gradient monitoring point for remedial actions at OA 9.
PL2-605A	6 - 21	n/a	X			X		X		Monitoring well for extent of TPH/BTEX contamination data gap investigation at OA 9.
PL2-606A	6 - 21	n/a	X			X		X		Monitoring well for extent of TPH/BTEX contamination data gap investigation at OA 9.
Direct Push Locations										
2-60-DP-1	10 - 14 40 - 44	n/a	X			X				Up-gradient (east) of PL2-326A/B to determine contaminant concentrations. Probe data indicate VOC detections in 1995 in this area. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-2	10 - 14 40 - 44	n/a	X			X				Up-gradient (east) of PL2-326A/B to determine contaminant concentrations. Probe data indicate VOC detections in 1995 in this area. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-3	10 - 14 40 - 44	n/a	X			X				Up-gradient (east) of PL2-326A/B to determine contaminant concentrations. Probe data indicate VOC detections in 1995 in this area. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-4	10 - 14 40 - 44	n/a	Δ	O		Δ	Δ		X	Down-gradient (west) of PL2-327A/B and PL2-328A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-5	10 - 14 40 - 44	n/a	Δ	O		Δ	Δ			Down-gradient (west) of PL2-327A/B and PL2-328A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-6	10 - 14 40 - 44	n/a	Δ	O		Δ	Δ		X	Down-gradient (west) of PL2-327A/B and PL2-328A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
GROUNDWATER SAMPLING SUMMARY										
2-60-DP-7	10 - 14 40 - 44	n/a	Δ	O		Δ	Δ			Down-gradient (west) of PL2-327A/B and PL2-328A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-8	10 - 14 40 - 44	n/a	Δ	O		Δ	Δ			Down-gradient (west) of PL2-327A/B and PL2-328A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-9	10 - 14 40 - 44	n/a	Δ	O		Δ	O		X	Down-gradient (west) of PL2-327A/B and PL2-328A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-10	10 - 14 40 - 44	n/a	X			Δ	X			Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-11	10 - 14 40 - 44	n/a	X			X	X		X	Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-12	10 - 14 40 - 44	n/a	X			X	X			Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-13	10 - 14 40 - 44	n/a	X			X	X		X	Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-14	10 - 14 40 - 44	n/a	X			X	X			Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-15	10 - 14 40 - 44	n/a	X	O	O	X	O		X	Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-16	10 - 14 40 - 44	n/a	X	O	O	X	O			Down-gradient (west) of PL2-330A/B to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-17	10 - 14	n/a	O		O	O				Down-gradient (west) of UST PL-37 to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 feet bgs.
2-60-DP-18	10 - 14	n/a	O	O	O	O	O			Determine contaminant concentrations and extent at AOC 2-62.46 (Paint Booth Sump). Groundwater samples will be collected at 14 feet bgs.
2-60-DP-19	10 - 14	n/a	O	O	O	O	O			Determine contaminant concentrations and extent at AOC 2-62.46 (Paint Booth Sump). Groundwater samples will be collected at 14 feet bgs.

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
GROUNDWATER SAMPLING SUMMARY										
2-60-DP-20	10 - 14	n/a	O	O	O	O	O			Determine contaminant concentrations and extent at AOC 2-62.46 (Paint Booth Sump). Investigate extent of cyanide in southeast corner of Building 2-62 slab. Groundwater samples will be collected at 14 feet bgs.
2-60-DP-21	10 - 14	n/a	O			O				Determine contaminant concentrations and extent east of Building 2-48. Groundwater samples will be collected at 14 feet bgs.
2-60-DP-22	10 - 14	n/a	O			O	O			Determine contaminant concentrations and extent down-gradient of SWMU 2-63.47 (Dilute Chrome Tank). Groundwater samples will be collected at 14 feet bgs.
2-60-DP-23	10 - 14	n/a	O		O	O	O			Determine contaminant concentrations and extent at between south end of Building 2-63 and Building 2-65 slabs. Groundwater samples will be collected at 14 feet bgs.
2-60-DP-24	10 - 14	n/a	O	O	O	O	O			Determine contaminant concentrations and extent at southeast corner of Building 2-65 slab. Groundwater samples will be collected at 14 feet bgs.
2-60-DP-25	10 - 14 40 - 44	n/a	O			X				Down-gradient (west) of AST PL-12 to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
2-60-DP-26	10 - 14 40 - 44	n/a	O			X				Down-gradient (west) of Sump SPL 049-006 to determine contaminant concentrations and extent. Groundwater samples will be collected at 14 and 44 feet bgs.
SOIL SAMPLING SUMMARY										
New Wells										
PL2-604A	0 - 1 4 - 5 9 - 10	n/a	#			#		#		Soil sample analyses to match groundwater analyses at this location
PL2-605A	0 - 1 4 - 5 9 - 10	n/a	#			#		#		Soil sample analyses to match groundwater analyses at this location
PL2-606A	0 - 1 4 - 5 9 - 10	n/a	#			#		#		Soil sample analyses to match groundwater analyses at this location

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
SOIL SAMPLING SUMMARY										
Direct Push Locations										
2-60-DP-1	0 - 1 4 - 5 9 - 10	n/a	#			#				Soil sample analyses to match groundwater analyses at this location
2-60-DP-2	0 - 1 4 - 5 9 - 10	n/a	#			#				Soil sample analyses to match groundwater analyses at this location
2-60-DP-3	0 - 1 4 - 5 9 - 10	n/a	#			#				Soil sample analyses to match groundwater analyses at this location
2-60-DP-4	0 - 1 4 - 5 9 - 10	n/a	#	#		#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-5	0 - 1 4 - 5 9 - 10	n/a	#	#		#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-6	0 - 1 4 - 5 9 - 10	n/a	#	#		#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-7	0 - 1 4 - 5 9 - 10	n/a	#	#		#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-8	0 - 1 4 - 5 9 - 10	n/a	#	#		#	#			Soil sample analyses to match groundwater analyses at this location, and determine mercury concentrations and extent
2-60-DP-9	0 - 1 4 - 5 9 - 10	n/a	#	#		#	#			Soil sample analyses to match groundwater analyses at this location

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
SOIL SAMPLING SUMMARY										
2-60-DP-10	0 - 1 4 - 5 9 - 10	n/a	#			#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-11	0 - 1 4 - 5 9 - 10	n/a	#			#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-12	0 - 1 4 - 5 9 - 10	n/a	#			#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-13	0 - 1 4 - 5 9 - 10	n/a	#			#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-14	0 - 1 4 - 5 9 - 10	n/a	#			#	#			Soil sample analyses to match groundwater analyses at this location
2-60-DP-15	0 - 1 4 - 5 9 - 10	n/a	#	#	#	#	#			Soil sample analyses to match groundwater analyses at this location, and determine cyanide concentrations and extent, and respond to historical PCB RLs issues
2-60-DP-16	0 - 1 4 - 5 9 - 10	n/a	#	#	#	#	#			Soil sample analyses to match groundwater analyses at this location, and determine cyanide concentrations and extent, and respond to historical PCB RLs issues
2-60-DP-17	0 - 1 4 - 5 9 - 10	n/a	#		#	#				Down-gradient (west) of UST PL-37 to determine contaminant concentrations and extent. Groundwater samples will be collected at 15 feet bgs.
2-60-DP-18	0 - 1 4 - 5 9 - 10	n/a	#	#	#	#	#			Determine contaminant concentrations and extent at AOC 2-62.46 (Paint Booth Sump). Groundwater samples will be collected at 15 feet bgs.
2-60-DP-19	0 - 1 4 - 5 9 - 10	n/a	#	#	#	#	#			Determine contaminant concentrations and extent at AOC 2-62.46 (Paint Booth Sump). Groundwater samples will be collected at 15 feet bgs.

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		
SOIL SAMPLING SUMMARY										
2-60-DP-20	0 - 1 4 - 5 9 - 10	n/a	#	#	#	#	#			Determine contaminant concentrations and extent at AOC 2-62.46 (Paint Booth Sump). Investigate extent of cyanide in southeast corner of Building 2-62 slab. Groundwater samples will be collected at 15 feet bgs.
2-60-DP-21	0 - 1 4 - 5 9 - 10	n/a	#			#				Determine contaminant concentrations and extent east of Building 2-48. Groundwater samples will be collected at 15 feet bgs.
2-60-DP-22	0 - 1 4 - 5 9 - 10	n/a	#			#	#			Determine contaminant concentrations and extent down-gradient of SWMU 2-63.47 (Dilute Chrome Tank). Groundwater samples will be collected at 15 feet bgs.
2-60-DP-23	0 - 1 4 - 5 9 - 10	n/a	#		#	#	#			Determine contaminant concentrations and extent at between south end of Building 2-63 and Building 2-65 slabs. Groundwater samples will be collected at 15 feet bgs.
2-60-DP-24	0 - 1 4 - 5 9 - 10	n/a	#	#	#	#	#			Determine contaminant concentrations and extent at southeast corner of Building 2-65 slab. Groundwater samples will be collected at 15 feet bgs.
SOIL SAMPLING SUMMARY										
2-60-DP-25	0 - 1 4 - 5 9 - 10	n/a	#			#				Down-gradient (west) of AST PL-12 to determine contaminant concentrations and extent. Groundwater samples will be collected at 15 and 45 feet bgs.
2-60-DP-26	0 - 1 4 - 5 9 - 10	n/a	#			#				Down-gradient (west) of Sump SPL 049-006 to determine contaminant concentrations and extent. Groundwater samples will be collected at 15 and 45 feet bgs.

Notes:

X	= groundwater sample to fill groundwater data gap
O	= groundwater sample to fill soil data gap
Δ	= groundwater sample to fill soil and groundwater data gap
#	= soil sample to fill soil data gap
1	VOCs and priority pollutant metals plus Mn will be analyzed at all 2-60s Area sampling locations to fill the area-wide data gap for current and concurrent data.
2	SVOC and PCBs will be analyzed at selected locations based on data gap evaluations for individual COCs and pathways.
3	Petroleum hydrocarbons and chromium VI will be analyzed for in groundwater at selected locations to support the soil data gap investigation process.

Table 2-2 Summary of Groundwater and Soil Data Gap Investigations
2-60s Area
Boeing Plant 2

Location	Sample Interval (ft bgs, see note at end of table)	Date of Most Recent Sampling	Constituent Groups with 2-60s COCs						Redox Parameters[4]	Rationale for Selection of Laboratory Analyses
			VOCs[1]	SVOCs[2]	PCBs[2]	Metals[1]	Cyanide	TPH Dx/ TPH G[3]		

4	Redox parameter sampling locations were selected to adequately account for spatial variability in redox parameter concentrations in the 2-60s area.
n/a	Not applicable
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TPH	Total petroleum hydrocarbon
VOCs	Volatile organic compounds
Note on sample intervals	For existing wells, sample interval is the installed screen interval. For new wells, sample interval is the planned approximate screened interval. For soil samples, sample interval is the planned sampling depth.

Table 2-3. Locations of COCs Detected Above Screening Levels in Groundwater
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Range of Detects above Screening Levels (µg/L)	Nearest RCRA Unit					
			OA 9	SWMU 2-64.49	SWMU 78C	OA 12	AOC 2-62.45	SWMU 2-62.43
Metals and Cyanide								
7440-38-2	Arsenic	0.3 to 44	Max	X				
7440-50-8	Copper	4 to 42			X	Max	X	
7439-96-5	Manganese	111 to 4640	Max			X		
7440-02-0	Nickel (soluble salts)	10 to 35.7			X	X		Max
57-12-5	Cyanide	7 to 18				Max		
Volatile Organic Compounds (VOCs)								
71-43-2	Benzene	800 to 6200	Max					
75-35-4	1,1-Dichloroethene	1.4				Max		
100-41-4	Ethylbenzene	2300	Max					
75-09-2	Methylene Chloride	310	Max			X		
127-18-4	Tetrachloroethene	1.1 to 28				Max		
79-01-6	Trichloroethene	1 to 150			X	Max		
75-01-4	Vinyl Chloride	1 to 140	X			Max		
Petroleum Hydrocarbons								
	TPH-Diesel Range	1100 to 4800	Max					
	TPH-Gasoline Range	65000	Max					

Notes:

X COC detected above screening levels

Max maximum COC detection noted at this unit

Table 2-4 Locations of COCs Detected Above Screening Levels in Soil
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Range of Detects Above Soil Screening Levels Protective of Surface Water and/or Direct Contact	RCRA Units														Non-RCRA Areas					
			AOC 2-62.45 Paint booths and sump	AOC 2-62.46 Paint booth sump	SWMU 2-62.43 Tank Line	SWMU 2-63.47 Dilute chrome tank	SWMU 2-64.48 Underground waste tank	SWMU 2-64.49 Air compressor building sump and accumulation area	SWMU 2-65.50 Machine pit	SWMU 70.55 East steam clean and underground bulk storage tank	SWMU 77.A PCD Retention tank	SWMU 77.B Building 2-64 PCB Retention Tank	SWMU 77.B Building 2-62 PCB Retention tank	SWMU 78.C Oil/water seperator	OA 12 Buidling 2-63 area	OA 9 (SWMU 2-78.6) Former USTs PL-16, -17, -18	SPL-049-006, Sump, Building 2-62	PL-37 2000-Gallon fuel UST, Building 2-44 SE	Building 2-63/2-65 slabs	SE Corner Building 2-65 Slab	Building 2-48	NE Corner of Building 2-63 Slab
Metals (mg/kg)																						
7440-38-2	Arsenic[a]	5.1 to 76																	Max			
7440-43-9	Cadmium	3.4		Max																		
7440-50-8	Copper[a]	7.2 to 55.3		X										Max						X		
7439-96-5	Manganese[a]	130 to 346																				
7439-97-6	Mercury	0.06 to .28		X		Max		X							X			X		X	X	
7440-02-0	Nickel (soluble salts)[a]	11 to 42.7																				
7439-92-1	Silver	0.4 to 0.5		Max			X				X								X			
7439-96-5	Thallium (soluble salts)	0.7																	Max			
7782-49-2	Zinc	402 to 757		Max			X															
CN	Cyanide	0.24 to 1.2	X	X											Max					X		
Semivolatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs), (µg/kg)																						
56-55-3	Benzo(a)anthracene	55 ot 130		X										X								Max
50-32-8	Benzo(a)pyrene	140 to 200		Max																		X
205-99-2	Benzo(b)fluoranthene	160		Max																		
218-01-9	Chrysene	66 to 160		X			X							X								Max
117-81-7	bis(2-Ethylhexyl)phthalate	1,600		Max																		
105-67-9	Aroclor 1254	47 to 510		X			X		X		X				Max			X				
117-81-7	Aroclor 1260	43 to 76		X						Max												
11097-69-1	Total PCBs	43 to 510		X			X		X	X	X				Max			X				
Volatile Organic Compounds (VOCs), (µg/kg)																						
71-43-2	Benzene	60 to 2000														Max						
104-51-8	n-Butylbenzene*	NA														Max						
135-98-8	sec-Butylbenzene*	NA														Max						
100-41-4	Ethylbenzene	9100 to 100000														Max						
98-82-8	Isopropylbenzene*	NA														Max						
91-20-3	Naphthalene	31000 to 120000														Max						
103-65-1	n-Propylbenzene*	NA														Max						
127-18-4	Tetrachloroethene	8.8													Max							
79-01-6	Trichloroethene	2.0 to 300								X					X		X	Max				
95-63-6	1,2,4,-Trimethylbenzene*	NA														Max						
108-67-8	1,3,5-Trimethylbenzene*	NA														Max						

Notes:

a COC unit or area association is based on concentrations being exhibited above the Puget Sound Basin Ecology (1994) calculated background concentration.

X COC detected above screening levels

Max Maximum COC detection noted at this unit

* COC status is based solely on preliminary soil to air pathway screening level. An air pathway evaluation will be performed in the addendum to the work plan.

Table 3-1 Proposed CMS Data Gap Soil Sampling
2-60s Area
Boeing Plant 2

Sample Location	Soil Sampling Interval (feet bgs)	Approximate Screened Interval (feet bgs)	Analyses					
			VOCs (8260B)	SVOCs (8270C)	WTPH-G and WTPH-Dx	Cyanide (335.2)	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/ 6010/7000 Series)
New Wells								
PL2-604A	0 to 1 4 to 5 9 to 10	6 to 21	X		X			X
PL2-605A	0 to 1 4 to 5 9 to 10	6 to 21	X		X			X
PL2-606A	0 to 1 4 to 5 9 to 10	6 to 21	X		X			X
Direct-Push Probes								
2-60-DP-1	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X					X
2-60-DP-2	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X					X

Table 3-1 Proposed CMS Data Gap Soil Sampling
2-60s Area
Boeing Plant 2

Sample Location	Soil Sampling Interval (feet bgs)	Approximate Screened Interval (feet bgs)	Analyses					
			VOCs (8260B)	SVOCs (8270C)	WTPH-G and WTPH-Dx	Cyanide (335.2)	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/ 6010/7000 Series)
2-60-DP-3	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X					X
Direct-Push Probes, (cont'd)								
2-60-DP-4	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X		X
2-60-DP-5	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X		X
2-60-DP-6	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X		X
2-60-DP-7	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X		X
2-60-DP-8	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X		X

Table 3-1 Proposed CMS Data Gap Soil Sampling
2-60s Area
Boeing Plant 2

Sample Location	Soil Sampling Interval (feet bgs)	Approximate Screened Interval (feet bgs)	Analyses					
			VOCs (8260B)	SVOCs (8270C)	WTPH-G and WTPH-Dx	Cyanide (335.2)	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/ 6010/7000 Series)
2-60-DP-9	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X		X
Direct-Push Probes, (cont'd)								
2-60-DP-10	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X			X		X
2-60-DP-11	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X			X		X
2-60-DP-12	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X			X		X
2-60-DP-13	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X			X		X
2-60-DP-14	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X			X		X

Table 3-1 Proposed CMS Data Gap Soil Sampling
2-60s Area
Boeing Plant 2

Sample Location	Soil Sampling Interval (feet bgs)	Approximate Screened Interval (feet bgs)	Analyses					
			VOCs (8260B)	SVOCs (8270C)	WTPH-G and WTPH-Dx	Cyanide (335.2)	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/ 6010/7000 Series)
2-60-DP-15	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X	X	X
Direct-Push Probes, (cont'd)								
2-60-DP-16	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X	X		X	X	X
2-60-DP-17	0 to 1 4 to 5 9 to 10	10 to 14	X				X	X
2-60-DP-18	0 to 1 4 to 5 9 to 10	10 to 14	X	X		X	X	X
2-60-DP-19	0 to 1 4 to 5 9 to 10	10 to 14	X	X		X	X	X
2-60-DP-20	0 to 1 4 to 5 9 to 10	10 to 14	X	X		X	X	X

Table 3-1 Proposed CMS Data Gap Soil Sampling
2-60s Area
Boeing Plant 2

Sample Location	Soil Sampling Interval (feet bgs)	Approximate Screened Interval (feet bgs)	Analyses					
			VOCs (8260B)	SVOCs (8270C)	WTPH-G and WTPH-Dx	Cyanide (335.2)	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/ 6010/7000 Series)
2-60-DP-21	0 to 1 4 to 5 9 to 10	10 to 14	X					X
Direct-Push Probes, (cont'd)								
2-60-DP-22	0 to 1 4 to 5 9 to 10	10 to 14	X			X		X
2-60-DP-23	0 to 1 4 to 5 9 to 10	10 to 14	X			X	X	X
2-60-DP-24	0 to 1 4 to 5 9 to 10	10 to 14	X	X		X	X	X
2-60-DP-25	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X					X
2-60-DP-26	0 to 1 4 to 5 9 to 10	10 to 14 40 to 44	X					X

Notes: bgs below ground surface

Table 3-2 Laboratory Methods and Sample Requirements
2-60s Area
Boeing Plant 2

Constituent Group	Method	Estimated Number of Samples	Containers per Sample	Handling & Preservation	Holding Time
Soil Samples					
VOCs	USEPA 8260B	87 field samples, 3 equipment blank, 4 MS, 4 MSD (98 total)	One 2-oz wide-mouth jar with septum cap	No headspace Stored at 4°C	14 days
SVOCs	USEPA 8270C and 8270-SIM	36 field samples, 3 equipment blank 2 MS, 2 MSD (43 total)	One 8-oz wide-mouth jar	Stored at 4°C	14 days to extract 40 days to analyze extracts
Gasoline-range Petroleum Hydrocarbons	NWTPH-G	9 field samples, 1 equipment blank 1 MS, 1 MSD (12 total)	One 2-oz wide-mouth jar with septum cap	No headspace Stored at 4°C	14 days to extract 40 days to analyze extracts
Diesel-range Petroleum Hydrocarbons	NWTPH-Dx with silica jel cleanup	9 field samples, 1 equipment blank 1 MS, 1 MSD (12 total)	One 4-oz wide-mouth jar	Stored at 4°C	14 days to extract 40 days to analyze extracts
Metals[1]	USEPA 200.8 3500, 6010- and 7000-Series	87 field samples, 3 equipment blank, 4 MS, 4 MSD (98 total)	One 4-oz wide-mouth jar	Stored at 4°C	6 months 28 days for mercury
PCBs	USEPA 8082	24 field samples, 3 equipment blank, 1 MS, 1 MSD (29 total)	One 4-oz wide-mouth jar	Stored at 4°C	14 days to extract 40 days to analyze extracts

Table 3-2 Laboratory Methods and Sample Requirements
2-60s Area
Boeing Plant 2

Constituent Group	Method	Estimated Number of Samples	Containers per Sample	Handling & Preservation	Holding Time
Cyanide	USEPA 335.2[2]	57 field samples, 3 equipment blank 3 MS, 3 MSD (66 total)	One 8-oz wide-mouth jar	Stored at 4°C	14 days
Groundwater Samples					
VOCs	USEPA 8260B	73 field samples, 7 duplicates, 4 trip blanks, 4 MS, 4 MSD (92 total)	Three 40-mL vials	Preserved with HCl to pH less than 2.0* No headspace Stored at 4°C	14 days (preserved)
SVOCs	USEPA 8270C and 8270-SIM	20 field samples, 2 duplicates, 1 MS, 1 MSD (24 total)	Two 1-liter amber glass bottles	Stored at 4°C	7 days to extract 40 days to analyze extracts
Diesel Range Petroleum Hydrocarbons	NWTPH-Dx with silica gel cleanup	6 field samples, 1 duplicate, 1 MS, 1 MSD (9 total)	two 500-mL amber glass bottles	Stored at 4°C	7 days to extract 40 days to analyze extracts
Gasoline Range Petroleum Hydrocarbons	NWTPH-G	6 field samples, 1 duplicate, 1 MS, 1 MSD (9 total)	Two 40-mL vials	Preserved with HCl to pH less than 2.0* No headspace Stored at 4°C	7 days (unpreserved) 14 days (preserved)
Total Metals[1]	USEPA 200.8, 3500, 6010- and 7000-Series	29 field samples, 3 duplicates, 1 MS, 1 MSD (34 total)	One 1-liter HDPE bottle	If NTU < 5 (wells only), preserved with HNO_3 * Stored at 4°C	6 months 28 days for mercury

Table 3-2 Laboratory Methods and Sample Requirements
2-60s Area
Boeing Plant 2

Constituent Group	Method	Estimated Number of Samples	Containers per Sample	Handling & Preservation	Holding Time
Dissolved Metals[1]	USEPA 200.8, 3500, 6010- and 7000-Series	73 field samples, 7 duplicates, 4 MS, 4 MSD (88 total)	One 1-liter HDPE bottle	Filtered (probe and well samples) Preserved with HNO_3 * Stored at 4°C	6 months 28 days for mercury
PCBs	USEPA 8082	13 field samples, 1 duplicate, 1 MS, 1 MSD (16 total)	Two 500 mL amber glass bottles	Stored at 4°C	7 days to extract 40 days to analyze extracts
Cyanide	USEPA 335.2	50 field samples 5 duplicates, 2 MS, 2 MSD (59 total)	One 500-mL HDPE bottle	Stored at 4°C NaOH to pH of 12	14 days
Redox Parameters: Nitrate, Nitrite, Sulfate	Various methods including USEPA 300-series	23 field samples, 2 field duplicates, 1 MS, 1 MSD (27 total)	One 500 mL HDPE bottle	Stored at 4°C	48 hours for nitrate, nitrite 28 days for sulfate

Table 3-2 Laboratory Methods and Sample Requirements
2-60s Area
Boeing Plant 2

Constituent Group	Method	Estimated Number of Samples	Containers per Sample	Handling & Preservation	Holding Time
Ammonia	USEPA 350.1	23 field samples, 2 field duplicates, 1 MS, 1 MSD (27 total)	One 500 mL HDPE bottle	Preserved with H_2SO_4* to pH of < 2 Stored at 4°C	28 days
Ferrous Iron	Hach Kit	23 field samples, 2 field duplicates, (25 total)	Analysis performed in the field	Analysis performed in the field	Analysis performed in the field
Sulfide	376.2	23 field samples, 2 field duplicates, 1 MS, 1 MSD (27 total)	One 500-mL HDPE bottle	Preserved with NaOH to pH greater than 9, Zinc Acetate (2N 4 drops/100 mL), no headspace Stored at 4°C	7 days
TOC	USEPA 415.1	23 field samples, 2 field duplicates, 1 MS, 1 MSD (27 total)	250-mL amber glass bottle	Preserved with H_2SO_4* to pH of < 2 Stored at 4°C	28 days

Notes:

*	Sample containers provided by the laboratory are pre-preserved.
MS	Matrix spike
MSD	Matrix spike duplicate
PCBs	Polychlorinated biphenyls
SVOCs	Semivolatile organic compounds
TOC	Total organic carbon
VOCs	Volatile organic compounds
1	Metals analysis to include all Plant 2 site-wide groundwater and soil constituents of concern plus iron and any other metal whose concentration is greater than one-half the groundwater or soil screening level: antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium and zinc
2	Extraction of soil samples by ILM05.3, analysis of extracts by EPA 335.2.

Table 3-3 CMS Data Gap Groundwater Sampling

2-60s Area

Boeing Plant 2

Sample Locations	Groundwater Analyses						
	VOCs (8260B)	SVOCs (8270C)	WTPH-G & WTPH-DX	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/6010/ 7000 Series)	Cyanide (9010B)	Redox Parameters (various methods)
New Wells							
PL2-604A	X		X		X		X
PL2-605A	X		X		X		
PL2-606A	X		X		X		
Existing Wells							
PL2-310A	X		X		X		
PL2-311A	X		X		X		X
PL2-312A	X				X		
PL2-314A	X				X	X	
PL2-315A	X			X	X	X	X
PL2-315B	X				X	X	X
PL2-316A	X				X	X	X

Table 3-3 CMS Data Gap Groundwater Sampling

2-60s Area

Boeing Plant 2

Sample Locations	Groundwater Analyses						
	VOCs (8260B)	SVOCs (8270C)	WTPH-G & WTPH-DX	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/6010/ 7000 Series)	Cyanide (9010B)	Redox Parameters (various methods)
PL2-316B	X				X	X	X
PL2-316C	X				X		
PL2-317AR	X				X		X
PL2-319A	X				X		
PL2-325A	X				X	X	X
PL2-325B	X				X		X
PL2-326A	X				X	X	X
PL2-326B	X				X	X	X
PL2-327A	X				X	X	
PL2-327B	X				X	X	
PL2-328A	X				X	X	
PL2-328B	X				X	X	

Table 3-3 CMS Data Gap Groundwater Sampling

2-60s Area

Boeing Plant 2

Sample Locations	Groundwater Analyses						
	VOCs (8260B)	SVOCs (8270C)	WTPH-G & WTPH-DX	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/6010/ 7000 Series)	Cyanide (9010B)	Redox Parameters (various methods)
PL2-329A	X			X	X	X	
PL2-329B	X				X	X	
PL2-330A	X			X	X	X	
PL2-330B	X				X	X	
PL2-331A	X				X	X	
PL2-331B	X				X	X	
PL2-332A	X		X		X		
Direct-Push Probes							
2-60-DP-1	X				X		
2-60-DP-2	X				X		
2-60-DP-3	X				X		
2-60-DP-4	X	X			X	X	X

Table 3-3 CMS Data Gap Groundwater Sampling

2-60s Area

Boeing Plant 2

Sample Locations	Groundwater Analyses						
	VOCs (8260B)	SVOCs (8270C)	WTPH-G & WTPH-DX	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/6010/ 7000 Series)	Cyanide (9010B)	Redox Parameters (various methods)
2-60-DP-5	X	X			X	X	
2-60-DP-6	X	X			X	X	X
2-60-DP-7	X	X			X	X	
2-60-DP-8	X	X			X	X	
2-60-DP-9	X	X			X	X	X
2-60-DP-10	X				X	X	
2-60-DP-11	X				X	X	X
2-60-DP-12	X				X	X	
2-60-DP-13	X				X	X	X
2-60-DP-14	X				X	X	
2-60-DP-15	X	X		X	X	X	X
2-60-DP-16	X	X		X	X	X	

Table 3-3 CMS Data Gap Groundwater Sampling

2-60s Area

Boeing Plant 2

Sample Locations	Groundwater Analyses						
	VOCs (8260B)	SVOCs (8270C)	WTPH-G & WTPH-DX	PCBs (8082)	Priority Pollutant Metals plus Mn (200.8/3500/6010/ 7000 Series)	Cyanide (9010B)	Redox Parameters (various methods)
2-60-DP-17	X			X	X		
2-60-DP-18	X	X		X	X	X	
2-60-DP-19	X	X		X	X	X	
2-60-DP-20	X	X		X	X	X	
2-60-DP-21	X				X		
2-60-DP-22	X				X	X	
2-60-DP-23	X			X	X	X	
2-60-DP-24	X	X		X	X	X	
2-60-DP-25	X				X		
2-60-DP-26	X				X		

Table 3-4 Reporting Limits Compared to Screening Levels for Site-wide Constituents of Concern
2-60s Area
Boeing Plant 2

		Soil (refer to Laboratory RL Units)										Groundwater (µg/L)						
CAS Number	**Analytes**	**Analytical Method**	**Laboratory RL**		**Sitewide Soil COC**	**2-60s Area Soil COC**	**Background (Metals)**	**Minimum Calculated Soil Screening Level**	**Direct Contact Screening Level**	**Air Pathway Screening Level**	**Surface Water Pathway Screening Level**	**Analytical Method**	**Laboratory RL**	**Sitewide Groundwater COC**	**2-60s Area Groundwater COC**	**Minimum Calculated Groundwater Screening Level**	**Air Pathway Screening Level**	**Surface Water Pathway Screening Level**
Metals and Cyanide																		
7429-90-5	Aluminum	6010	5.0	mg/kg			*		- -	- -	- -	6010	50.0				- -	- -
7440-36-0	Antimony	6010	5.0	mg/kg	X		*	3.40E+02	5.33E+02	- -	3.40E+02	6010	50.0			3.76E+02	- -	3.76E+02
7440-38-2	**Arsenic**	6010	**5.0**	mg/kg	X	X	7	1.13E-02	3.33E+01	3.22E+04	1.13E-02	200.8	**0.2**	X	X	1.94E-02	- -	1.94E-02
7440-39-3	Barium	6010	0.3	mg/kg			*	9.33E+04	9.33E+04	4.62E+05	- -	6010	3.0				- -	- -
7440-41-7	Beryllium	6010	0.1	mg/kg			*	1.63E+02	2.67E+03	2.64E+04	1.63E+02	6010	1.0			9.90E+01	- -	9.90E+01
7440-43-9	Cadmium	6010	0.2	mg/kg	X	X	1	1.01E+00	6.67E+02	7.70E+04	1.01E+00	6010	2.0	X		7.35E+00	- -	7.35E+00
16065-83-1	Chromium (III)			mg/kg			*		2.00E+06	- -	- -					8.82E+04	- -	8.82E+04
18540-29-9	Chromium (VI)	3500	0.2	mg/kg	X		*	1.92E+01	4.00E+03	1.06E+04	1.92E+01	3500	10.0			5.00E+01	- -	5.00E+01
7440-47-3	Chromium (Total)	6010	0.5	mg/kg			*		- -	- -	- -	6010	5.0				- -	- -
7440-48-4	Cobalt	6010	0.3	mg/kg			*		- -	- -	- -	6010	3.0				- -	- -
7440-50-8	Copper	6010	0.2	mg/kg	X	X	36	1.38E+00	4.93E+04	- -	1.38E+00	200.8	0.5	X	X	3.10E+00	- -	3.10E+00
7439-89-6	Iron	6010	5.0	mg/kg			*		- -	- -	- -	6010	50.0				- -	- -
7439-92-1	Lead	6010	2.0	mg/kg	X		24	1.00E+03	1.00E+03	- -	1.62E+03	200.8	1.0	X		8.10E+00	- -	8.10E+00
7439-95-4	Magnesium	6010	5.0	mg/kg			*		- -	- -	- -	6010	50.0				- -	- -
7439-96-5	Manganese	6010	0.1	mg/kg	X	X	1,200	1.30E+02	1.87E+05	- -	1.30E+02	6010	1.0	X	X	1.00E+02	- -	1.00E+02
7439-97-6	**Mercury**	7471	**0.05**	mg/kg	X	X	0.07	6.39E-03	4.19E+01	6.39E-03	2.61E-02	1631	0.025	X		2.50E-02	1.84E+02	2.50E-02
7439-98-7	Molybdenum	6010	0.5	mg/kg			*	6.67E+03	6.67E+03	- -	- -	6010	5.0				- -	- -
7440-02-0	Nickel (soluble salts)	6010	1.0	mg/kg	X	X	48	1.07E+01	2.67E+04	- -	1.07E+01	200.8	0.5	X	X	8.20E+00	- -	8.20E+00
7782-49-2	Selenium	6010	5.0	mg/kg	X		*	7.38E+00	6.67E+03	- -	7.38E+00	6010	50.0	X		7.10E+01	- -	7.10E+01
7440-22-4	Silver	6010	0.3	mg/kg	X	X	*	3.23E-01	6.67E+03	- -	3.23E-01	200.8	0.5	X		1.90E+00	- -	1.90E+00
7440-28-0	Thallium (soluble salts)	200.8	0.2	mg/kg	X	X	*	6.69E-01	8.64E+01	- -	6.69E-01	200.8	0.2	X		4.70E-01	- -	4.70E-01
7440-31-5	Tin	6010	1.0	mg/kg			*		8.00E+05	- -	- -	6010	10.0				- -	- -
7440-62-2	Vanadium	6010	0.3	mg/kg			*	9.33E+03	9.33E+03	- -	4.12E+04	6010	3.0			2.06E+03	- -	2.06E+03
7440-66-6	Zinc	6010	0.6	mg/kg	X	X	85	1.01E+02	4.00E+05	- -	1.01E+02	6010	6.0	X		8.10E+01	- -	8.10E+01
57-12-5	**Cyanide**	335.2	0.1	mg/kg	X	X	*	2.02E-01	2.67E+04	- -	2.02E-01	335.2	**5.0**	X	X	1.00E+00	- -	1.00E+00
Semivolatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs)																		
83-32-9	Acenaphthene	8270	67.0	µg/kg			*	2.38E+04	0.00E+00	- -	2.38E+04	8270	0.1			2.33E+02	- -	2.33E+02
208-96-8	Acenaphthylene	8270	67.0	µg/kg			*		0.00E+00	- -	- -	8270	0.1				- -	- -
120-12-7	Anthracene	8270	67.0	µg/kg			*	4.46E+06	0.00E+00	- -	4.46E+06	8270	0.1			9.40E+03	- -	9.40E+03
56-55-3	**Benzo(a)anthracene**	8270 (SIM)	6.7	µg/kg	X	X	*	4.19E+01	3.42E+03	- -	4.19E+01	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
205-99-2	**Benzo(b)fluoranthene**	8270 (SIM)	6.7	µg/kg	X	X	*	1.44E+02	3.42E+03	- -	1.44E+02	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
207-08-9	**Benzo(k)fluoranthene**	8270 (SIM)	6.7	µg/kg	X		*	1.44E+02	3.42E+03	- -	1.44E+02	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
191-24-2	Benzo(g,h,i)perylene	8270	67.0	µg/kg			*		- -	- -	- -	8270	0.1				- -	- -
50-32-8	**Benzo(a)pyrene**	8270 (SIM)	6.7	µg/kg	X	X	*	1.13E+02	3.42E+03	7.95E+07	1.13E+02	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
65-85-0	Benzoic Acid	8270	670.0	µg/kg			*		- -	- -	- -	8270	10.0				- -	- -
100-51-6	Benzyl alcohol	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
101-55-3	4-Bromophenyl-phenylether	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
85-68-7	Butylbenzylphthalate	8270	67.0	µg/kg			*	1.27E+05	1.33E+08	- -	1.27E+05	8270	1.0			4.54E+02	- -	4.54E+02
86-74-8	Carbazole	8270	67.0	µg/kg			*	1.25E+06	1.25E+06	- -	- -	8270	1.0				- -	- -
106-47-8	4-Chloroaniline	8270	200.0	µg/kg			*		- -	- -	- -	8270	3.0				- -	- -
111-91-1	bis(2-Chloroethoxy) Methane	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
111-44-4	Bis-(2-Chloroethyl) Ether	8270	130.0	µg/kg			*		- -	- -	- -	8270	2.0				- -	- -
59-50-7	4-Chloro-3-methylphenol	8270	130.0	µg/kg			*		- -	- -	- -	8270	2.0				- -	- -
91-58-7	2-Chloronaphthalene	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
95-57-8	2-Chlorophenol	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
7005-72-3	4-Chlorophenyl-phenylether	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
218-01-9	**Chrysene**	8270 (SIM)	6.7	µg/kg	X	X	*	4.66E+01	3.42E+03	- -	4.66E+01	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
53-70-3	**Dibenz(a,h)anthracene**	8270 (SIM)	6.7	µg/kg	X		*	2.10E+02	3.42E+03	- -	2.10E+02	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
132-64-9	Dibenzofuran	8270	67.0	µg/kg			*		- -	- -	- -	8270	0.1				- -	- -
84-74-2	Di-n-butylphthalate	8270	67.0	µg/kg			*	3.73E+04	6.67E+07	- -	3.73E+04	8270	1.0			1.06E+03	- -	1.06E+03
91-94-1	3,3'-Dichlorobenzidine	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
120-83-2	2,4-Dichlorophenol	8270	200.0	µg/kg			*		- -	- -	- -	8270	10.0				- -	- -
84-66-2	Diethylphthalate	8270	67.0	µg/kg			*	5.81E+04	5.33E+08	- -	5.81E+04	8270	1.0			1.03E+04	- -	1.03E+04
105-67-9	2,4-Dimethylphenol	8270	200.0	µg/kg	X		*	1.64E+03	1.33E+07	- -	1.64E+03	8270	3.0	X		2.01E+02	- -	2.01E+02
131-11-3	Dimethylphthalate	8270	67.0	µg/kg	X		*	1.24E+05	6.67E+08	- -	1.24E+05	8270	1.0			2.61E+04	- -	2.61E+04
534-52-1	4,6-Dinitro-2-methylphenol	8270	670.0	µg/kg			*		- -	- -	- -	8270	10.0				- -	- -

Table 3-4 Reporting Limits Compared to Screening Levels for Site-wide Constituents of Concern
2-60s Area
Boeing Plant 2

		Soil (refer to Laboratory RL Units)										Groundwater (µg/L)						
CAS Number	**Analytes**	**Analytical Method**	**Laboratory RL**		**Sitewide Soil COC**	**2-60s Area Soil COC**	**Background (Metals)**	**Minimum Calculated Soil Screening Level**	**Direct Contact Screening Level**	**Air Pathway Screening Level**	**Surface Water Pathway Screening Level**	**Analytical Method**	**Laboratory RL**	**Sitewide Groundwater COC**	**2-60s Area Groundwater COC**	**Minimum Calculated Groundwater Screening Level**	**Air Pathway Screening Level**	**Surface Water Pathway Screening Level**
SVOC's and PCB's (cont'd)																		
117-84-0	Di-n-octylphthalate	8270	67.0	µg/kg			*	1.33E+07	1.33E+07	- -	- -	8270	1.0				- -	- -
51-28-5	2,4-Dinitrophenol	8270	670.0	µg/kg			*		- -	- -	- -	8270	10.0				- -	- -
121-14-2	2,4-Dinitrotoluene	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
606-20-2	2,6-Dinitrotoluene	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
117-81-7	**bis(2-Ethylhexyl)phthalate**	8270	67.0	µg/kg	X	X	*	1.57E+03	1.79E+06	- -	1.57E+03	8270	**3.0**	X		7.05E-01	- -	7.05E-01
206-44-0	Fluoranthene	8270	67.0	µg/kg	X		*	3.23E+04	2.67E+07	- -	3.23E+04	8270	0.1			3.27E+01	- -	3.27E+01
86-73-7	Fluorene	8270	67.0	µg/kg			*	1.98E+05	2.67E+07	- -	1.98E+05	8270	0.1			1.25E+03	- -	1.25E+03
118-74-1	Hexachlorobenzene	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
77-47-4	Hexachlorocyclopentadiene	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
67-72-1	Hexachloroethane	8270	130.0	µg/kg			*		- -	- -	- -	8270	2.0				- -	- -
193-39-5	**Indeno(1,2,3-cd)pyrene**	8270 (SIM)	6.7	µg/kg	X		*	4.06E+02	3.42E+03	- -	4.06E+02	8270 (SIM)	**0.1**	X		5.86E-03	- -	5.86E-03
78-59-1	Isophorone	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
91-57-6	2-Methylnaphthalene	8270	67.0	µg/kg			*		- -	- -	- -	8270	0.1				- -	- -
95-48-7	2-Methylphenol	8270	67.0	µg/kg			*	3.33E+07	3.33E+07	- -	- -	8270	1.0				- -	- -
106-44-5	4-Methylphenol	8270	67.0	µg/kg			*	3.33E+06	3.33E+06	- -	- -	8270	1.0				- -	- -
88-74-4	2-Nitroaniline	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
99-09-2	3-Nitroaniline	8270	400.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
100-01-6	4-Nitroaniline	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
98-95-3	Nitrobenzene	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
88-75-5	2-Nitrophenol	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
100-02-7	4-Nitrophenol	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
621-64-7	N-Nitroso-di-n-propylamine	8270	130.0	µg/kg			*		- -	- -	- -	8270	2.0				- -	- -
86-30-6	N-Nitrosodiphenylamine	8270	67.0	µg/kg			*	5.10E+06	5.10E+06	- -	- -	8270	5.0				- -	- -
108-60-1	2,2'-Oxybis(1-Chloropropane)	8270	67.0	µg/kg			*		- -	- -	- -	8270	1.0				- -	- -
87-86-5	Pentachlorophenol	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
85-01-8	Phenanthrene	8270	67.0	µg/kg			*		- -	- -	- -	8270	0.1				- -	- -
108-95-2	Phenol	8270	130.0	µg/kg			*	9.23E+05	2.00E+08	- -	9.23E+05	8270	2.0			2.02E+05	- -	2.02E+05
129-00-0	Pyrene	8270	67.0	µg/kg			*	1.28E+06	2.00E+07	- -	1.28E+06	8270	0.1			9.40E+02	- -	9.40E+02
95-95-4	2,4,5-Trichlorophenol	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
88-06-2	2,4,6-Trichlorophenol	8270	330.0	µg/kg			*		- -	- -	- -	8270	5.0				- -	- -
12674-11-2	Aroclor 1016	8082	33.0	µg/kg			*		- -	- -	- -	8082	0.01				- -	- -
-	**Aroclor 1016/1242**	8082	**33.0**	µg/kg	X		*	1.38E-01	4.67E+04	- -	1.38E-01	8082	**0.01**	X		6.40E-05	- -	6.40E-05
11104-28-2	Aroclor 1221	8082	33.0	µg/kg			*		- -	- -	- -	8082	0.01				- -	- -
11141-16-5	Aroclor 1232	8082	33.0	µg/kg			*		- -	- -	- -	8082	0.01				- -	- -
53469-21-9	Aroclor 1242	8082	33.0	µg/kg			*		- -	- -	- -	8082	0.01				- -	- -
12672-29-6	Aroclor 1248	8082	33.0	µg/kg			*		- -	- -	- -	8082	0.01				- -	- -
11097-69-1	**Aroclor 1254**	8082	**33.0**	µg/kg	X	X	*	1.08E+00	1.33E+04	- -	1.08E+00	8082	**0.01**	X		6.40E-05	- -	6.40E-05
11096-82-5	**Aroclor 1260**	8082	**33.0**	µg/kg	X	X	*	1.05E+00	- -	- -	1.05E+00	8082	**0.01**	X		6.40E-05	- -	6.40E-05
37324-23-5	Aroclor 1262	8082	33.0	µg/kg			*		- -	- -	- -	8082	0.01				- -	- -
11100-14-4	**Aroclor 1268**	8082	33.0	µg/kg			*		- -	- -	- -	8082	**0.01**			6.40E-05	- -	6.40E-05
-	**Total PCBs**	8082	**33.0**	µg/kg	X	X	*		- -	- -	3.96E-01	8082	**0.01**	X		6.40E-05	- -	6.40E-05
Volatile Organic Compounds (VOCs)																		
67-64-1	Acetone	8260	5.0	µg/kg			*	3.55E+05	3.05E+08	3.55E+05	- -	8260	1.0			6.43E+06	6.43E+06	- -
107-02-8	Acrolein	8260	50.0	µg/kg			*		- -	- -	- -	8260	5.0				- -	- -
107-13-1	Acrylonitrile	8260	5.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
71-43-2	Benzene	8260	1.0	µg/kg	X	X	*	2.53E+01	1.36E+06	1.04E+02	2.53E+01	8260	0.2	X	X	4.48E+00	1.40E+03	4.48E+00
108-86-1	Bromobenzene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
74-97-5	Bromochloromethane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
75-27-4	Bromodichloromethane	8260	1.0	µg/kg			*	2.88E+01	8.80E+05	1.49E+02	2.88E+01	8260	0.2			5.52E+00	2.69E+03	5.52E+00
74-96-4	Bromoethane	8260	2.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
75-25-2	Bromoform	8260	1.0	µg/kg			*	2.84E+02	8.11E+07	1.33E+06	2.84E+02	8260	0.2			4.33E+01	1.19E+05	4.33E+01
74-83-9	Bromomethane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
78-93-3	2-Butanone	8260	5.0	µg/kg			*	8.02E+05	1.19E+09	8.02E+05	- -	8260	1.0			1.49E+07	1.49E+07	- -
104-51-8	n-Butylbenzene	8260	1.0	µg/kg	X	X	*	4.64E+03	- -	4.64E+03	- -	8260	0.2			8.63E+06	8.63E+06	- -
135-98-8	sec-Butylbenzene	8260	1.0	µg/kg	X	X	*	7.86E+03	- -	7.86E+03	- -	8260	0.2			4.40E+08	4.40E+08	- -
98-06-6	tert-Butylbenzene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -

Table 3-4 Reporting Limits Compared to Screening Levels for Site-wide Constituents of Concern
2-60s Area
Boeing Plant 2

		Soil (refer to Laboratory RL Units)										Groundwater (µg/L)						
CAS Number	Analytes	Analytical Method	Laboratory RL		Sitewide Soil COC	2-60s Area Soil COC	Background (Metals)	Minimum Calculated Soil Screening Level	Direct Contact Screening Level	Air Pathway Screening Level	Surface Water Pathway Screening Level	Analytical Method	Laboratory RL	Sitewide Groundwater COC	2-60s Area Groundwater COC	Minimum Calculated Groundwater Screening Level	Air Pathway Screening Level	Surface Water Pathway Screening Level
VOC's (cont'd)																		
75-15-0	Carbon Disulfide	8260	1.0	µg/kg			*	3.64E+03	6.40E+07	3.64E+03	- -	8260	0.2			3.43E+04	3.43E+04	- -
56-23-5	Carbon Tetrachloride	8260	1.0	µg/kg			*	4.84E+00	5.73E+05	2.51E+01	4.84E+00	8260	0.2	X		5.26E-01	1.52E+02	5.26E-01
108-90-7	Chlorobenzene	8260	1.0	µg/kg			*	6.13E+03	9.57E+06	6.13E+03	1.40E+04	8260	0.2			1.60E+03	1.00E+04	1.60E+03
75-00-3	Chloroethane	8260	1.0	µg/kg			*	2.77E+02	- -	2.77E+02	- -	8260	0.2			4.05E+03	4.05E+03	- -
67-66-3	Chloroform	8260	1.0	µg/kg	X		*	3.96E+01	7.03E+06	3.96E+01	2.98E+02							
110-75-8	2-Chloroethylvinylether	8260	5.0	µg/kg			*		- -	- -	- -	8260	0.5				- -	- -
74-87-3	Chloromethane	8260	1.0	µg/kg			*	4.63E+08	4.63E+08	- -	- -	8260	0.2	X		2.63E+01	2.44E+03	2.63E+01
95-49-8	2-Chlorotoluene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
106-43-4	4-Chlorotoluene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
124-48-1	Dibromochloromethane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
74-95-3	Dibromomethane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
96-12-8	1,2-Dibromo-3-chloropropane	8260	5.0	µg/kg			*		- -	- -	- -	8260	2.0				- -	- -
95-50-1	1,2-Dichlorobenzene	8260	1.0	µg/kg			*	1.52E+04	1.54E+08	1.67E+06	1.52E+04	8260	0.2			1.30E+03	- -	1.30E+03
541-73-1	1,3-Dichlorobenzene	8260	1.0	µg/kg			*	1.24E+04	- -	1.14E+05	1.24E+04	8260	0.2			9.60E+02	- -	9.60E+02
106-46-7	1,4-Dichlorobenzene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
110-57-6	trans-1,4-Dichloro-2-butene	8260	5.0	µg/kg			*		- -	- -	- -	8260	1.0				- -	- -
75-34-3	1,1-Dichloroethane	8260	1.0	µg/kg			*		6.69E+07	7.95E+03	- -	8260	0.2			1.12E+05	1.12E+05	- -
107-06-2	1,2-Dichloroethane	8260	1.0	µg/kg			*	5.67E+01	8.19E+05	9.27E+01	5.67E+01	8260	0.2	X		1.17E+01	1.78E+03	1.17E+01
75-35-4	1,1-Dichloroethene	8260	1.0	µg/kg	X		*	2.73E+00	1.24E+05	1.23E+03	2.73E+00	8260	0.2	X	X	3.82E-01	4.23E+01	3.82E-01
156-59-2	cis-1,2-Dichloroethene	8260	1.0	µg/kg	X		*	7.94E+02	7.99E+06	7.94E+02	5.66E+03	8260	0.2	X		1.13E+03	1.51E+04	1.13E+03
156-60-5	trans-1,2-Dichloroethene	8260	1.0	µg/kg	X		*	8.99E+02	1.31E+07	8.99E+02	5.43E+04	8260	0.2			1.00E+04	1.39E+04	1.00E+04
540-59-0	1,2-Dichloroethene (total)	8260	-	µg/kg			*	1.79E+07	1.79E+07	- -	- -	8260	-				- -	- -
78-87-5	1,2-Dichloropropane	8260	1.0	µg/kg			*	2.36E+01	8.02E+05	6.92E+01	2.36E+01	8260	0.2			4.60E+00	- -	4.60E+00
142-28-9	1,3-Dichloropropane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
594-20-7	2,2-Dichloropropane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
563-58-6	1,1-Dichloropropene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
10061-01-5	cis-1,3-Dichloropropene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
10061-02-6	trans-1,3-Dichloropropene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
100-41-4	Ethylbenzene	8260	1.0	µg/kg	X	X	*	2.52E+03	1.45E+08	2.52E+03	1.81E+04	8260	0.2	X	X	2.10E+03	9.50E+03	2.10E+03
106-93-4	Ethylene Dibromide	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
87-68-3	Hexachlorobutadiene	8260	5.0	µg/kg			*	6.38E+03	2.91E+05	8.89E+03	6.38E+03	8260	0.5			5.91E+00	- -	5.91E+00
591-78-6	2-Hexanone	8260	5.0	µg/kg			*		- -	- -	- -	8260	1.0				- -	- -
98-82-8	Isopropylbenzene	8260	1.0	µg/kg	X	X	*	1.27E+03	1.45E+08	1.27E+03	- -	8260	0.2			1.22E+03	1.22E+03	- -
99-87-6	4-Isopropyltoluene	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
75-09-2	Methylene Chloride	8260	2.0	µg/kg	X		*	8.28E+02	9.94E+06	1.89E+03	8.28E+02	8260	0.3	X	X	1.90E+02	4.46E+04	1.90E+02
74-88-4	Methyl Iodide	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
108-10-1	4-Methyl-2-Pentanone	8260	5.0	µg/kg			*	3.55E+04	1.16E+08	3.55E+04	- -	8260	1.0			1.56E+09	1.56E+09	- -
91-20-3	Naphthalene	8260	5.0	µg/kg	X	X	*	2.48E+04	1.44E+07	2.48E+04	4.99E+04	8260	0.5			1.79E+03	1.12E+04	1.79E+03
103-65-1	n-Propylbenzene	8260	1.0	µg/kg	X	X	*	1.36E+04	- -	1.36E+04	- -	8260	0.2			4.00E+04	4.00E+04	- -
100-42-5	Styrene	8260	1.0	µg/kg			*	7.10E+01	1.82E+06	4.65E+05	7.10E+01	8260	0.2			3.17E+00	- -	3.17E+00
630-20-6	1,1,1,2-Tetrachloroethane	8260	1.0	µg/kg			*		- -	- -	- -	8260	0.2					
79-34-5	1,1,2,2-Tetrachloroethane	8260	1.0	µg/kg	X		*	7.19E+00	2.73E+05	3.48E+02	7.19E+00	8260	0.2			1.28E+00	2.36E+03	1.28E+00
127-18-4	Tetrachloroethene	8260	1.0	µg/kg	X	X	*	8.72E+00	1.07E+06	1.99E+02	8.72E+00	8260	0.2	X	X	8.22E-01	1.52E+03	8.22E-01
108-88-3	Toluene	8260	1.0	µg/kg	X		*	1.90E+04	1.34E+08	1.90E+04	1.09E+05	8260	0.2			1.50E+04	1.17E+05	1.50E+04
87-61-6	1,2,3-Trichlorobenzene	8260	5.0	µg/kg			*		- -	- -	- -	8260	0.5				- -	- -
120-82-1	1,2,4-Trichlorobenzene	8260	5.0	µg/kg			*	3.08E+03	1.45E+07	1.77E+05	3.08E+03	8260	0.5			8.25E+01	- -	8.25E+01
71-55-6	1,1,1-Trichloroethane	8260	1.0	µg/kg	X		*	2.78E+04	4.12E+08	2.78E+04	1.20E+06	8260	0.2			1.51E+05	2.50E+05	1.51E+05
79-00-5	1,1,2-Trichloroethane	8260	1.0	µg/kg	X		*	2.78E+01	9.57E+05	2.90E+02	2.78E+01	8260	0.2	X		5.00E+00	3.67E+03	5.00E+00
79-01-6	Trichloroethene	8260	1.0	µg/kg	X	X	*	2.00E+00	1.36E+05	8.86E+00	2.00E+00	8260	0.2	X	X	3.02E-01	6.20E+01	3.02E-01
75-69-4	Trichlorofluoromethane	8260	1.0	µg/kg			*	5.71E+03	5.96E+08	5.71E+03	- -	8260	0.2			1.16E+04	1.16E+04	- -
76-13-1	1,1,2-Trichlorotrifluoroethane	8260	2.0	µg/kg			*	8.76E+05	5.96E+10	8.76E+05	- -	8260	0.2			1.17E+05	1.17E+05	- -
95-63-6	1,2,4-Trimethylbenzene	8260	1.0	µg/kg	X	X	*	2.36E+03	7.27E+07	2.36E+03	- -	8260	0.2			2.84E+03	2.84E+03	- -
108-67-8	1,3,5-Trimethylbenzene	8260	1.0	µg/kg	X	X	*	2.47E+03	7.27E+07	2.47E+03	- -	8260	0.2				- -	- -
108-05-4	Vinyl Acetate	8260	5.0	µg/kg			*		- -	- -	- -	8260	0.2				- -	- -
75-01-4	Vinyl Chloride	8260	1.0	µg/kg	X		*	4.59E+00	4.97E+04	1.64E+01	4.59E+00	8260	0.2	X	X	7.31E-01	3.71E+02	7.31E-01
-	m,p-Xylene	8260	1.0	µg/kg			*	2.91E+09	2.91E+09	- -	- -	8260	0.4				- -	- -
95-47-6	o-Xylene	8260	1.0	µg/kg			*	1.43E+05	3.92E+08	1.43E+05	- -	8260	0.2			4.01E+04	4.01E+04	- -
1330-20-7	Total Xylenes	8260	-	µg/kg			*	2.91E+08	2.91E+08	- -	- -	8260	-				- -	- -

Table 3-4 Reporting Limits Compared to Screening Levels for Site-wide Constituents of Concern
2-60s Area
Boeing Plant 2

		Soil (refer to Laboratory RL Units)										Groundwater (µg/L)						
CAS Number	**Analytes**	**Analytical Method**	**Laboratory RL**		**Sitewide Soil COC**	**2-60s Area Soil COC**	**Background (Metals)**	**Minimum Calculated Soil Screening Level**	**Direct Contact Screening Level**	**Air Pathway Screening Level**	**Surface Water Pathway Screening Level**	**Analytical Method**	**Laboratory RL**	**Sitewide Groundwater COC**	**2-60s Area Groundwater COC**	**Minimum Calculated Groundwater Screening Level**	**Air Pathway Screening Level**	**Surface Water Pathway Screening Level**
Total Petroleum Hydrocarbons (TPH)																		
-	TPH - Diesel Range	NWTPH-D	5	mg/kg	X		*	2,000	2,000			NWTPH-D	500	X	X		500	
-	TPH - Oil Range	NWTPH-Dx	10	mg/kg	X		*	2,000	2,000			NWTPH-Dx	500	X			500	
-	TPH - Gasoline Range	NWPTH-G	5	mg/kg	X	X	*	30	30			NWPTH-G	250	X	X		800	

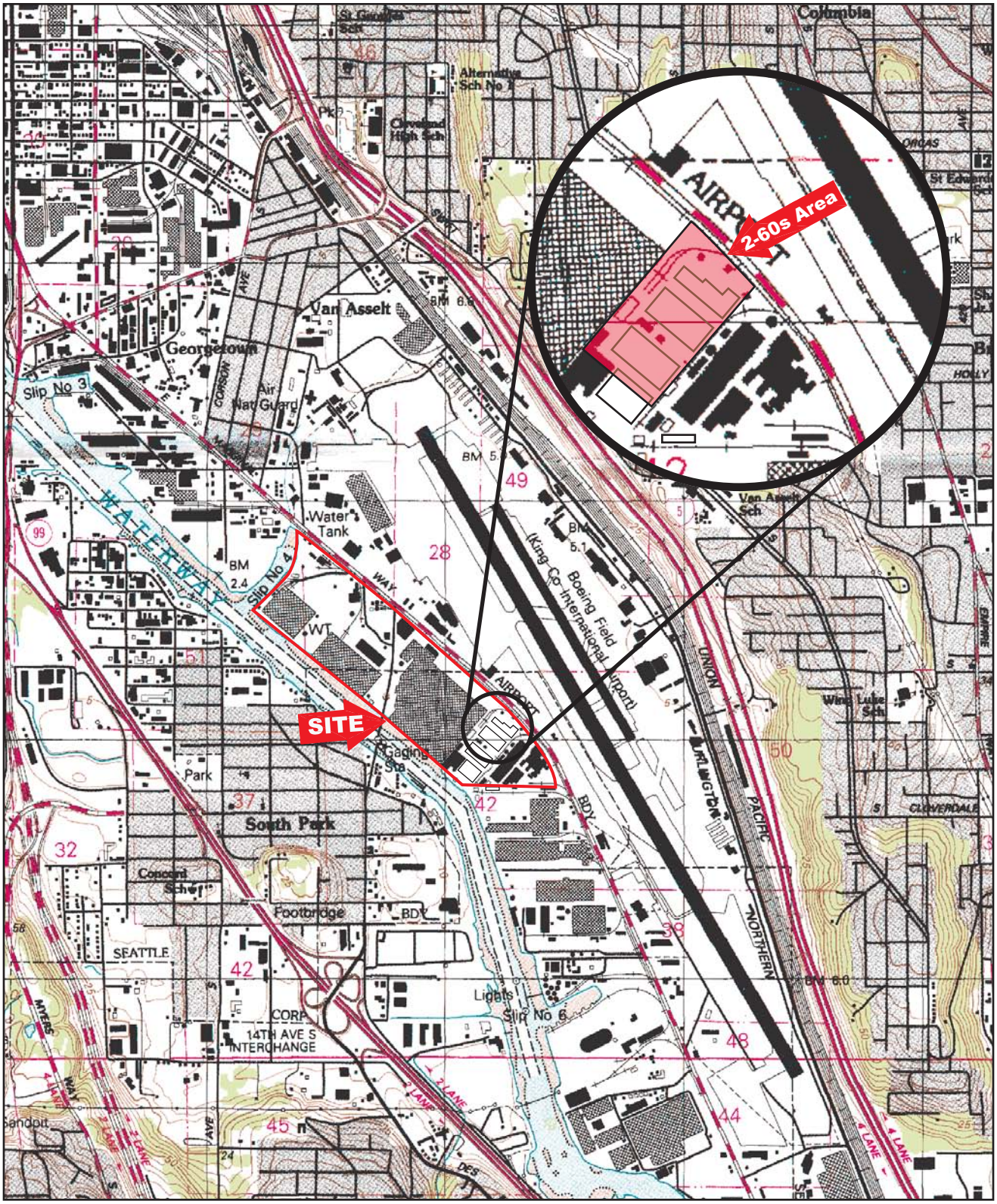
Notes:
Bolded analytes have reporting limits above lowest risk based calculation. Screening levels were adjusted on Table 2-1 accordingly. Analytes measured by the 8270 (SIM) method are also included in the 8270 analysis, but at a higher RL.
- No CAS number available

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Figures



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Data Gaps Investigation Work Plan
2-60s Area
Boeing Plant 2
Seattle/Tukwila, Washington

Figure 1-1
Vicinity Map

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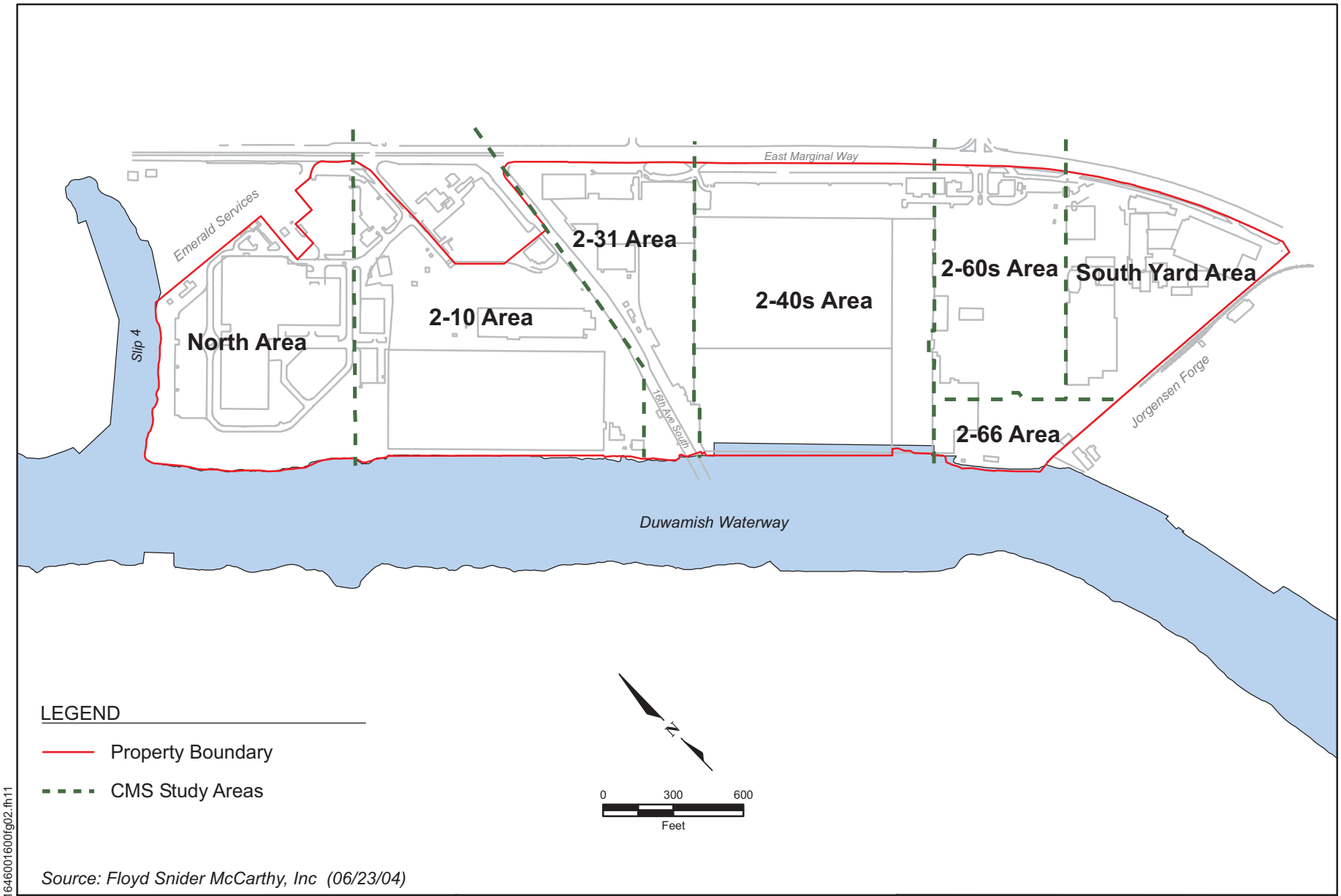

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DRAWING NO. 0131646001600fg02.fh11

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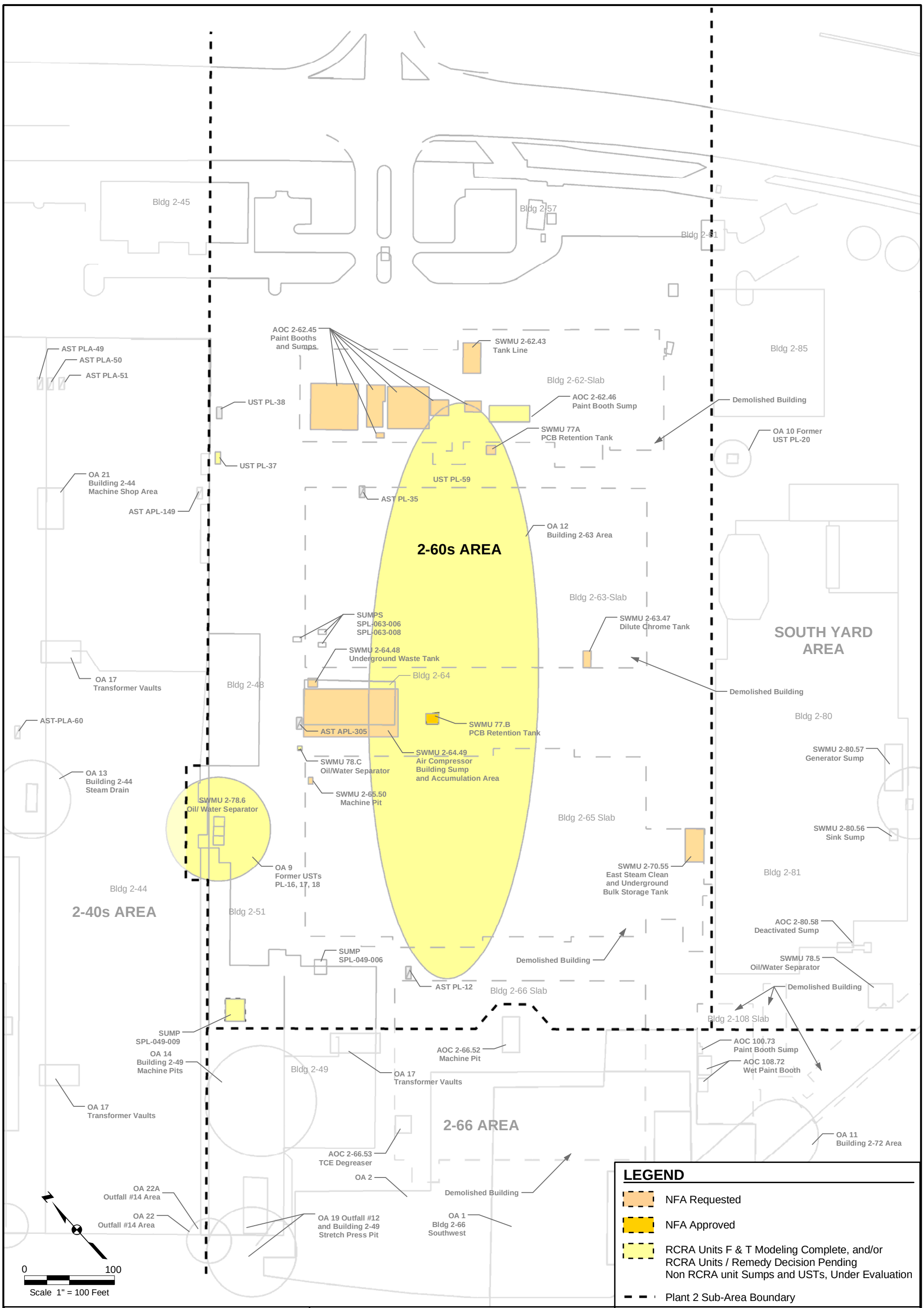
TN	06/22/05

Data Gaps Investigation Work Plan
2-60s Area
Boeing Plant 2
Seattle/Tukwila, Washington

Figure 1-2
Site Plan with CMS Study Areas



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1 OF 1	RT
REVIEWED BY	DATE
KA	06/22/04

DATA GAPS INVESTIGATION WORK PLAN
2-60s AREA
BOEING PLANT 2
SEATTLE / TUKWILA, WASHINGTON

Figure 1-3
2-60s Area

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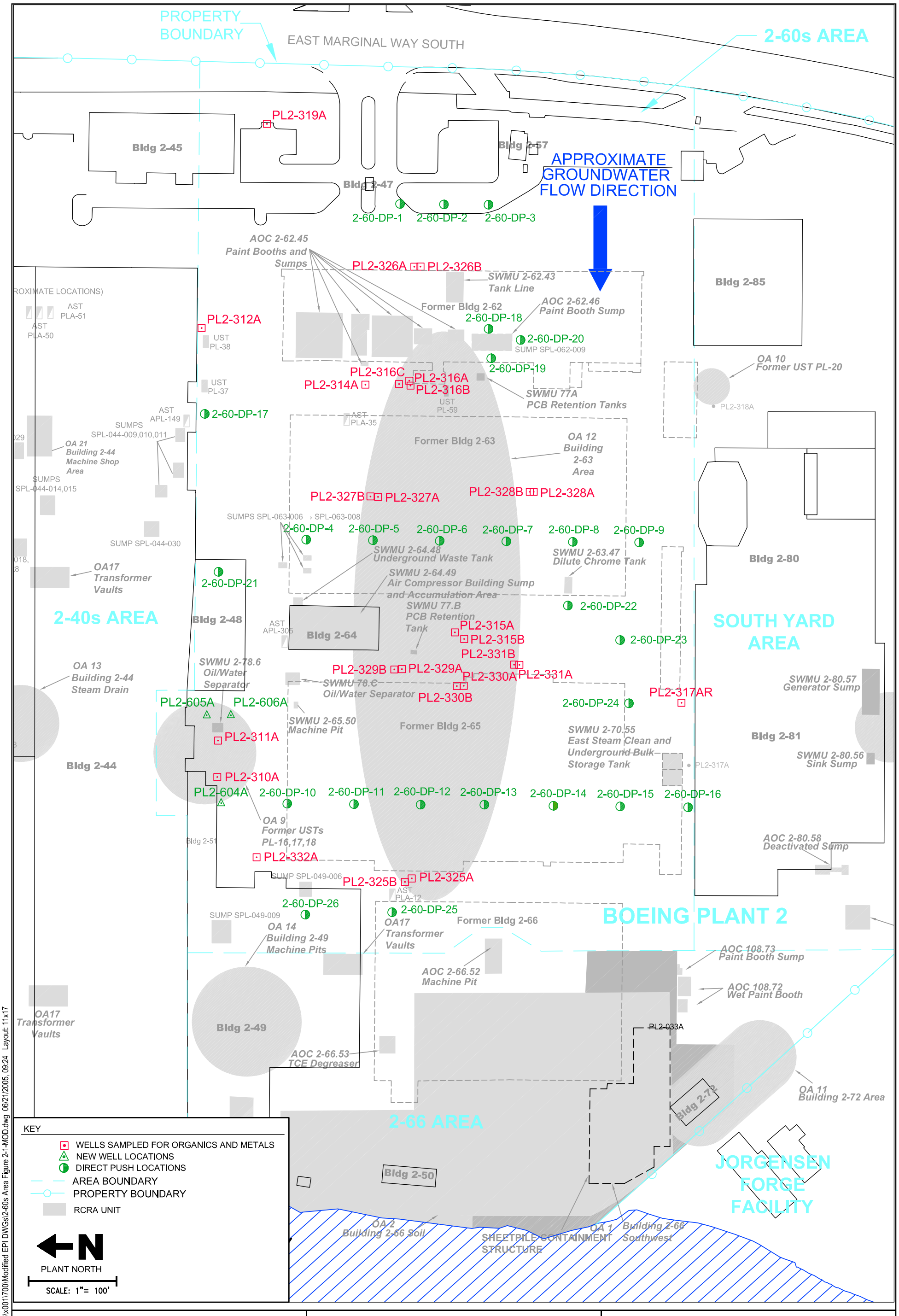

SHEET	DRAWN BY
1 of 1	SLG
REVIEWED BY	DATE
KA	6/22/05

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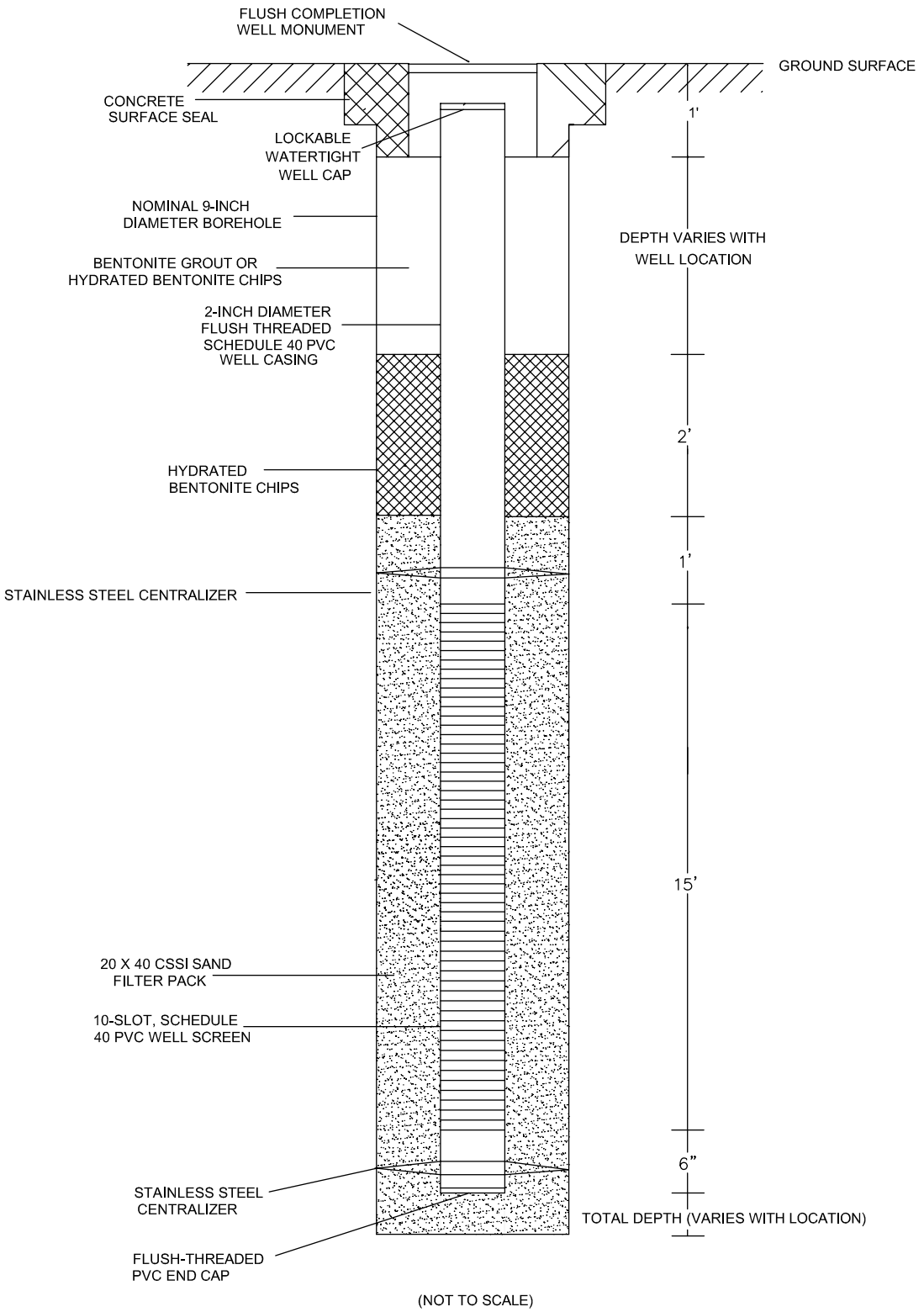
Data Gaps Investigation Work Plan
2-60s Area
Boeing Plant 2
Seattle/Tukwila, Washington

Figure 2-1
Groundwater Data Gap Sampling Locations

K:\CAD\Projects\2001\0131646\x001\700\Modified EPI DWGs\2-60s Area Figure 2-1-MOD.dwg 06/21/2005, 09:24 Layout: 11x17



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1 of 1	TJN	DCK	6/22/05

Data Gaps Investigation Work Plan
2-60's Area
Boeing Plant 2
Seattle/Tukwila, Washington

Figure 3-1
Generalized Shallow
Monitoring Well
Construction Drawing

K:\CAD\Projects\2001\0131646\x002\100\0131646002100F02.dwg 06/21/2005, 09:21 Layout: FIG_3-1

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment A
Groundwater Constituents of Concern

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Manganese – Dissolved in Level A Groundwater

Manganese – Dissolved in Level B Groundwater

Manganese – Dissolved in Level C Groundwater

Nickel – Dissolved in Level A Groundwater

Nickel – Dissolved in Level C Groundwater

Benzene Concentrations in Level A Groundwater

1,1-Dichloroethene Concentration in Level A Groundwater

cis-1,2-Dichloroethene Concentration in Level A Groundwater

Ethylbenzene Concentration in Level A Groundwater

Methylene Chloride Concentration in Level A Groundwater

Tetrachloroethene Concentration in Level A Groundwater

Trichloroethene Concentration in Level A Groundwater

Vinyl Chloride Concentration in Level A Groundwater

Vinyl Chloride Concentration in Level B Groundwater

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Maximum Cyanide Concentrations in Groundwater
Maximum Benzene Concentrations in Groundwater
Maximum 1,1-Dichloroethene Concentrations in Groundwater
Maximum Ethylbenzene Concentrations in Groundwater
Maximum Methylene Chloride Concentrations in Groundwater
Maximum Tetrachloroethene Concentrations in Groundwater
Maximum Trichloroethene Concentrations in Groundwater
Maximum Vinyl Chloride Concentrations in Groundwater
Maximum Total Petroleum Hydrocarbons (Diesel Range) in Groundwater
Maximum Total Petroleum Hydrocarbons (Gasoline Range) in Groundwater

A1.0 Groundwater Constituents of Concern

This attachment includes groundwater data information for the 2-60 Area of Boeing Plant 2 (Plant 2). This information was used to prepare Section 2, Data Gap Analysis, of this Data Gap Investigation Work Plan and includes: tables summarizing site-wide and 2-60s Area groundwater COCs, maps showing the distribution of COCs in the different groundwater zones of the 2-60s Area, and data tables for each groundwater COC.

A1.1 IDENTIFICATION OF COCS

Table A-1 summarizes the screening levels for the site-wide groundwater COCs. All accepted groundwater data including any qualified data compiled since 1986 were used to prepare the table. It is important to note that these data include samples from the Jorgensen Forge area that likely do not represent constituents from Plant 2, but are included to present the most conservative and comprehensive result. A COC was identified when laboratory analysis of a sample resulted in a concentration greater than the screening level at least once in any groundwater zone at the site. Table A-1 also includes the risk calculation for the groundwater-to-air and groundwater-to-surface water pathways. As discussed in detail in Volume II, screening levels for groundwater are the same as risk calculation results. At the time of this submittal, background metal concentrations for Plant 2 have not been determined, so a blank column is included in the table as a placeholder. Background metals concentrations will be used to revise screening levels when the values are available later in the CMS process. Because no risk information is available, the TPH screening level was established according to the Model Toxics Control Act (MTCA) Method A.

Table A-2 presents the current groundwater COCs for the 2-60s Area. COCs were identified by the same method as described above for Table A-1. All accepted groundwater data, including any qualified data compiled from the 2-60s Area since 1989 collected under the agreed order, were used to prepare the table.

A1.2 SPATIAL DISTRIBUTION OF COCS

Included in this attachment are maps showing the spatial distribution of each COC in Level A groundwater of the 2-60s Area. Maps are also included that show the distribution of a COC in Levels B or C if there were enough detections to interpret a groundwater plume. The accepted maximum concentration of each COC was used to generate the maps. If a constituent was never detected at a particular location, then the reporting limit and date for the most recent non-detects is presented along with the number of times the constituent was sampled at that location. All maps are oriented according to “plant” north.

A1.3 DATA TABLES

The data tables show all of the accepted maximum concentrations for each groundwater COC and the three soil COCs mentioned above. The data tables include data from all three groundwater levels, regardless of the frequency of detection.

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment A
Tables

Table A-1 Screening Levels for Constituents of Concern in Site-wide Groundwater
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Maximum Detect (µg/l)	Laboratory RL (µg/l)	Air Risk Calculation[a] (µg/l)	Air Screening Level (µg/l)	Surface Water Risk Calculation[b] (µg/l)	Surface Water Screening Level (µg/l)
Metals and Cyanide							
7440-38-2	Arsenic	1.30E+02	2.00E-01	- -	- -	***1.94E-02***	***2.00E-01***
7440-43-9	Cadmium	1.02E+02	2.00E+00	- -	- -	***7.35E+00***	***7.35E+00***
7440-50-8	Copper	1.10E+02	5.00E-01	- -	- -	***3.10E+00***	***3.10E+00***
7439-92-1	Lead	1.00E+01	1.00E+00	- -	- -	***8.10E+00***	***8.10E+00***
7439-96-5	Manganese	6.77E+03	1.00E+00	- -	- -	***1.00E+02***	***1.00E+02***
7439-97-6	Mercury	9.00E-01	2.50E-02	1.84E+02	1.84E+02	***2.50E-02***	***2.50E-02***
7440-02-0	Nickel (soluble salts)	3.40E+02	5.00E-01	- -	- -	***8.20E+00***	***8.20E+00***
7782-49-2	Selenium	3.00E+02	5.00E+01	- -	- -	***7.10E+01***	***7.10E+01***
7440-22-4	Silver	3.00E+01	5.00E-01	- -	- -	***1.90E+00***	***1.90E+00***
7440-28-0	Thallium (soluble salts)	7.00E+01	2.00E-01	- -	- -	***4.70E-01***	***4.70E-01***
7440-66-6	Zinc	2.11E+03	6.00E+00	- -	- -	***8.10E+01***	***8.10E+01***
57-12-5	Cyanide	5.80E+02	5.00E+00	- -	- -	***1.00E+00***	***5.00E+00***
Semivolatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs)							
56-55-3	Benzo(a)anthracene	3.30E+00	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
205-99-2	Benzo(b)fluoranthene	8.50E-01	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
207-08-9	Benzo(k)fluoranthene	2.80E-01	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
50-32-8	Benzo(a)pyrene	1.50E+00	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
218-01-9	Chrysene	6.20E+00	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
53-70-3	Dibenz(a,h)anthracene	1.90E-01	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
105-67-9	2,4-Dimethylphenol	5.20E+02	3.00E+00	- -	- -	***2.01E+02***	***2.01E+02***
117-81-7	bis(2-Ethylhexyl)phthalate	1.30E+01	3.00E+00	- -	- -	***7.05E-01***	***3.00E+00***
193-39-5	Indeno(1,2,3-cd)pyrene	2.90E-01	1.00E-01	- -	- -	***5.86E-03***	***1.00E-01***
-	Aroclor 1016/1242	1.10E-01	1.00E-02	- -	- -	***6.40E-05***	***1.00E-02***
11097-69-1	Aroclor 1254	1.90E+00	1.00E-02	- -	- -	***6.40E-05***	***1.00E-02***
11097-69-1	Aroclor 1260	8.90E+00	1.00E-02	- -	- -	***6.40E-05***	***1.00E-02***
-	Total PCBs	8.90E+00	1.00E-02	- -	- -	***6.40E-05***	***1.00E-02***

Table A-1 Screening Levels for Constituents of Concern in Site-wide Groundwater
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Maximum Detect (µg/l)	Laboratory RL (µg/l)	Air Risk Calculation[a] (µg/l)	Air Screening Level (µg/l)	Surface Water Risk Calculation[b] (µg/l)	Surface Water Screening Level (µg/l)
Volatile Organic Compounds (VOCs)							
71-43-2	Benzene	6.20E+03	2.00E-01	***1.40E+03***	***1.40E+03***	***4.48E+00***	***4.48E+00***
56-23-5	Carbon Tetrachloride	2.02E+02	2.00E-01	***1.52E+02***	***1.52E+02***	***5.26E-01***	***5.26E-01***
74-87-3	Chloromethane	4.80E+01	2.00E-01	2.44E+03	2.44E+03	***2.63E+01***	***2.63E+01***
107-06-2	1,2-Dichloroethane	2.30E+01	2.00E-01	1.78E+03	1.78E+03	***1.17E+01***	***1.17E+01***
75-35-4	1,1-Dichloroethene	5.00E+02	2.00E-01	***4.23E+01***	***4.23E+01***	***3.82E-01***	***3.82E-01***
156-59-2	cis-1,2-Dichloroethene	4.60E+05	2.00E-01	***1.51E+04***	***1.51E+04***	***1.13E+03***	***1.13E+03***
100-41-4	Ethylbenzene	2.30E+03	2.00E-01	9.50E+03	9.50E+03	***2.10E+03***	***2.10E+03***
75-09-2	Methylene Chloride	5.10E+02	3.00E-01	4.46E+04	4.46E+04	***1.90E+02***	***1.90E+02***
127-18-4	Tetrachloroethene	3.60E+01	2.00E-01	1.52E+03	1.52E+03	***8.22E-01***	***8.22E-01***
79-00-5	1,1,2-Trichloroethane	4.40E+02	2.00E-01	3.67E+03	3.67E+03	***5.00E+00***	***5.00E+00***
79-01-6	Trichloroethene	4.20E+05	2.00E-01	***6.20E+01***	***6.20E+01***	***3.02E-01***	***3.02E-01***
75-01-4	Vinyl Chloride	9.80E+04	2.00E-01	***3.71E+02***	***3.71E+02***	***7.31E-01***	***7.31E-01***
Total Petroleum Hydrocarbons (TPH)							
-	TPH-D	7.00E+03	5.00E+02	5.00E+02			
-	TPH-G	6.50E+04	2.50E+02	8.00E+02			
-	TPH-O	3.00E+03	5.00E+02	5.00E+02			

Notes

All maximum detections for metals represent dissolved metals.

Screening levels adjust risk calculations up to RL where applicable.

Bolded — **Bolded** risk based and screening level concentrations are below maximum detect.

[a] Lowest groundwater concentration protective of indoor air, outdoor air, and trenching.

[b] Lowest groundwater concentration protective of human ingestion of aquatic organisms and protection of aquatic organisms.

RL — Reporting Limit as detailed in Analytical Resources Inc. Laboratory Quality Assurance Plan, Version 11-022, dated 5/17/04 (generally equivalent to the practical quantitation limit in a clean matrix).

TPH — Total Petroleum Hydrocarbons

- - — Not calculated.

Table A-2 Constituents of Concern Detected in Groundwater
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Site Wide GW COC?	Maximum Detect (µg/l)	Samples Analyzed	Detects	Area GW COC?	Samples above Air Screening Level	Samples above Surface Water Screening Level
Metals and Cyanide								
7440-38-2	Arsenic	Yes	4.40E+01	52	43	Yes	- -	43
7440-50-8	Copper	Yes	4.20E+01	52	40	Yes	- -	21
7439-96-5	Manganese	Yes	4.64E+03	34	31	Yes	- -	15
7440-02-0	Nickel (soluble salts)	Yes	3.57E+01	52	20	Yes	- -	2
57-12-5	Cyanide	Yes	1.80E+01	12	2	Yes	- -	2
Volatile Organic Compounds (VOCs)								
71-43-2	Benzene	Yes	6.20E+03	119	6	Yes	2	5
75-35-4	1,1-Dichloroethene	Yes	1.40E+00	115	2	Yes	0	2
100-41-4	Ethylbenzene	Yes	2.30E+03	119	5	Yes	0	1
75-09-2	Methylene Chloride	Yes	3.10E+02	115	6	Yes	0	1
127-18-4	Tetrachloroethene	Yes	2.80E+01	115	14	Yes	0	14
79-01-6	Trichloroethene	Yes	1.50E+02	115	49	Yes	9	49
75-01-4	Vinyl Chloride	Yes	1.40E+02	115	58	Yes	0	29
Petroleum Hydrocarbons								
-	TPH-Diesel Range	Yes	4.80E+03	31	4	Yes	2	
-	TPH-Gasoline Range	Yes	6.50E+04	14	3	Yes	2	

Notes:

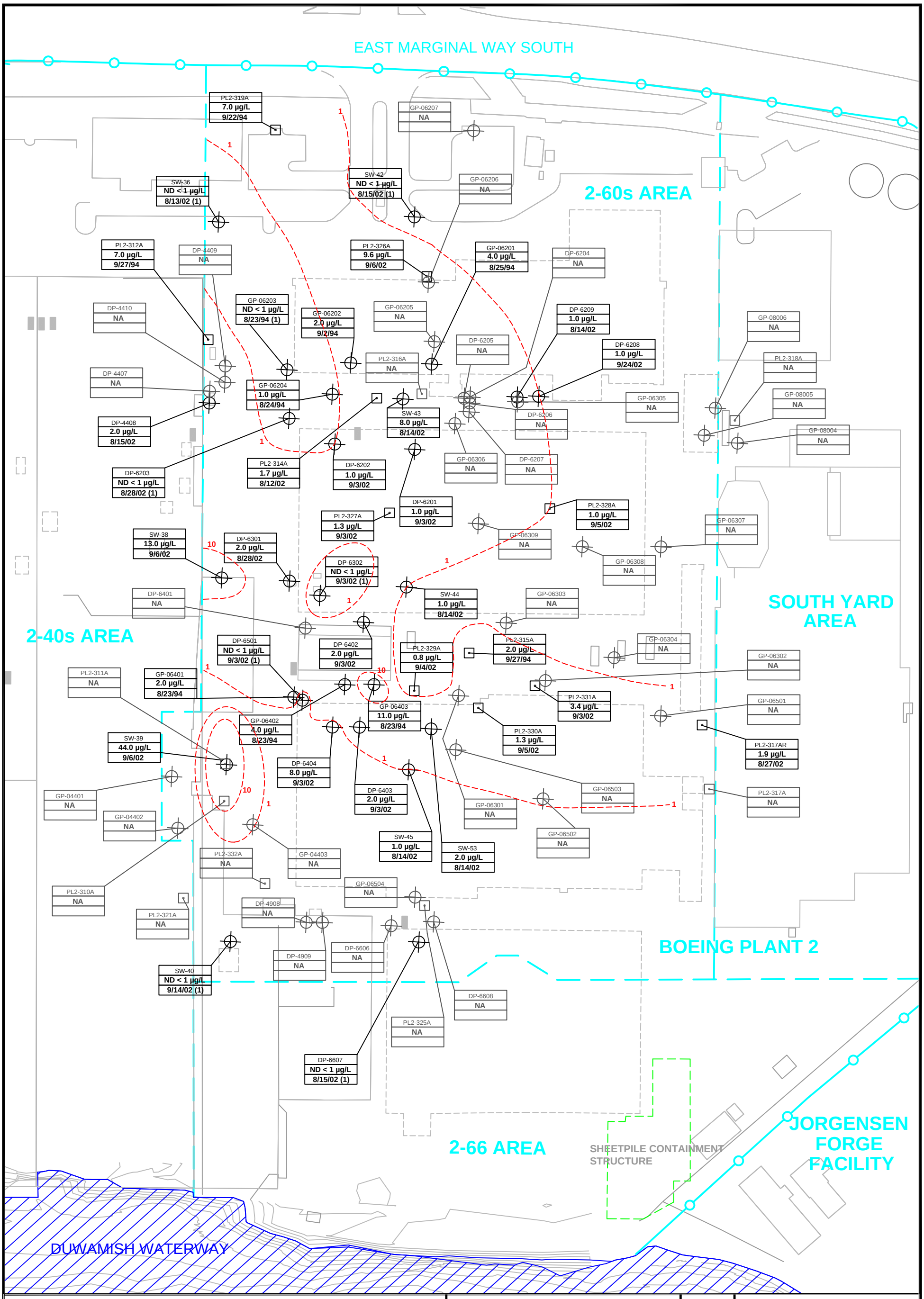
All maximum detections for metals represent dissolved metals.
Sample population is defined as groundwater samples collected from within the 2-60s Area.

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment A
Maps



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

N

SCALE: 1" = 100'

SCREENING LEVEL (2004) = 0.2 µg/L

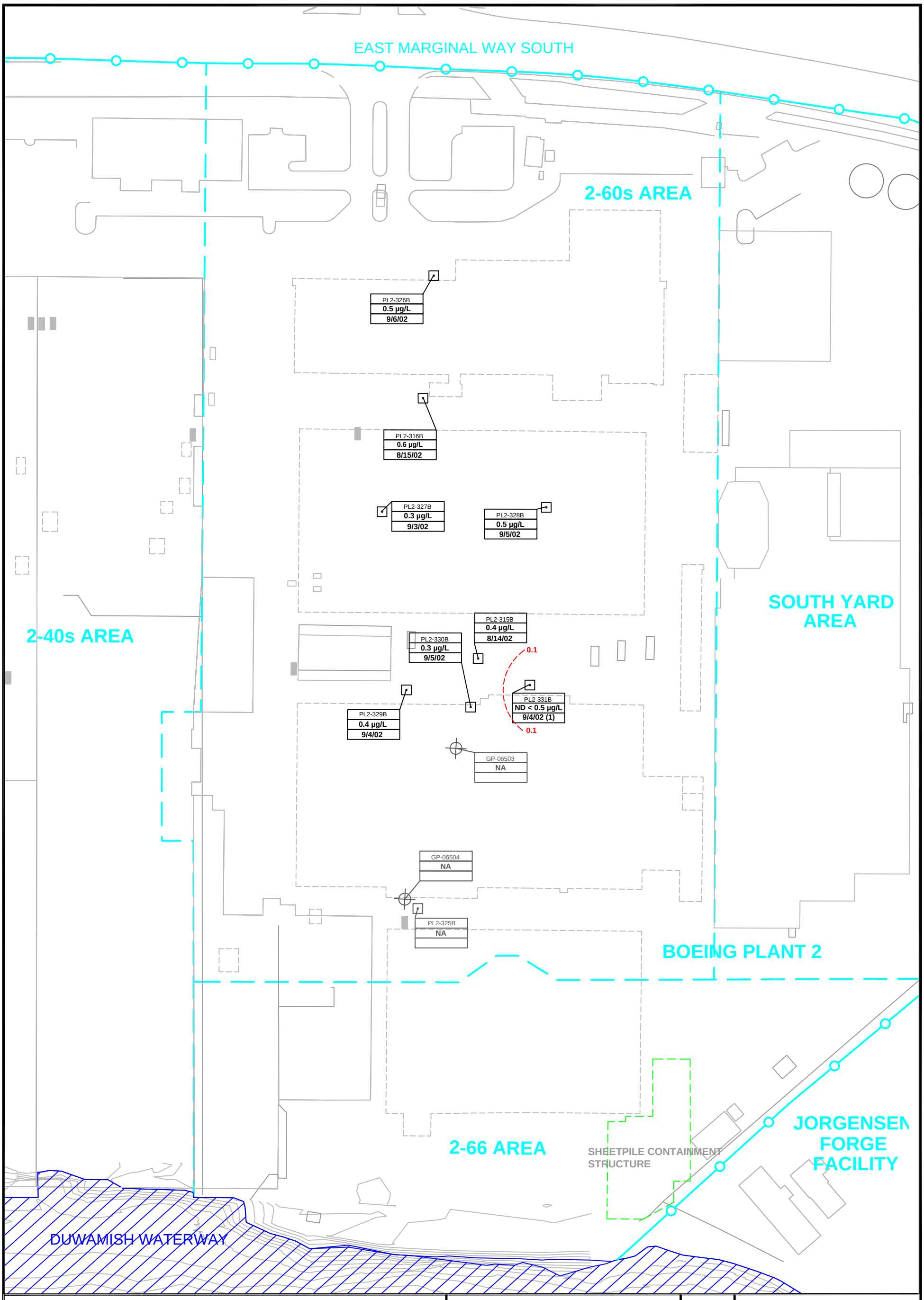
PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
ARSENIC - DISSOLVED
IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TK	DCK	8/16/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 0.2 µg/L

N

SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
ARSENIC - DISSOLVED
IN LEVEL B GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
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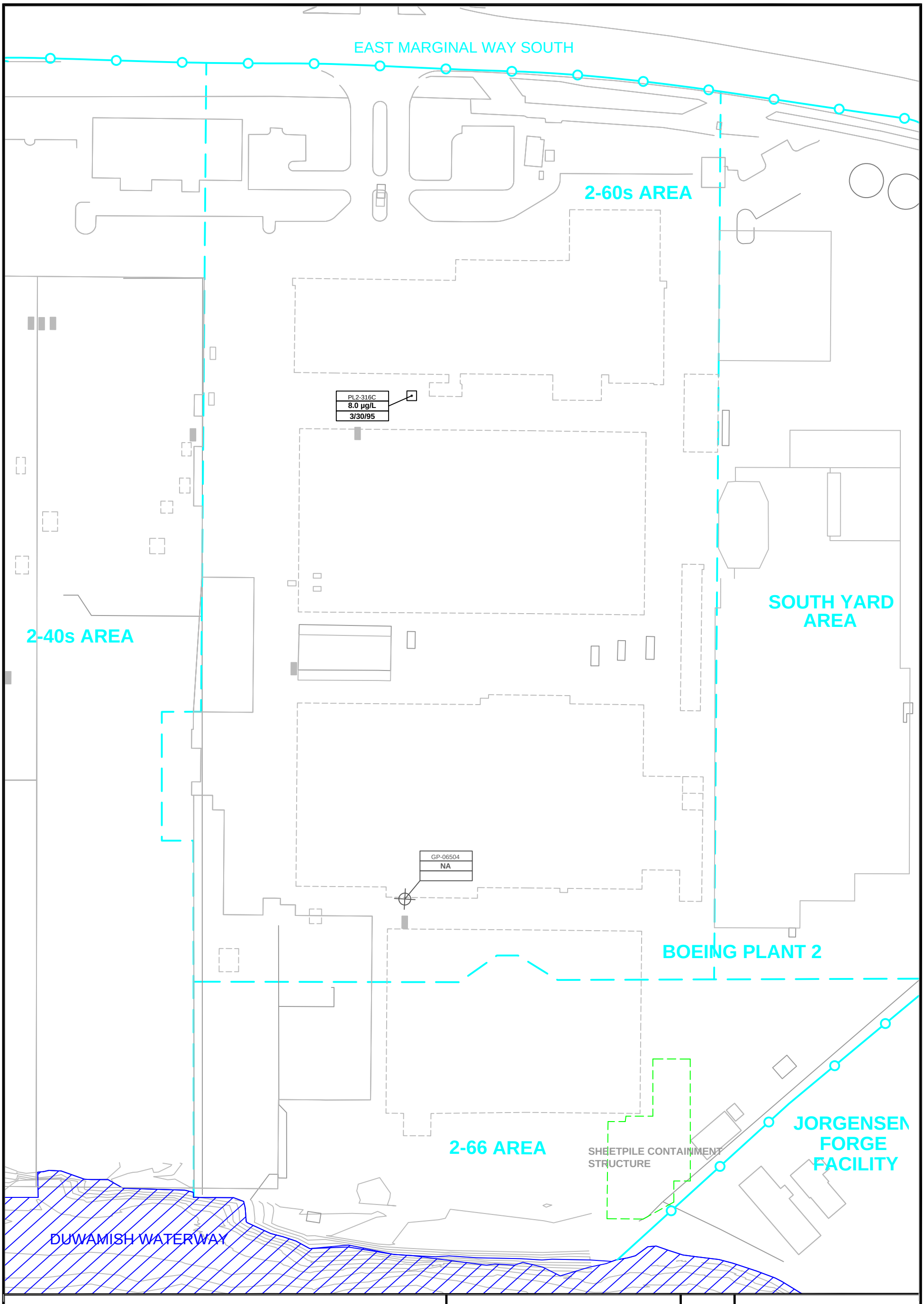


KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 0.2 µg/L

N

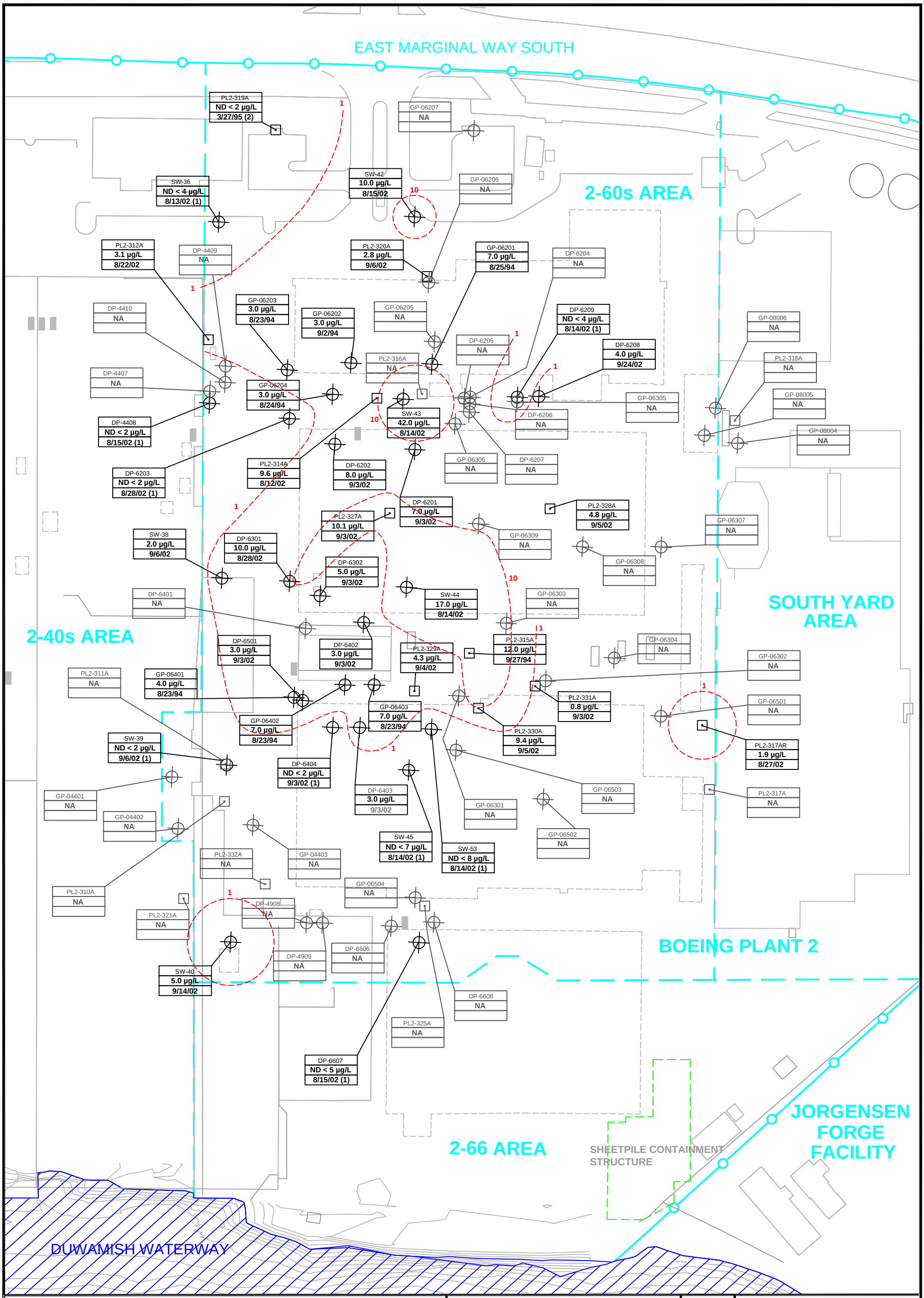
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
ARSENIC - DISSOLVED CONCENTRATIONS IN LEVEL C GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY DCK	DATE 8/19/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 3.10 µg/L

N

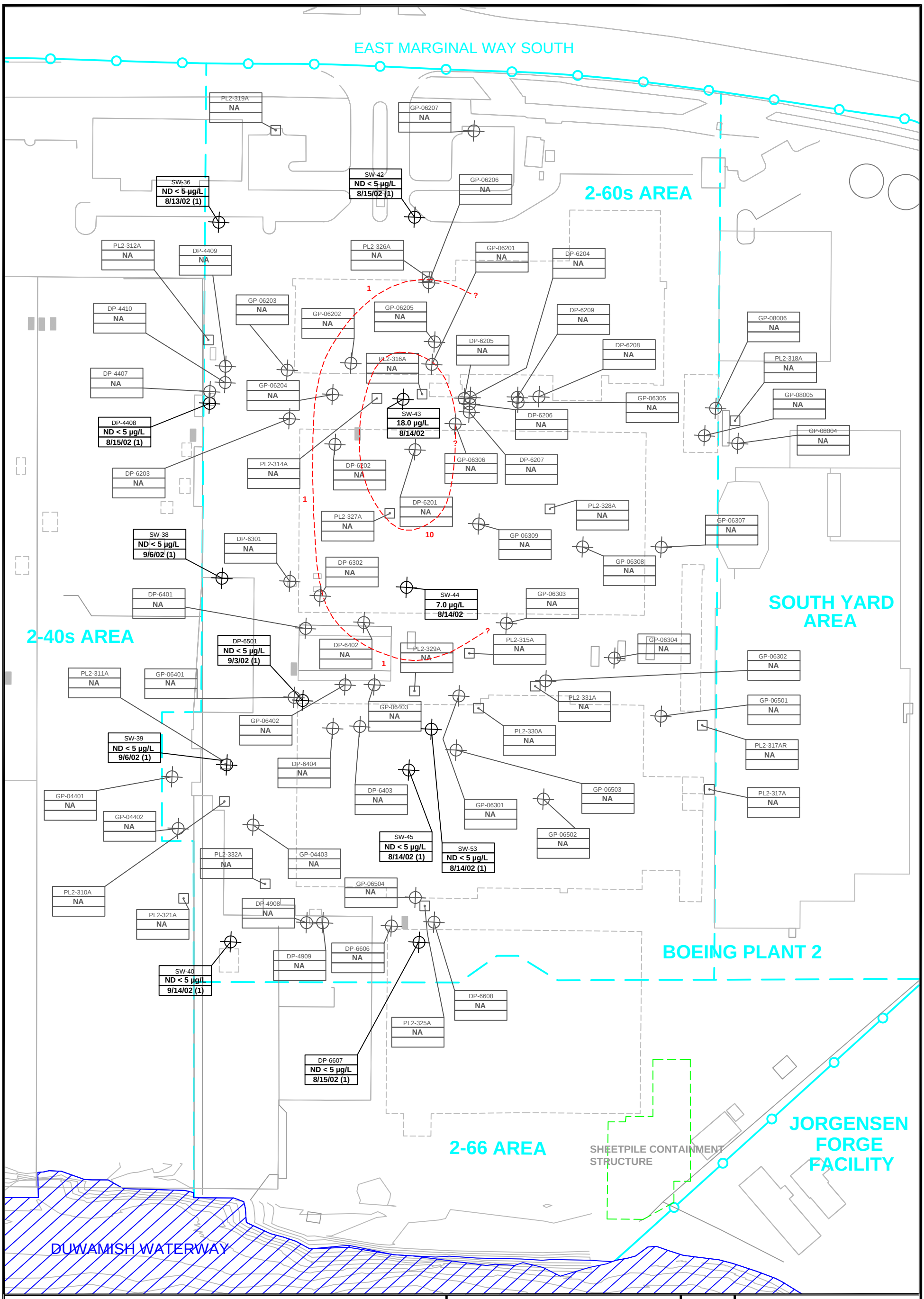
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
COPPER - DISSOLVED
IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY JOB	DATE 8/16/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 5.0 µg/L

N

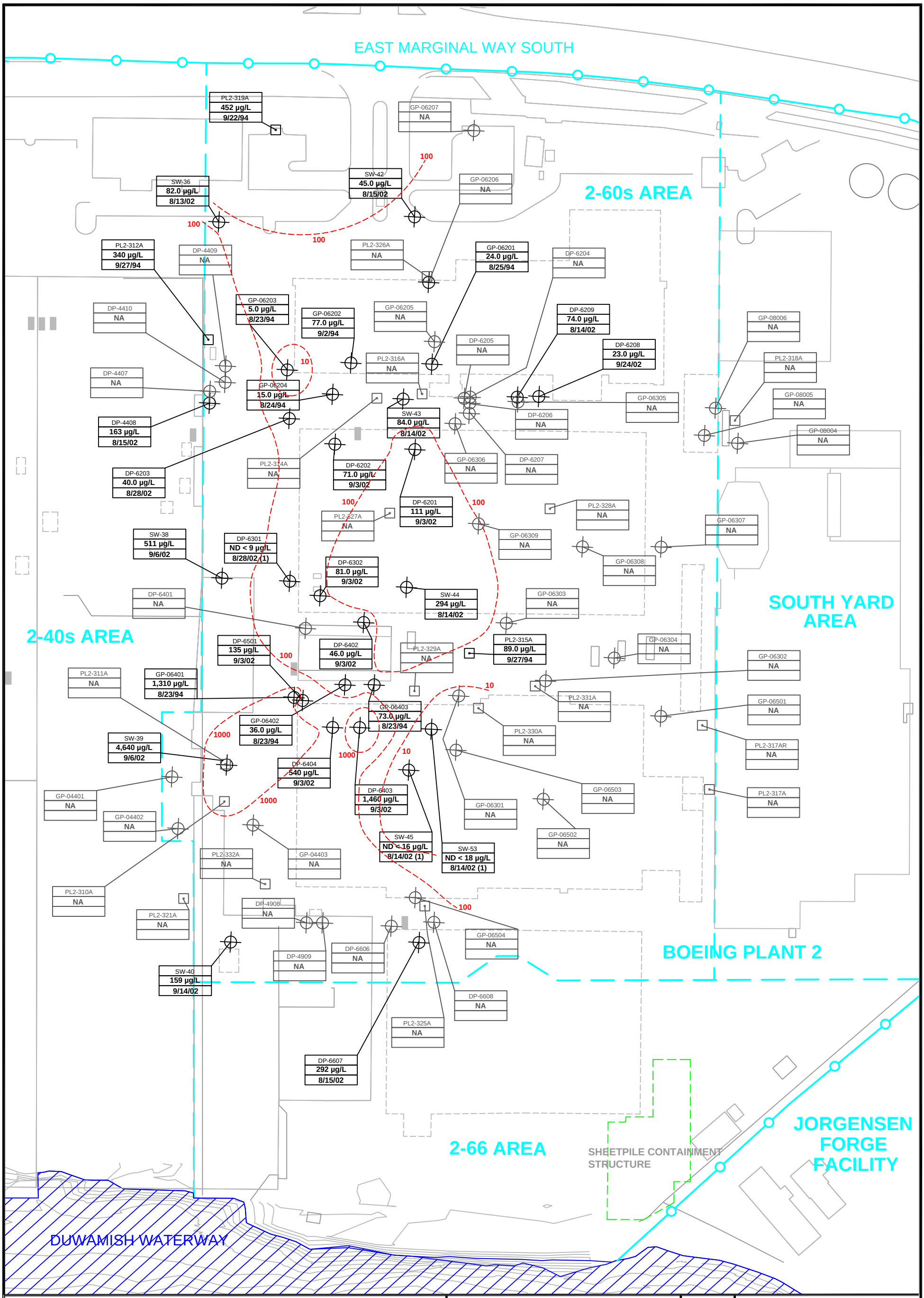
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
CYANIDE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY JMW	REVIEWED BY DCK	DATE 8/16/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 100 µg/L

N

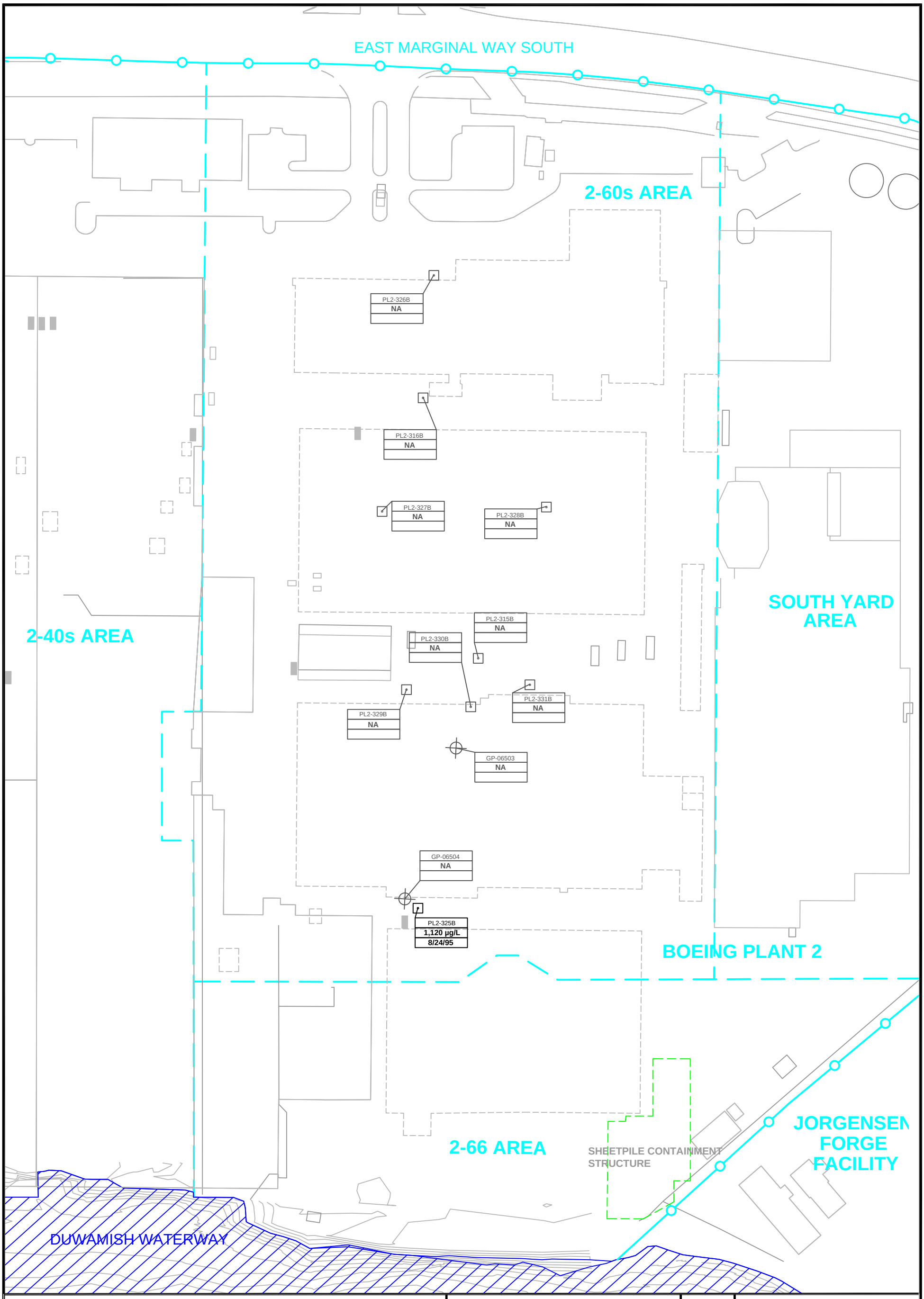
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
MANGANESE - DISSOLVED
IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY DCK	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 100 µg/L

N

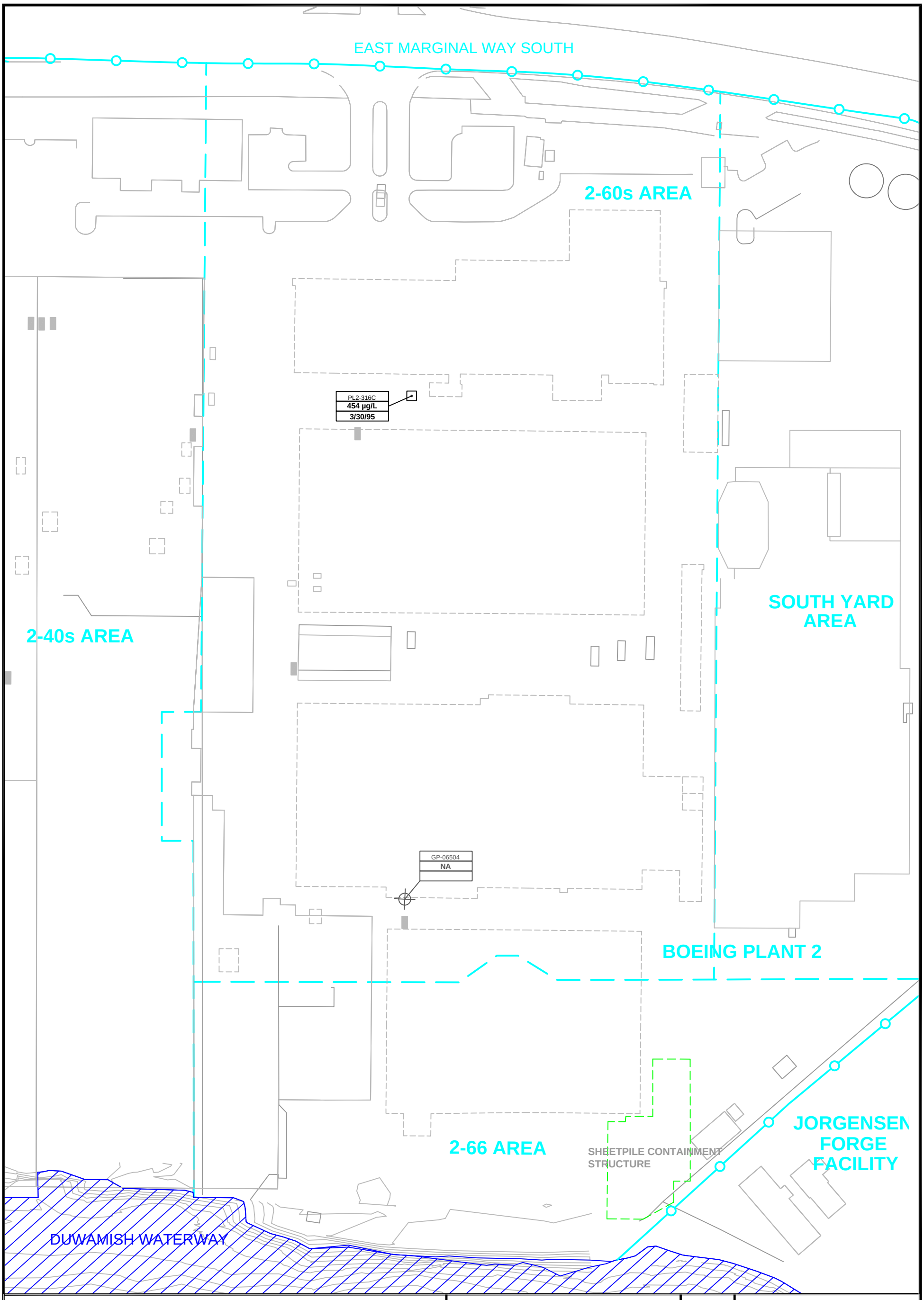
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
MANGANESE - DISSOLVED CONCENTRATIONS IN LEVEL B GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY DCK	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 100 µg/L

N

SCALE: 1"= 100'

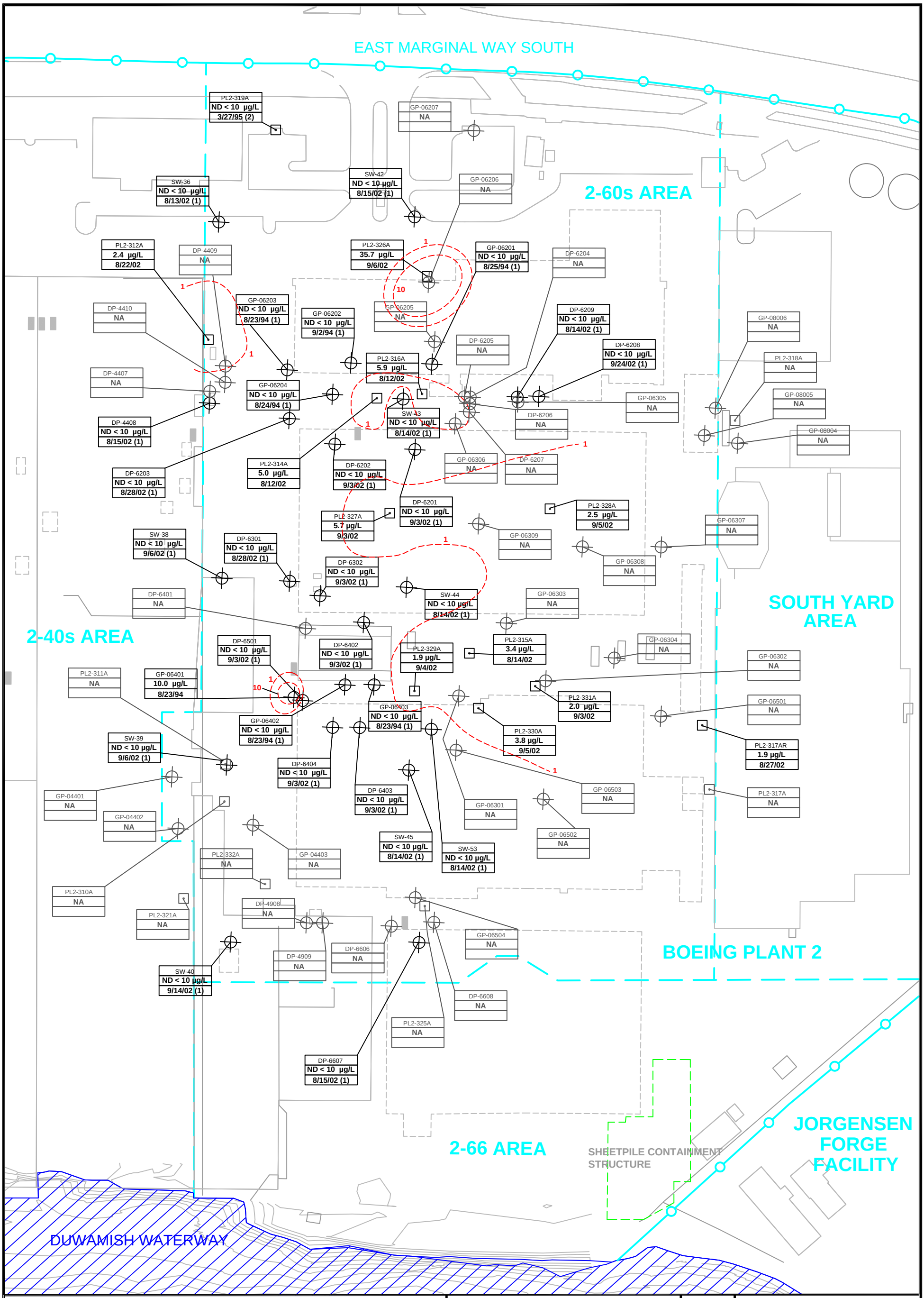
PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
MANGANESE - DISSOLVED CONCENTRATIONS IN LEVEL C GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TK	DCK	8/19/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 8.2 µg/L

N

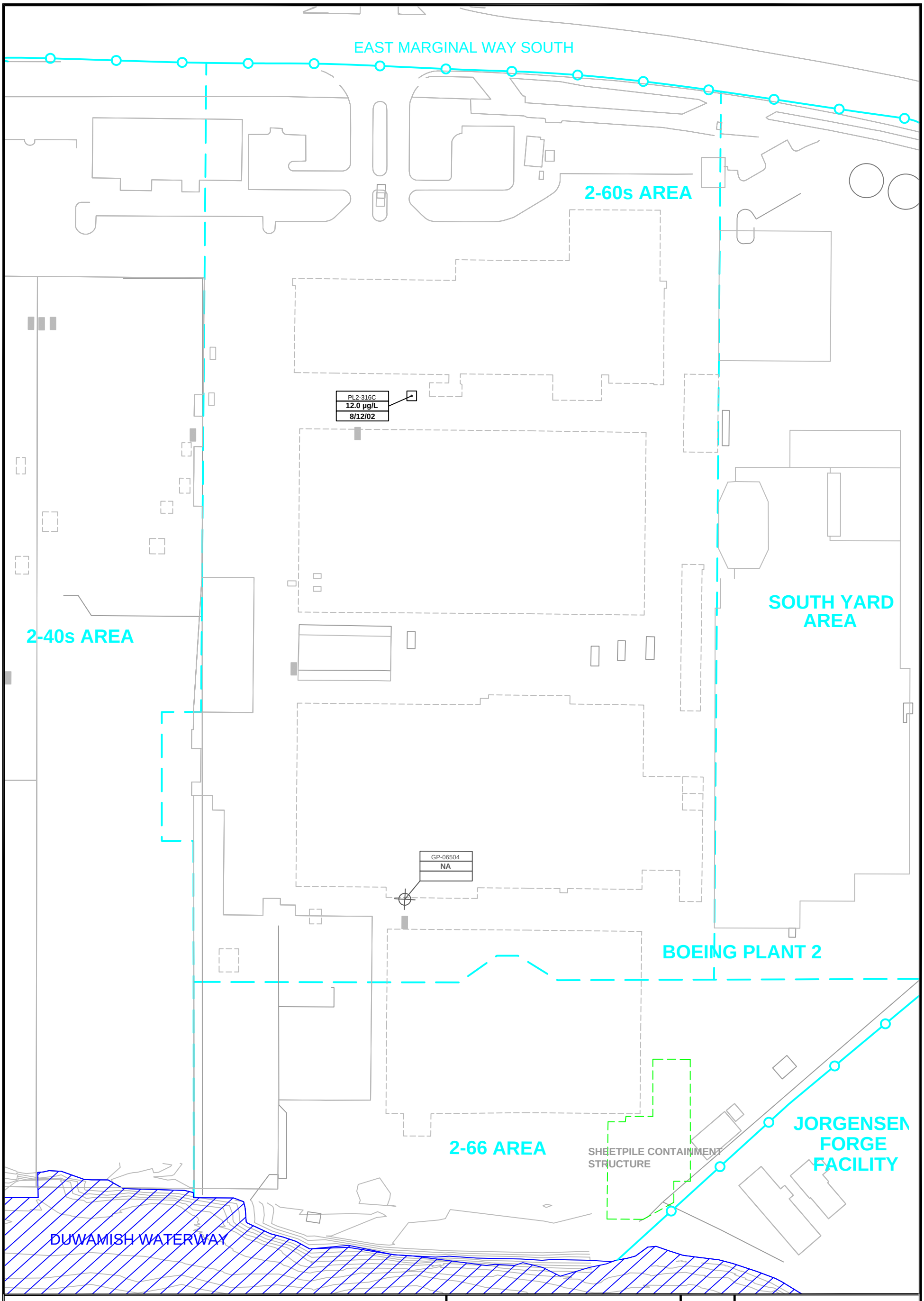
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
NICKEL - DISSOLVED
IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY DCK	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 8.2 µg/L

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

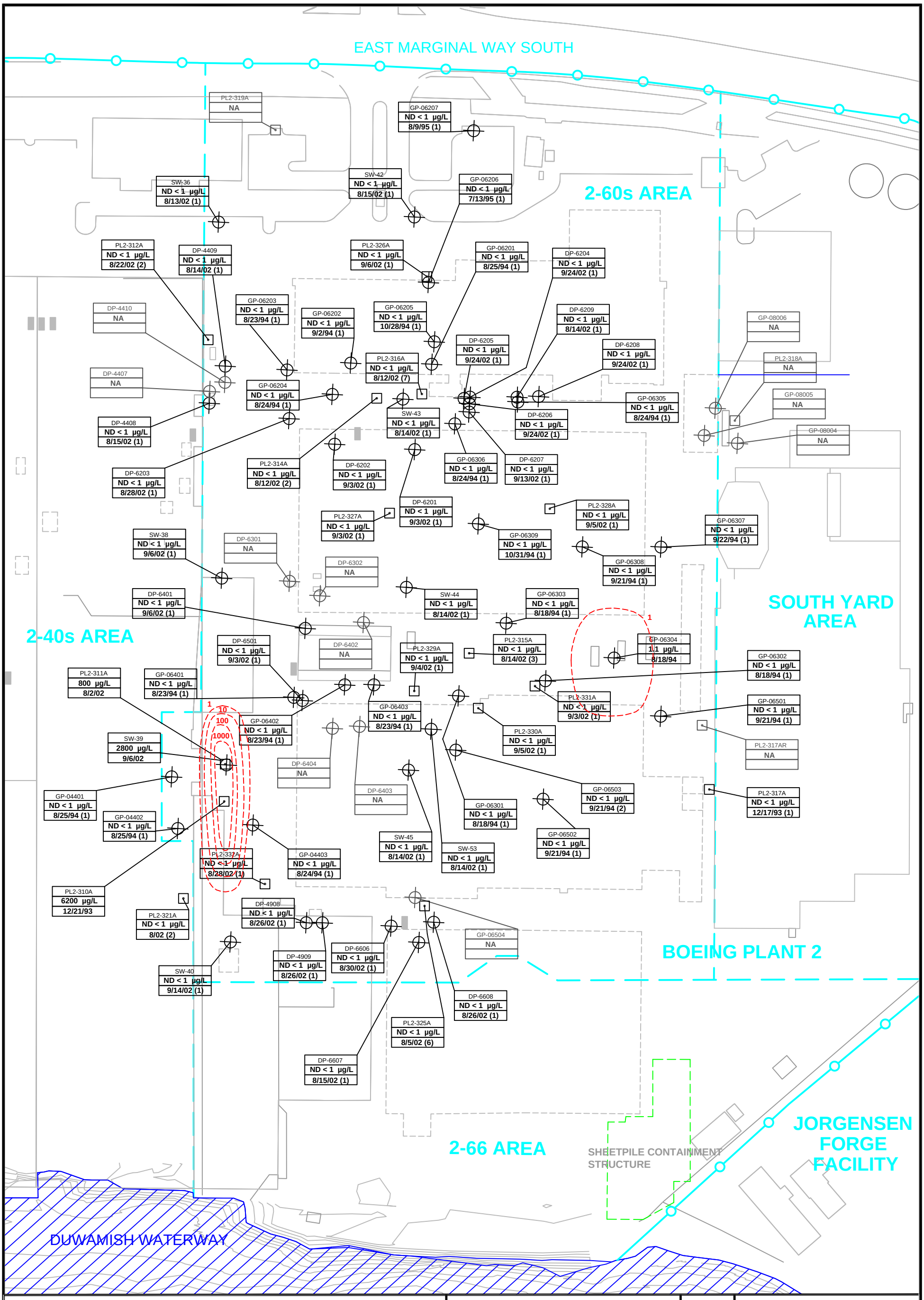
N

SCALE: 1"= 100'

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
NICKEL - DISSOLVED
CONCENTRATIONS
IN LEVEL C GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY DCK	DATE 8/19/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

N

SCALE: 1"= 100'

SCREENING LEVEL (2004) = 4.48 µg/L

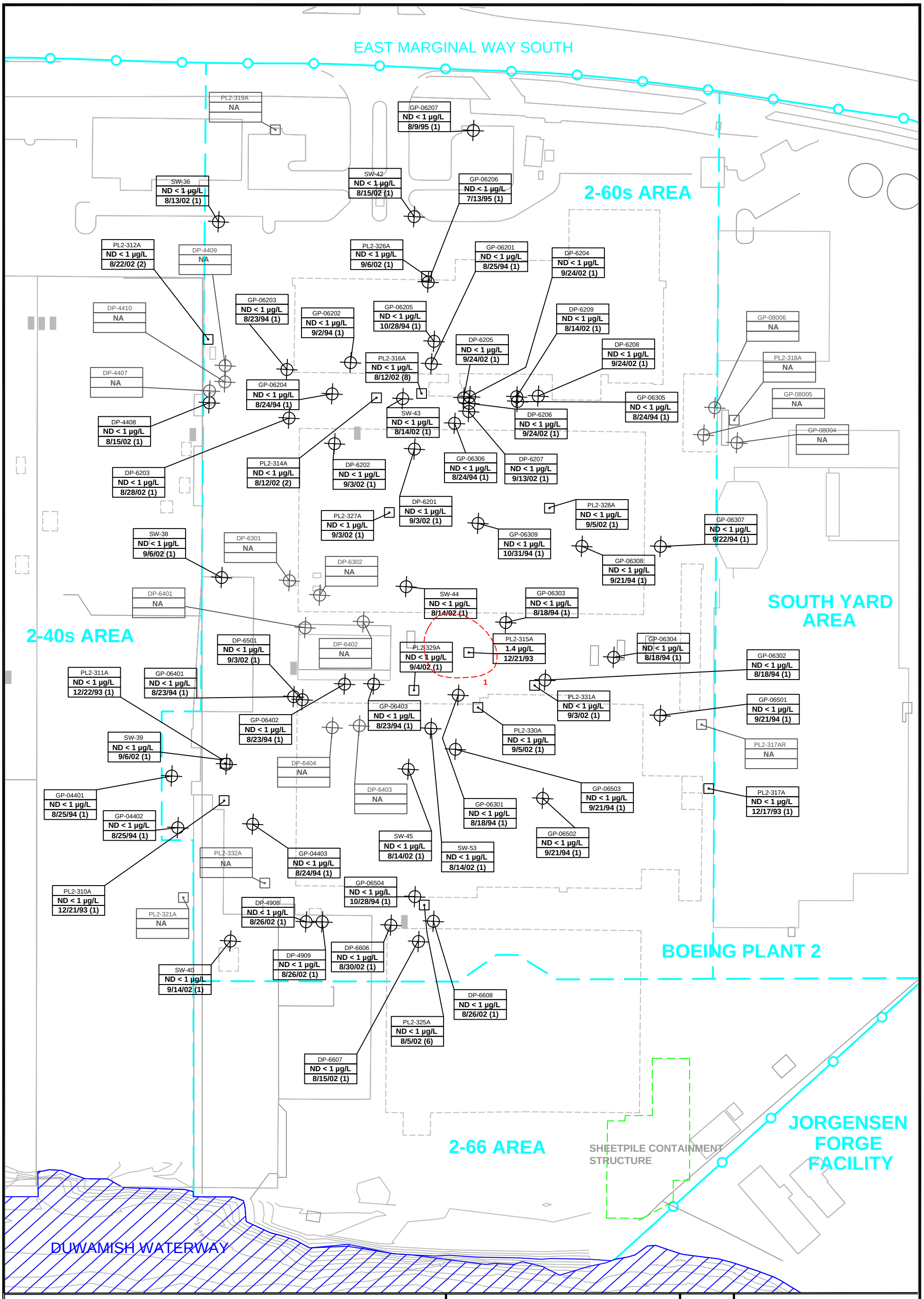
PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
BENZENE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	JMW	DCK	8/16/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

N

SCALE: 1"= 100'

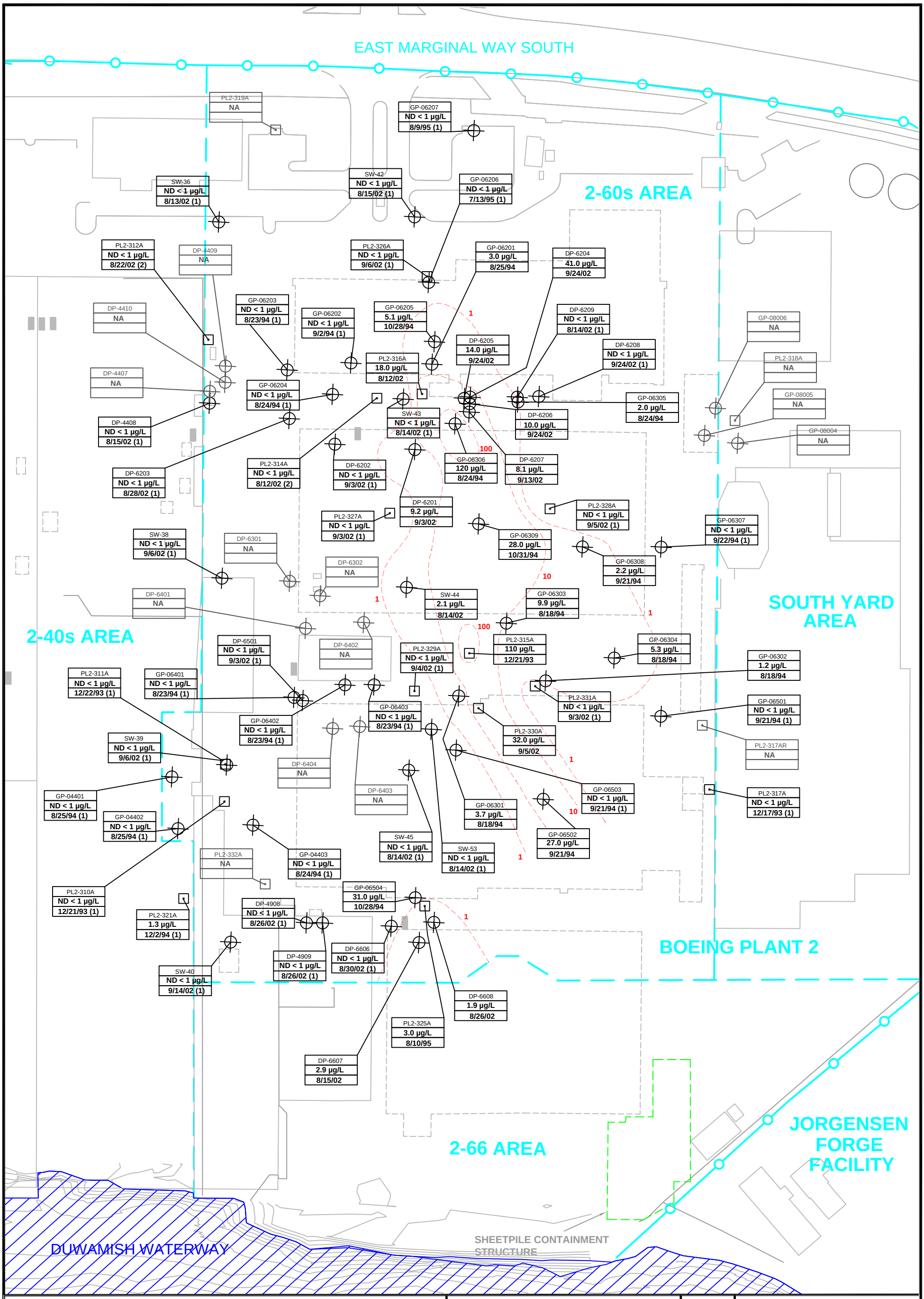
SCREENING LEVEL (2004) = 0.382 µg/L

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
1,1-DICHLOROETHENE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY JMW	REVIEWED BY DCK	DATE 8/12/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 1,130 µg/L

N

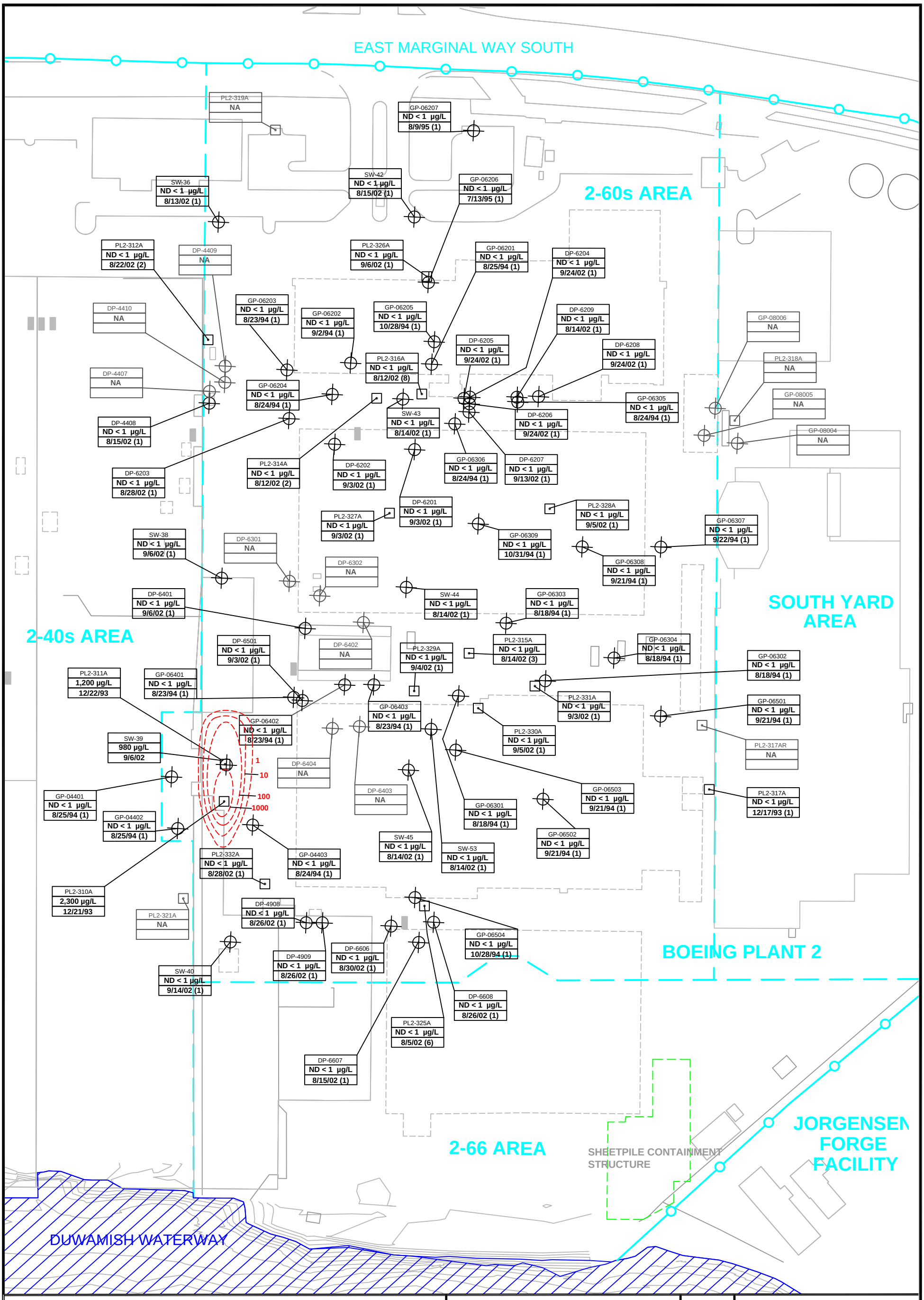
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
cis-1,2-DICHLOROETHENE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY JMW	REVIEWED BY DCK	DATE 8/16/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

N

SCALE: 1"= 100'

SCREENING LEVEL (2004) = 2,100 µg/L

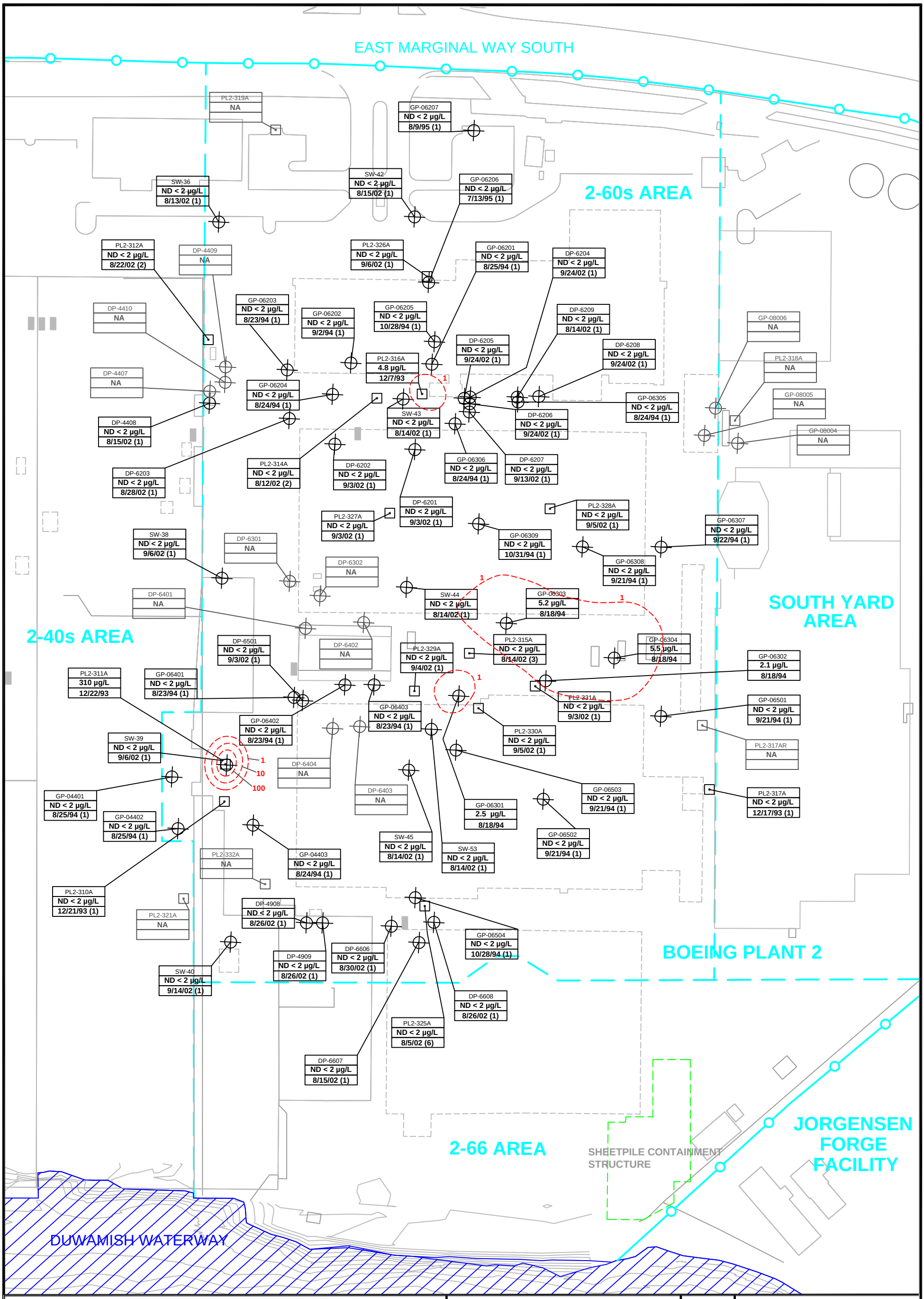
PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
ETHYLBENZENE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TK	DCK	8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 190 µg/L

N

SCALE: 1"= 100'

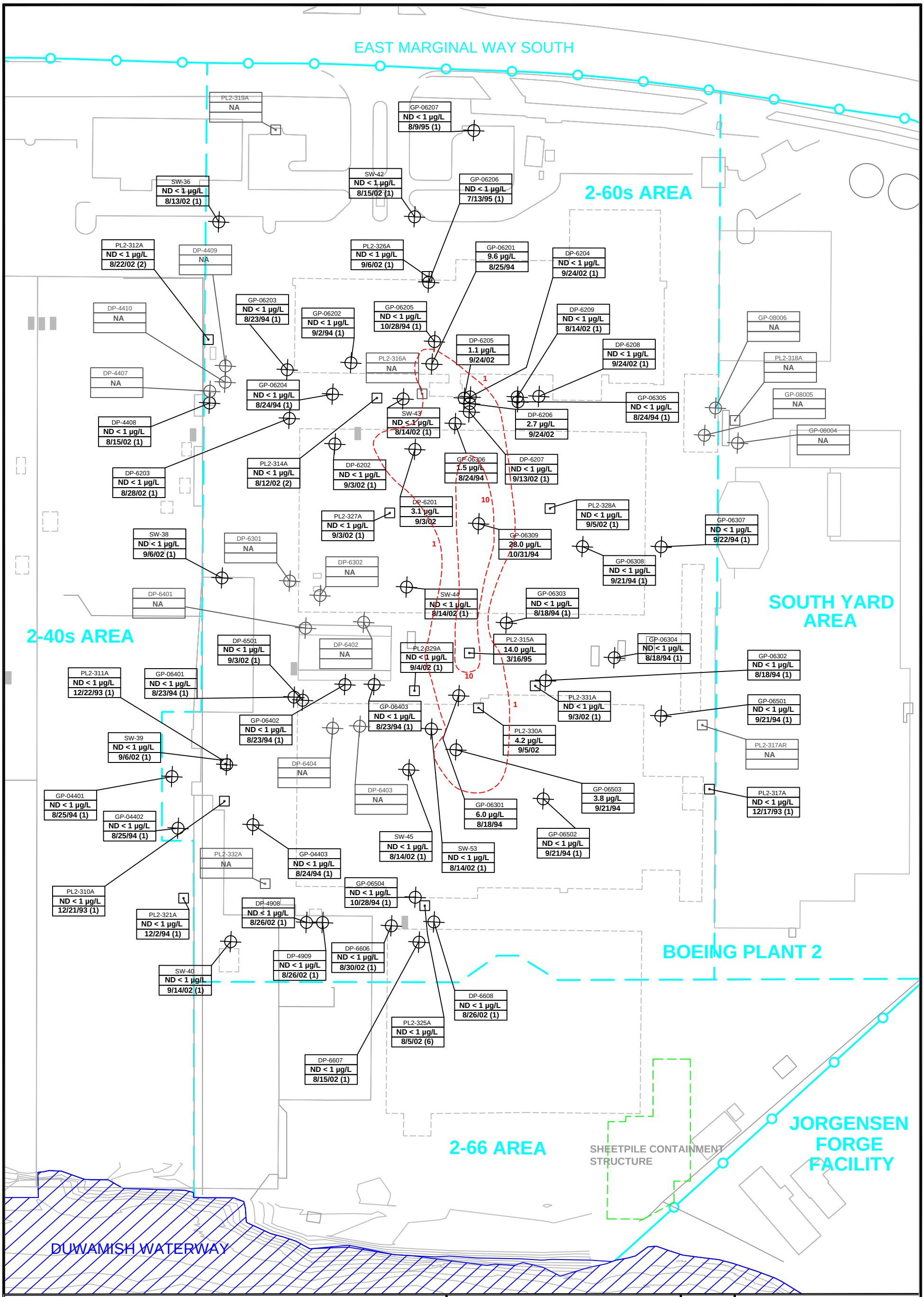
PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
METHYLENE CHLORIDE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TK	DCK	8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 0.822 µg/L

N

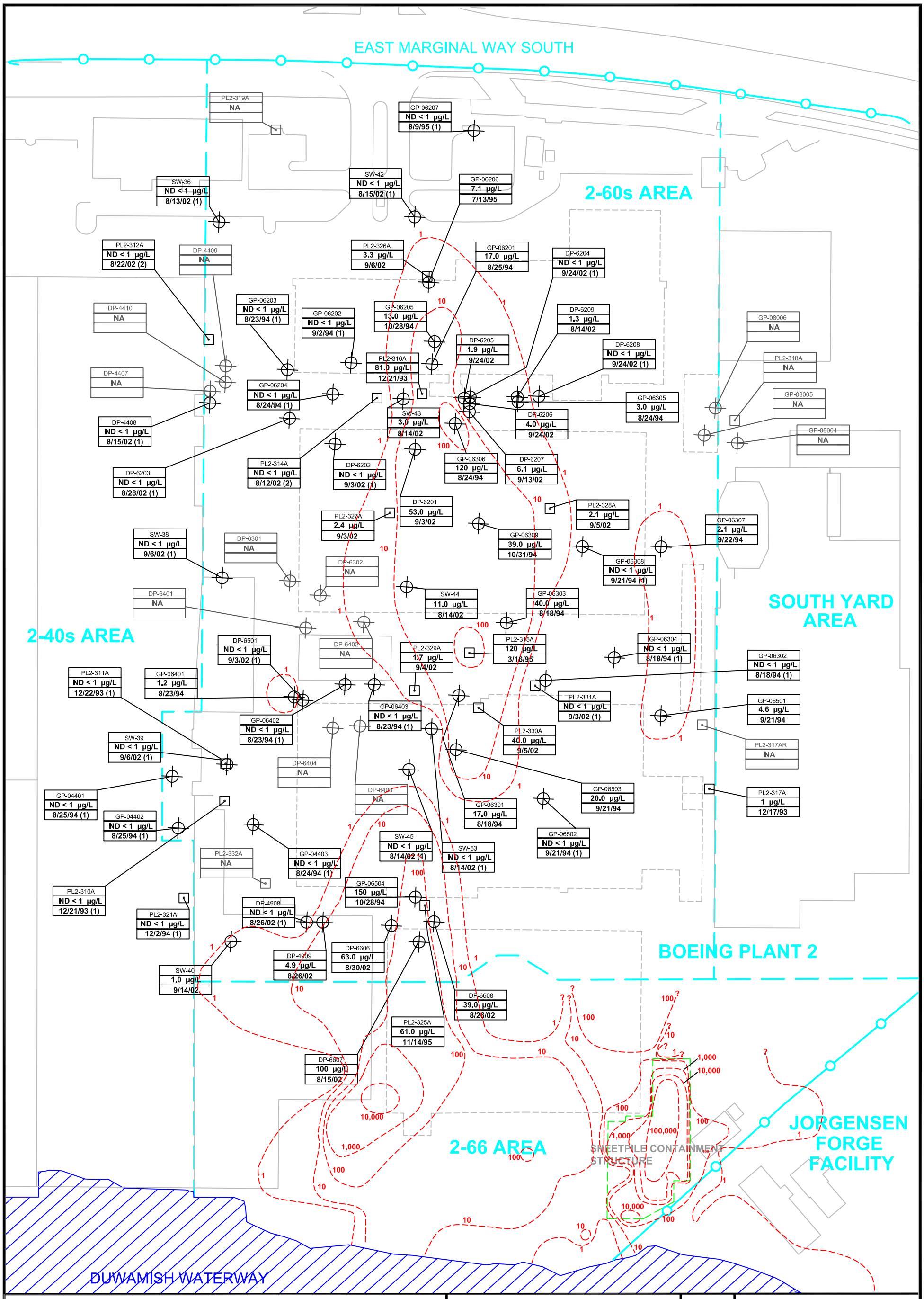
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
TETRACHLOROETHENE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY JOB	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 0.302 µg/L

N

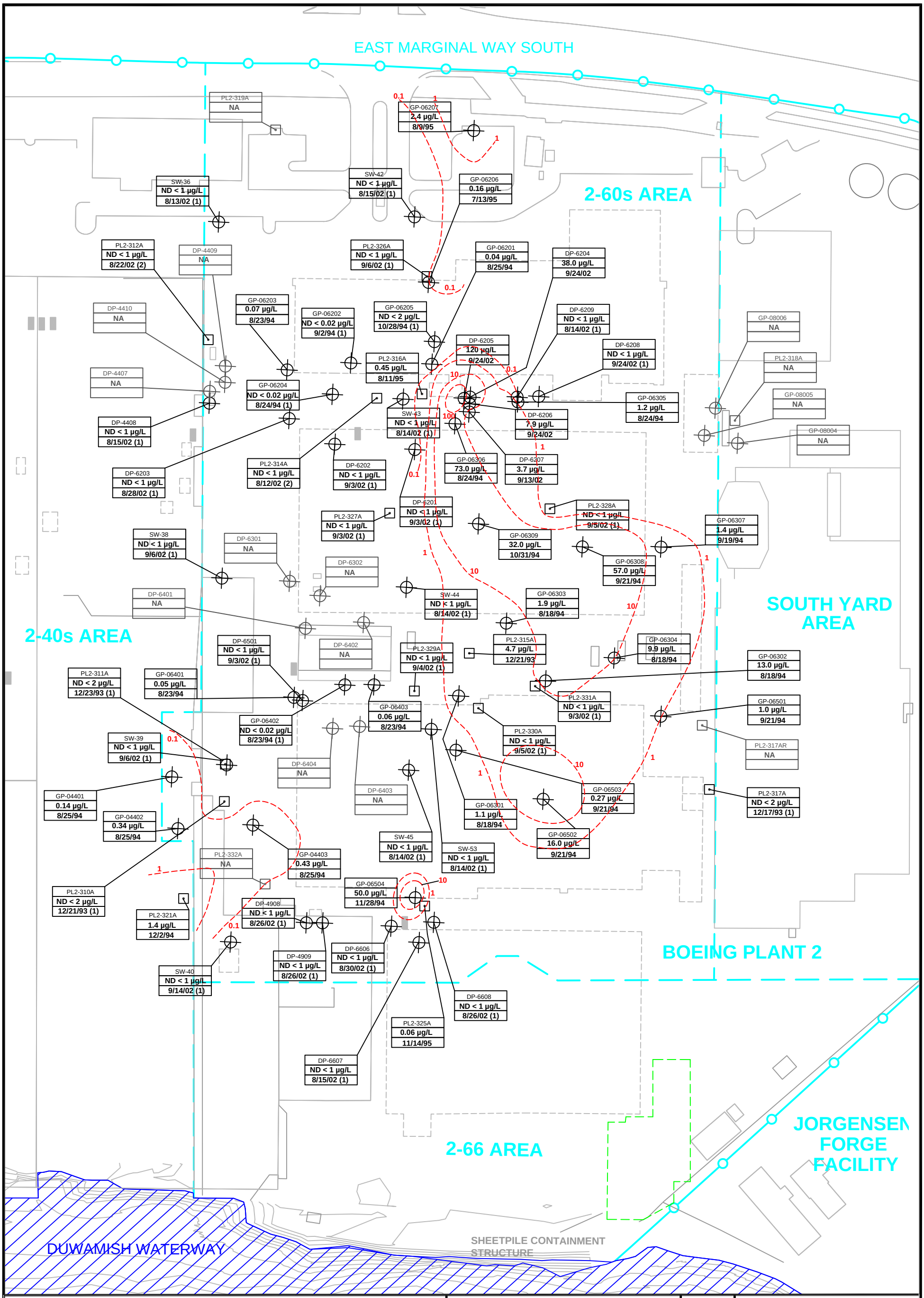
SCALE: 1" = 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

epi ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
TRICHLOROETHENE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TJN	REVIEWED BY DCK	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 0.731 µg/L

N

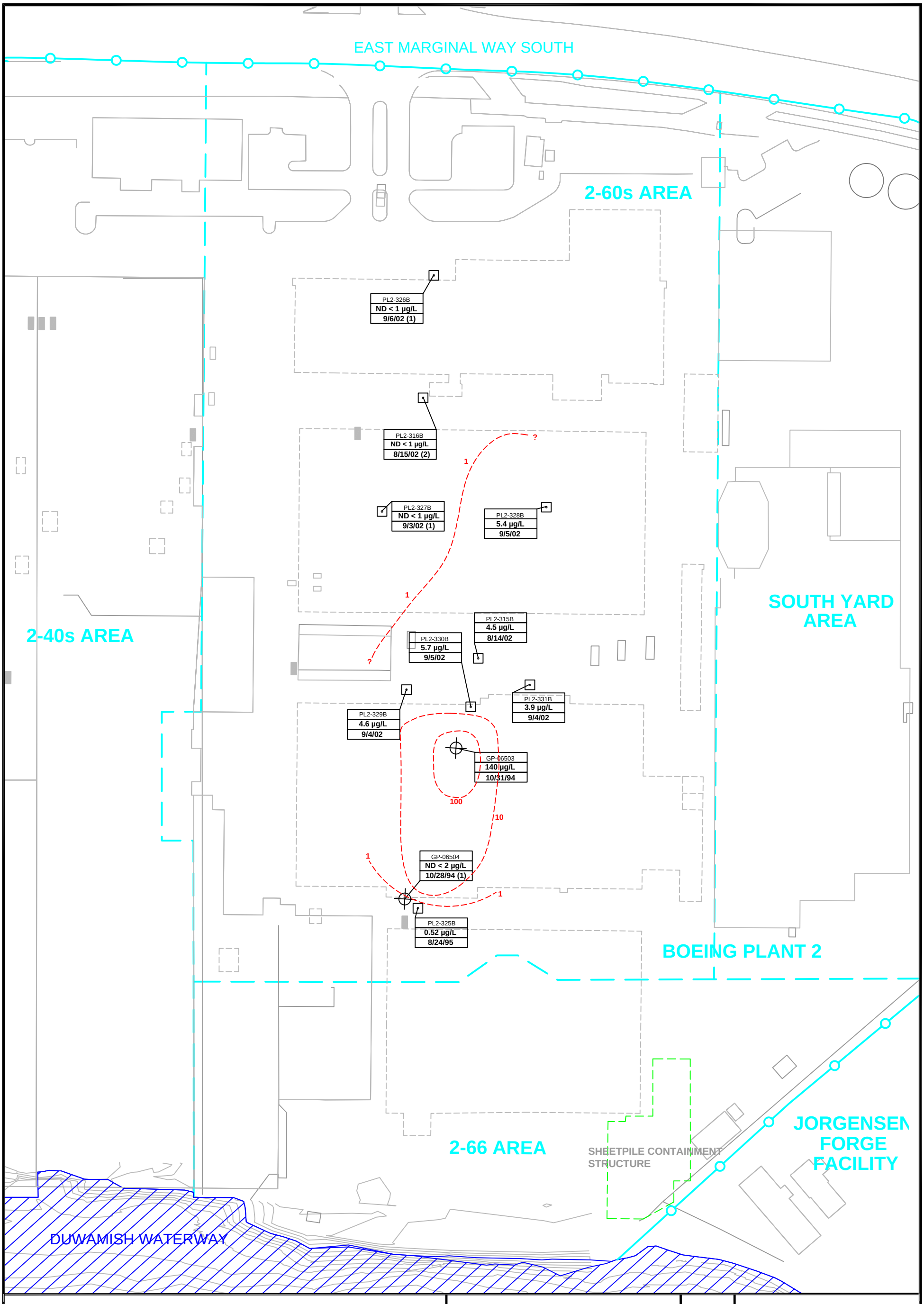
SCALE: 1"= 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
VINYL CHLORIDE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY TK	REVIEWED BY JOB	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 0.731 µg/L

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

N

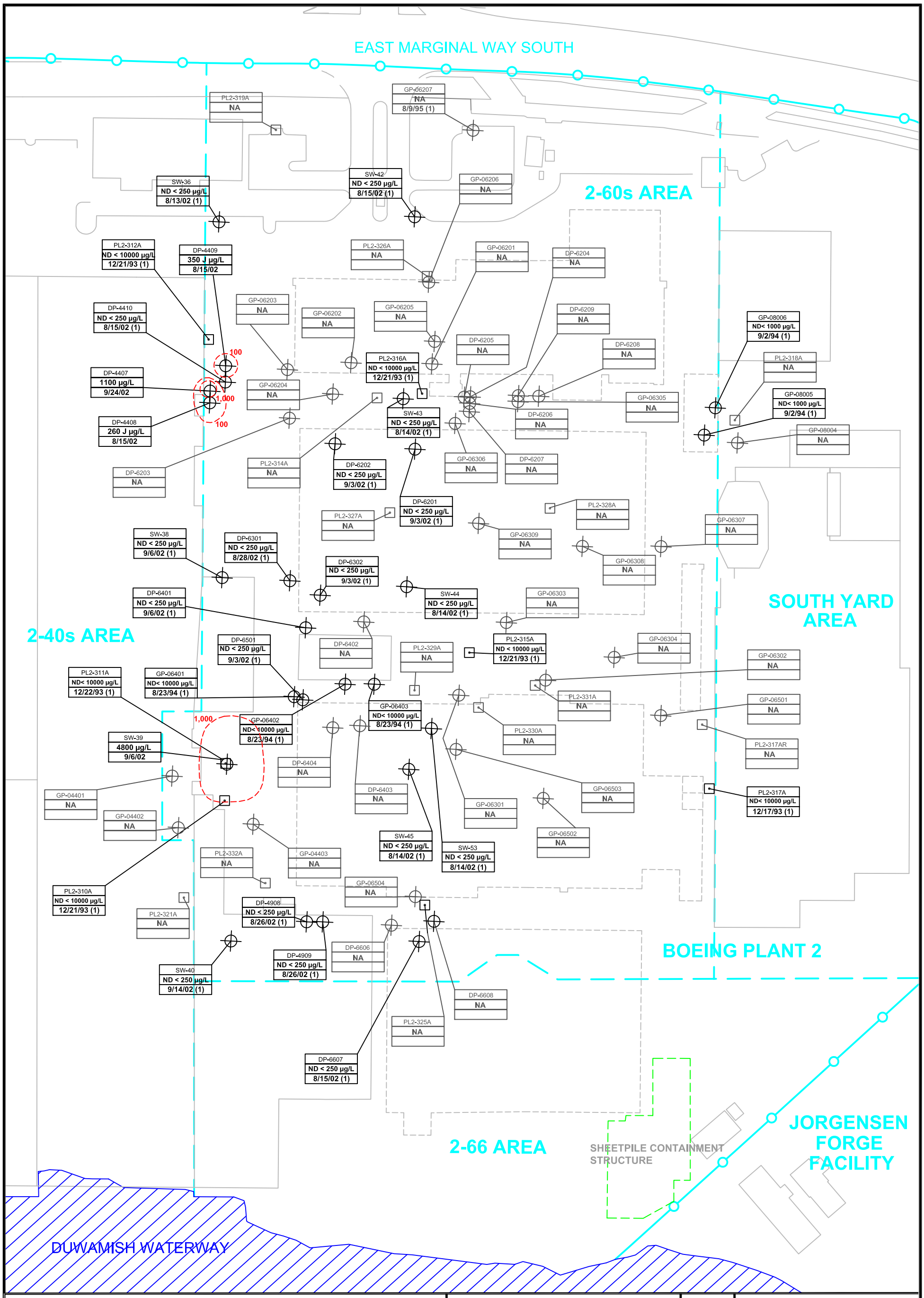
SCALE: 1"= 100'

ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
VINYL CHLORIDE CONCENTRATIONS IN LEVEL B GROUNDWATER

PROJECT	BOEING PLANT 2
PREPARED FOR	THE BOEING COMPANY
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON

SHEET	DRAWN BY	REVIEWED BY	DATE
1 of 1	TK	DCK	8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 500 µg/L

N

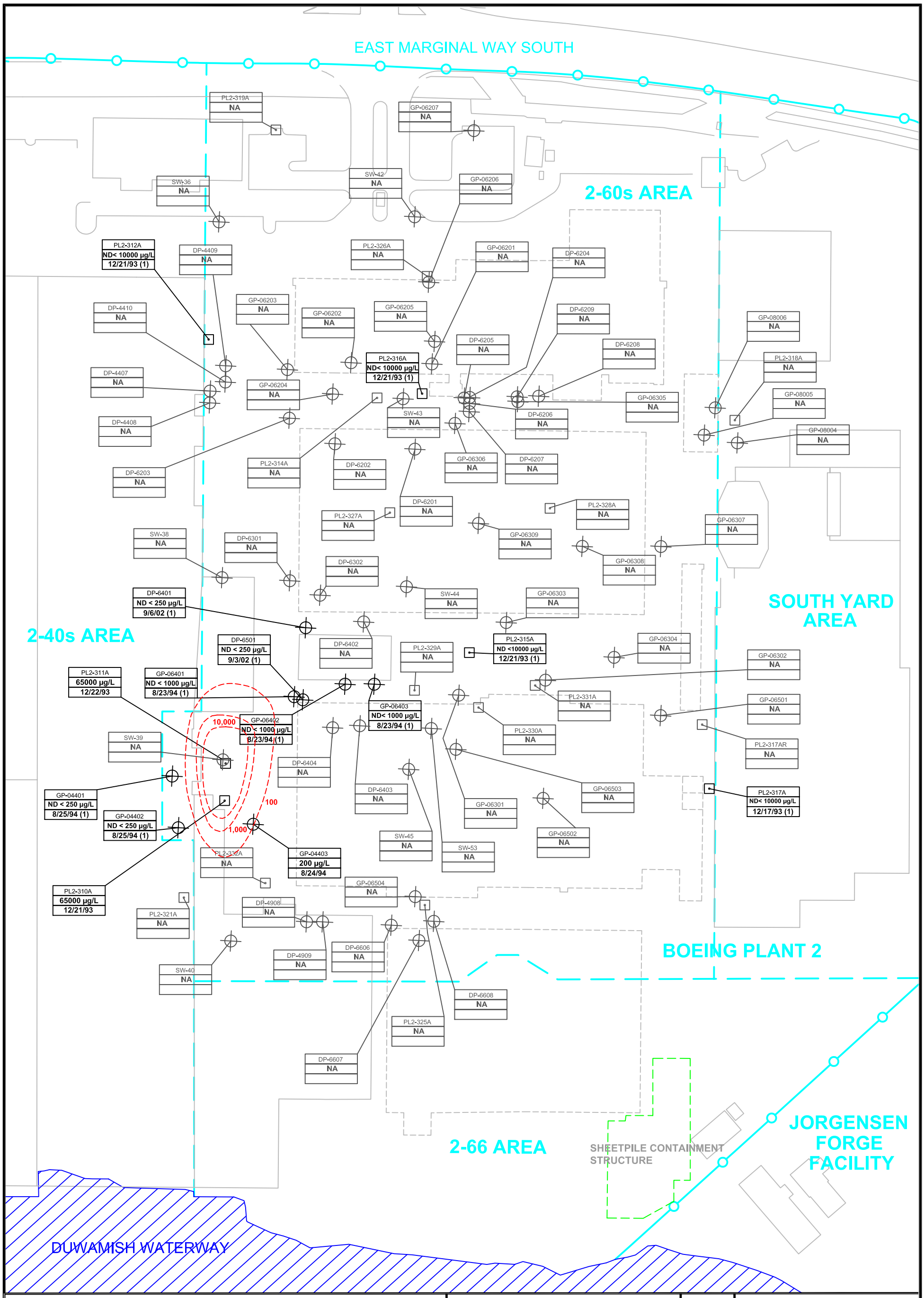
SCALE: 1" = 100'

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

epi ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
TPH-DIESEL
CONCENTRATIONS
IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY JMW	REVIEWED BY JOB	DATE 8/18/04



KEY

- WELL LOCATION
- PROBE LOCATION
- AREA BOUNDARY
- PROPERTY BOUNDARY
- ISOCONCENTRATION LINE
- SHEET PILE CONTAINMENT STRUCTURE

SCREENING LEVEL (2004) = 800 µg/L

PL2-005A	WELL/PROBE NAME
7.02 µg/L	MAXIMUM DETECTION OR NON-DETECT WITH DETECTION LIMIT
4/25/04 (2)	DATE (NUMBER OF NON-DETECTS)

N

SCALE: 1"= 100'

epi ENVIRONMENTAL PARTNERS INC

BOEING PLANT 2
2-60s AREA
TPH-GASOLINE CONCENTRATIONS IN LEVEL A GROUNDWATER

PROJECT	BOEING PLANT 2		
PREPARED FOR	THE BOEING COMPANY		
LOCATION	7725 EAST MARGINAL WAY SEATTLE/TUKWILA, WASHINGTON		
SHEET 1 of 1	DRAWN BY JMW	REVIEWED BY JOB	DATE 8/18/04

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment A
Data Tables

2-60s Area - Maximum Arsenic Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 0.2 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408	08/15/02	2			
DP-4409				N/A	
DP-4410				N/A	
DP-4908				N/A	
DP-4909				N/A	
DP-6201	09/03/02	1			
DP-6202	09/03/02	1			
DP-6203		1 U	08/28/02	ND	1
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208	09/24/02	1			
DP-6209	08/14/02	1			
DP-6301	08/28/02	2			
DP-6302		1 U	09/03/02	ND	1
DP-6401				N/A	
DP-6402	09/03/02	2			
DP-6403	09/03/02	2			
DP-6404	09/03/02	8			
DP-6501		1 U	09/03/02	ND	1
DP-6606				N/A	
DP-6607		1 U	08/15/02	ND	1
DP-6608				N/A	
GP-04401				N/A	
GP-04402				N/A	
GP-04403				N/A	
GP-06201	08/25/94	4			
GP-06202	09/02/94	2			
GP-06203		1 U	08/23/94	ND	1
GP-06204	08/24/94	1			
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401	08/23/94	2	08/23/94		
GP-06402	08/23/94	4	08/23/94		
GP-06403	08/23/94	11	08/23/94		
GP-06501				N/A	
GP-06502				N/A	

2-60s Area - Maximum Arsenic Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 0.2 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
GP-06503				N/A	
A-Level					
GP-06504				N/A	
GP-08005				N/A	
GP-08006				N/A	
PL2-310A				N/A	
PL2-311A				N/A	
PL2-312A	09/27/94	7			
PL2-314A	08/12/02	1.7			
PL2-315A	09/27/94	2			
PL2-316A	08/12/02	1.4			
PL2-317A				N/A	
PL2-317AR	08/27/02	1.9			
PL2-319A	09/22/94	7			
PL2-325A				N/A	
PL2-326A	09/06/02	9.6			
PL2-327A	09/03/02	1.3			
PL2-328A	09/05/02	1			
PL2-329A	09/04/02	0.8			
PL2-330A	09/05/02	1.3			
PL2-331A	09/03/02	3.4			
PL2-332A				N/A	
SW-36		1 U	08/13/02	ND	1
SW-38	09/06/02	13			
SW-39	09/06/02	44			
SW-40		1 U	09/14/02	ND	1
SW-42		1 U	08/15/02	ND	1
SW-43	08/14/02	8			
SW-44	08/14/02	1			
SW-45	08/14/02	1			
SW-53	08/14/02	2			
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B	08/14/02	0.4			
PL2-316B	08/15/02	0.6			
PL2-325B				N/A	
PL2-326B	09/06/02	0.5			
PL2-327B	09/03/02	0.3			
PL2-328B	09/05/02	0.5			
PL2-329B	09/04/02	0.4			
PL2-330B	09/05/02	0.3			
PL2-331B		0.5 U	09/04/02	ND	1
C-Level					
GP-06504				N/A	
PL2-316C	03/30/95	8			

2-60 Area - Maximum Copper - Dissolved Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 3.1 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		2 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908				N/A	
DP-4909				N/A	
DP-6201	09/03/02	7			
DP-6202	09/03/02	8			
DP-6203		2 U	08/28/02	ND	1
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208	09/24/02	4			
DP-6209		4 U	08/14/02	ND	1
DP-6301	08/28/02	10			
DP-6302	09/03/02	5			
DP-6401				N/A	
DP-6402	09/03/02	3			
DP-6403	09/03/02	3			
DP-6404		2 U	09/03/02	ND	1
DP-6501	09/03/02	3			
DP-6606				N/A	
DP-6607		5 U	08/15/02	ND	1
DP-6608				N/A	
GP-04401				N/A	
GP-04402				N/A	
GP-04403				N/A	
GP-06201	08/25/94	7			
GP-06202	09/02/94	3			
GP-06203	08/23/94	3			
GP-06204	08/24/94	3			
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401	08/23/94	4			
GP-06402	08/23/94	7			
GP-06403	08/23/94	7			
GP-06501				N/A	
GP-06502				N/A	

2-60 Area - Maximum Copper - Dissolved Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 3.1 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503				N/A	
GP-06504				N/A	
GP-08005				N/A	
GP-08006				N/A	
PL2-310A				N/A	
PL2-311A				N/A	
PL2-312A	08/22/02	3.1			
PL2-314A	08/12/02	9.6			
PL2-315A	09/27/94	12			
PL2-316A	08/12/02	6			
PL2-317A				N/A	
PL2-317AR	08/27/02	1.9			
PL2-319A		2 U	03/27/95	ND	2
PL2-325A				N/A	
PL2-326A	09/06/02	2.8			
PL2-327A	09/03/02	10.1			
PL2-328A	09/05/02	4.8			
PL2-329A	09/04/02	4.3			
PL2-330A	09/05/02	9.4			
PL2-331A	09/03/02	0.8			
PL2-332A				N/A	
SW-36		4 U	08/13/02	ND	1
SW-38	09/06/02	2			
SW-39		2 U	09/06/02	ND	1
SW-40	09/14/02	5			
SW-42	08/15/02	10			
SW-43	08/14/02	42			
SW-44	08/14/02	17			
SW-45		7 U	08/14/02	ND	1
SW-53		8 U	08/14/02	ND	1
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B	08/14/02	0.6			
PL2-316B	08/15/02	0.6			
PL2-325B				N/A	
PL2-326B	09/06/02	0.8			
PL2-327B	09/03/02	0.5			
PL2-328B	09/05/02	0.5			
PL2-329B	09/04/02	0.5			
PL2-330B	09/05/02	0.7			
PL2-331B		0.5 U	09/04/02	ND	1
C-Level					
GP-06504				N/A	
PL2-316C	08/12/02	3			

2-60s Area - Maximum Manganese - Dissolved Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 100 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408	08/15/02	163			
DP-4409				N/A	
DP-4410				N/A	
DP-4908				N/A	
DP-4909				N/A	
DP-6201	09/03/02	111			
DP-6202	09/03/02	71			
DP-6203	08/28/02	40			
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208	09/24/02	23			
DP-6209	08/14/02	74			
DP-6301		9 U	08/28/02	ND	1
DP-6302	09/03/02	81			
DP-6401				N/A	
DP-6402	09/03/02	46			
DP-6403	09/03/02	1460			
DP-6404	09/03/02	540			
DP-6501	09/03/02	135			
DP-6606				N/A	
DP-6607	08/15/02	292			
DP-6608				N/A	
GP-04401				N/A	
GP-04402				N/A	
GP-04403				N/A	
GP-06201	08/25/94	24			
GP-06202	09/02/94	77			
GP-06203	08/23/94	5			
GP-06204	08/24/94	15			
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401	08/23/94	1310			
GP-06402	08/23/94	36			
GP-06403	08/23/94	73			
GP-06501				N/A	
GP-06502				N/A	

2-60s Area - Maximum Manganese - Dissolved Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 100 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503				N/A	
GP-06504				N/A	
GP-08005				N/A	
GP-08006				N/A	
PL2-310A				N/A	
PL2-311A				N/A	
PL2-312A	09/27/94	340			
PL2-314A				N/A	
PL2-315A	09/27/94	89			
PL2-316A				N/A	
PL2-317A				N/A	
PL2-317AR				N/A	
PL2-319A	09/22/94	452			
PL2-325A				N/A	
PL2-326A				N/A	
PL2-327A				N/A	
PL2-328A				N/A	
PL2-329A				N/A	
PL2-330A				N/A	
PL2-331A				N/A	
PL2-332A				N/A	
SW-36	08/13/02	82			
SW-38	09/06/02	511 J			
SW-39	09/06/02	4640 J			
SW-40	09/14/02	159			
SW-42	08/15/02	45			
SW-43	08/14/02	84			
SW-44	08/14/02	294			
SW-45		16 U	08/14/02	ND	1
SW-53		18 U	08/14/02	ND	1
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B				N/A	
PL2-316B				N/A	
PL2-325B	08/24/95	1120			
PL2-326B				N/A	
PL2-327B				N/A	
PL2-328B				N/A	
PL2-329B				N/A	
PL2-330B				N/A	
PL2-331B				N/A	
C-Level					
GP-06504				N/A	
PL2-316C	03/30/95	454			

2-60s Area - Maximum Nickel - Dissolved Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 8.2 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		10 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908				N/A	
DP-4909				N/A	
DP-6201		10 U	09/03/02	ND	1
DP-6202		10 U	09/03/02	ND	1
DP-6203		10 U	08/28/02	ND	1
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208		10 U	09/24/02	ND	1
DP-6209		10 U	08/14/02	ND	1
DP-6301		10 U	08/28/02	ND	1
DP-6302		10 U	09/03/02	ND	1
DP-6401				N/A	
DP-6402		10 U	09/03/02	ND	1
DP-6403		10 U	09/03/02	ND	1
DP-6404		10 U	09/03/02	ND	1
DP-6501		10 U	09/03/02	ND	1
DP-6606				N/A	
DP-6607		10 U	08/15/02	ND	1
DP-6608				N/A	
GP-04401				N/A	
GP-04402				N/A	
GP-04403				N/A	
GP-06201		10 U	08/25/94	ND	1
GP-06202		10 U	09/02/94	ND	1
GP-06203		10 U	08/23/94	ND	1
GP-06204		10 U	08/24/94	ND	1
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401	08/23/94	10			
GP-06402		10 U	08/23/94	ND	1
GP-06403		10 U	08/23/94	ND	1
GP-06501				N/A	
GP-06502				N/A	

2-60s Area - Maximum Nickel - Dissolved Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 8.2 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503				N/A	
GP-06504				N/A	
GP-08005				N/A	
GP-08006				N/A	
PL2-310A				N/A	
PL2-311A				N/A	
PL2-312A	08/22/02	2.4			
PL2-314A	08/12/02	5			
PL2-315A	08/14/02	3.4			
PL2-316A	08/12/02	5.9			
PL2-317A				N/A	
PL2-317AR	08/27/02	1.9			
PL2-319A		10 U	03/27/95	ND	2
PL2-325A				N/A	
PL2-326A	09/06/02	35.7			
PL2-327A	09/03/02	5.7			
PL2-328A	09/05/02	2.5			
PL2-329A	09/04/02	1.9			
PL2-330A	09/05/02	3.8			
PL2-331A	09/03/02	2			
PL2-332A				N/A	
SW-36		10 U	08/13/02	ND	1
SW-38		10 U	09/06/02	ND	1
SW-39		10 U	09/06/02	ND	1
SW-40		10 U	09/14/02	ND	1
SW-42		10 U	08/15/02	ND	1
SW-43		10 U	08/14/02	ND	1
SW-44		10 U	08/14/02	ND	1
SW-45		10 U	08/14/02	ND	1
SW-53		10 U	08/14/02	ND	1
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B	08/14/02	1.3			
PL2-316B	08/15/02	2.9			
PL2-325B				N/A	
PL2-326B	09/06/02	2.8			
PL2-327B	09/03/02	1.3			
PL2-328B	09/05/02	2.1			
PL2-329B	09/04/02	1.9			
PL2-330B	09/05/02	2.2			
PL2-331B	09/04/02	2.2			
C-Level					
GP-06504				N/A	
PL2-316C	08/12/02	12			

2-60 Area - Maximum Cyanide Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 5.0 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		5 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908				N/A	
DP-4909				N/A	
DP-6201				N/A	
DP-6202				N/A	
DP-6203				N/A	
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208				N/A	
DP-6209				N/A	
DP-6301				N/A	
DP-6302				N/A	
DP-6401				N/A	
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		5 U	09/03/02	ND	1
DP-6606				N/A	
DP-6607		5 U	08/15/02	ND	1
DP-6608				N/A	
GP-04401				N/A	
GP-04402				N/A	
GP-04403				N/A	
GP-06201				N/A	
GP-06202				N/A	
GP-06203				N/A	
GP-06204				N/A	
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401				N/A	
GP-06402				N/A	
GP-06403				N/A	
GP-06501				N/A	
GP-06502				N/A	

2-60 Area - Maximum Cyanide Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 5.0 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503				N/A	
GP-06504				N/A	
GP-08005				N/A	
GP-08006				N/A	
PL2-310A				N/A	
PL2-311A				N/A	
PL2-312A				N/A	
PL2-314A				N/A	
PL2-315A				N/A	
PL2-316A				N/A	
PL2-317A				N/A	
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A				N/A	
PL2-326A				N/A	
PL2-327A				N/A	
PL2-328A				N/A	
PL2-329A				N/A	
PL2-330A				N/A	
PL2-331A				N/A	
PL2-332A				N/A	
SW-36		5 U	08/13/02	ND	1
SW-38		5 U	09/06/02	ND	1
SW-39		5 U	09/06/02	ND	1
SW-40		5 U	09/14/02	ND	1
SW-42		5 U	08/15/02	ND	1
SW-43	08/14/02	18			
SW-44	08/14/02	7			
SW-45		5 U	08/14/02	ND	1
SW-53		5 U	08/14/02	ND	1
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B				N/A	
PL2-316B				N/A	
PL2-325B				N/A	
PL2-326B				N/A	
PL2-327B				N/A	
PL2-328B				N/A	
PL2-329B				N/A	
PL2-330B				N/A	
PL2-331B				N/A	
C-Level					
GP-06504				N/A	
PL2-316C				N/A	

2-60s Area - Maximum Benzene Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 4.48 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		1 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908		1 U	08/26/02	ND	1
DP-4909		1 U	08/26/02	ND	1
DP-6201		1 U	09/03/02	ND	1
DP-6202		1 U	09/03/02	ND	1
DP-6203		1 U	08/28/02	ND	1
DP-6204		1 U	09/24/02	ND	1
DP-6205		1 U	09/24/02	ND	1
DP-6206		1 U	09/24/02	ND	1
DP-6207		1 U	09/13/02	ND	1
DP-6208		1 U	09/24/02	ND	1
DP-6209		1 U	08/14/02	ND	1
DP-6301				N/A	
DP-6302				N/A	
DP-6401		1 U	09/06/02	ND	1
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		1 U	09/03/02	ND	1
DP-6606		1 U	08/30/02	ND	1
DP-6607		1 U	08/15/02	ND	1
DP-6608		1 U	08/26/02	ND	1
GP-04401		1 U	08/25/94	ND	1
GP-04402		1 U	08/25/94	ND	1
GP-04403		1 U	08/24/94	ND	1
GP-06201		1 U	08/25/94	ND	1
GP-06202		1 U	09/02/94	ND	1
GP-06203		1 U	08/23/94	ND	1
GP-06204		1 U	08/24/94	ND	1
GP-06205		1 U	10/28/94	ND	1
GP-06206		1 U	07/13/95	ND	1
GP-06207		1 U	08/09/95	ND	1
GP-06301		1 U	08/18/94	ND	1
GP-06302		1 U	08/18/94	ND	1
GP-06303		1 U	08/18/94	ND	1
GP-06304	08/18/94	1.1			
GP-06305		1 U	08/24/94	ND	1
GP-06306		1 U	08/24/94	ND	1
GP-06307		1 U	09/22/94	ND	1
GP-06308		1 U	09/21/94	ND	1
GP-06309		1 U	10/31/94	ND	1
GP-06401		1 U	08/23/94	ND	1
GP-06402		1 U	08/23/94	ND	1
GP-06403		1 U	08/23/94	ND	1
GP-06501		1 U	09/21/94	ND	1
GP-06502		1 U	09/21/94	ND	1

2-60s Area - Maximum Benzene Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 4.48 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503		1 U	09/21/94	ND	1
GP-06504		1 U	10/28/94	ND	1
GP-08005				N/A	
GP-08006				N/A	
PL2-310A	12/21/93	6200			
PL2-311A	08/02/02	800			
PL2-312A		1 U	08/22/02	ND	2
PL2-314A		1 U	08/12/02	ND	2
PL2-315A		1 U	08/14/02	ND	3
PL2-316A		1 U	08/12/02	ND	8
PL2-317A		1 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A		1 U	08/05/02	ND	6
PL2-326A		1 U	09/06/02	ND	1
PL2-327A		1 U	09/03/02	ND	1
PL2-328A		1 U	09/05/02	ND	1
PL2-329A		1 U	09/04/02	ND	1
PL2-330A		1 U	09/05/02	ND	1
PL2-331A		1 U	09/03/02	ND	1
PL2-332A		1 U	08/28/02	ND	1
SW-36		1 U	08/13/02	ND	1
SW-38		1 U	09/06/02	ND	1
SW-39	09/06/02	2800 J			
SW-40		1 U	09/14/02	ND	1
SW-42		1 U	08/15/02	ND	1
SW-43		1 U	08/14/02	ND	1
SW-44		1 U	08/14/02	ND	1
SW-45		1 U	08/14/02	ND	1
SW-53		1 U	08/14/02	ND	1
B-Level					
GP-06503		1 U	10/31/94	ND	1
GP-06504		1 U	10/28/94	ND	1
PL2-315B		1 U	08/14/02	ND	2
PL2-316B		1 U	08/15/02	ND	2
PL2-325B		1 U	08/05/02	ND	6
PL2-326B		1 U	09/06/02	ND	1
PL2-327B		1 U	09/03/02	ND	1
PL2-328B		1 U	09/05/02	ND	1
PL2-329B		1 U	09/04/02	ND	1
PL2-330B		1 U	09/05/02	ND	1
PL2-331B		1 U	09/04/02	ND	1
C-Level					
GP-06504		1 U	10/28/94	ND	1
PL2-316C		1 U	08/12/02	ND	2

2-60 Area - Maximum 1,1-Dichloroethene Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 0.382 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		1 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908		1 U	08/26/02	ND	1
DP-4909		1 U	08/26/02	ND	1
DP-6201		1 U	09/03/02	ND	1
DP-6202		1 U	09/03/02	ND	1
DP-6203		1 U	08/28/02	ND	1
DP-6204		1 U	09/24/02	ND	1
DP-6205		1 U	09/24/02	ND	1
DP-6206		1 U	09/24/02	ND	1
DP-6207		1 U	09/13/02	ND	1
DP-6208		1 U	09/24/02	ND	1
DP-6209		1 U	08/14/02	ND	1
DP-6301				N/A	
DP-6302				N/A	
DP-6401				N/A	
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		1 U	09/03/02	ND	1
DP-6606		1 U	08/30/02	ND	1
DP-6607		1 U	08/15/02	ND	1
DP-6608		1 U	08/26/02	ND	1
GP-04401		1 U	08/25/94	ND	1
GP-04402		1 U	08/25/94	ND	1
GP-04403		1 U	08/24/94	ND	1
GP-06201		1 U	08/25/94	ND	1
GP-06202		1 U	09/02/94	ND	1
GP-06203		1 U	08/23/94	ND	1
GP-06204		1 U	08/24/94	ND	1
GP-06205		1 U	10/28/94	ND	1
GP-06206		1 U	07/13/95	ND	1
GP-06207		1 U	08/09/95	ND	1
GP-06301		1 U	08/18/94	ND	1
GP-06302		1 U	08/18/94	ND	1
GP-06303		1 U	08/18/94	ND	1
GP-06304		1 U	08/18/94	ND	1
GP-06305		1 U	08/24/94	ND	1
GP-06306		1 U	08/24/94	ND	1
GP-06307		1 U	09/22/94	ND	1
GP-06308		1 U	09/21/94	ND	1
GP-06309		1 U	10/31/94	ND	1
GP-06401		1 U	08/23/94	ND	1
GP-06402		1 U	08/23/94	ND	1
GP-06403		1 U	08/23/94	ND	1
GP-06501		1 U	09/21/94	ND	1

2-60 Area - Maximum 1,1-Dichloroethene Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 0.382 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06502		1 U	09/21/94	ND	1
GP-06503		1 U	09/21/94	ND	1
GP-06504		1 U	10/28/94	ND	1
GP-08005				N/A	
GP-08006				N/A	
PL2-310A		1 U	12/21/93	ND	1
PL2-311A		1 U	12/22/93	ND	1
PL2-312A		1 U	08/22/02	ND	2
PL2-314A		1 U	08/12/02	ND	2
PL2-315A	12/21/93	1.4			
PL2-316A		1 U	08/12/02	ND	8
PL2-317A		1 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A		1 U	08/05/02	ND	6
PL2-326A		1 U	09/06/02	ND	1
PL2-327A		1 U	09/03/02	ND	1
PL2-328A		1 U	09/05/02	ND	1
PL2-329A		1 U	09/04/02	ND	1
PL2-330A		1 U	09/05/02	ND	1
PL2-331A		1 U	09/03/02	ND	1
PL2-332A				N/A	
SW-36		1 U	08/13/02	ND	1
SW-38		1 U	09/06/02	ND	1
SW-39		1 U	09/06/02	ND	1
SW-40		1 U	09/14/02	ND	1
SW-42		1 U	08/15/02	ND	1
SW-43		1 U	08/14/02	ND	1
SW-44		1 U	08/14/02	ND	1
SW-45		1 U	08/14/02	ND	1
SW-53		1 U	08/14/02	ND	1
B-Level					
GP-06503		1 U	10/31/94	ND	1
GP-06504		1 U	10/28/94	ND	1
PL2-315B		1 U	08/14/02	ND	2
PL2-316B		1 U	08/15/02	ND	2
PL2-325B		1 U	08/05/02	ND	6
PL2-326B		1 U	09/06/02	ND	1
PL2-327B		1 U	09/03/02	ND	1
PL2-328B		1 U	09/05/02	ND	1
PL2-329B		1 U	09/04/02	ND	1
PL2-330B		1 U	09/05/02	ND	1
PL2-331B		1 U	09/04/02	ND	1
C-Level					
GP-06504		1 U	10/28/94	ND	1
PL2-316C		1 U	08/12/02	ND	2

2-60s Area - Maximum Ethylbenzene Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 2,100 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		1 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908		1 U	08/26/02	ND	1
DP-4909		1 U	08/26/02	ND	1
DP-6201		1 U	09/03/02	ND	1
DP-6202		1 U	09/03/02	ND	1
DP-6203		1 U	08/28/02	ND	1
DP-6204		1 U	09/24/02	ND	1
DP-6205		1 U	09/24/02	ND	1
DP-6206		1 U	09/24/02	ND	1
DP-6207		1 U	09/13/02	ND	1
DP-6208		1 U	09/24/02	ND	1
DP-6209		1 U	08/14/02	ND	1
DP-6301				N/A	
DP-6302				N/A	
DP-6401		1 U	09/06/02	ND	1
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		1 U	09/03/02	ND	1
DP-6606		1 U	08/30/02	ND	1
DP-6607		1 U	08/15/02	ND	1
DP-6608		1 U	08/26/02	ND	1
GP-04401		1 U	08/25/94	ND	1
GP-04402		1 U	08/25/94	ND	1
GP-04403		1 U	08/24/94	ND	1
GP-06201		1 U	08/25/94	ND	1
GP-06202		1 U	09/02/94	ND	1
GP-06203		1 U	08/23/94	ND	1
GP-06204		1 U	08/24/94	ND	1
GP-06205		1 U	10/28/94	ND	1
GP-06206		1 U	07/13/95	ND	1
GP-06207		1 U	08/09/95	ND	1
GP-06301		1 U	08/18/94	ND	1
GP-06302		1 U	08/18/94	ND	1
GP-06303		1 U	08/18/94	ND	1
GP-06304		1 U	08/18/94	ND	1
GP-06305		1 U	08/24/94	ND	1
GP-06306		1 U	08/24/94	ND	1
GP-06307		1 U	09/22/94	ND	1
GP-06308		1 U	09/21/94	ND	1
GP-06309		1 U	10/31/94	ND	1
GP-06401		1 U	08/23/94	ND	1
GP-06402		1 U	08/23/94	ND	1
GP-06403		1 U	08/23/94	ND	1
GP-06501		1 U	09/21/94	ND	1
GP-06502		1 U	09/21/94	ND	1

2-60s Area - Maximum Ethylbenzene Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 2,100 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
GP-06503		1 U	09/21/94	ND	1
A-Level					
GP-06504		1 U	10/28/94	ND	1
GP-08005				N/A	
GP-08006				N/A	
PL2-310A	12/21/93	2300			
PL2-311A	12/22/93	1200 D			
PL2-312A		1 U	08/22/02	ND	2
PL2-314A		1 U	08/12/02	ND	2
PL2-315A		1 U	08/14/02	ND	3
PL2-316A		1 U	08/12/02	ND	8
PL2-317A		1 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A		1 U	08/05/02	ND	6
PL2-326A		1 U	09/06/02	ND	1
PL2-327A		1 U	09/03/02	ND	1
PL2-328A		1 U	09/05/02	ND	1
PL2-329A		1 U	09/04/02	ND	1
PL2-330A		1 U	09/05/02	ND	1
PL2-331A		1 U	09/03/02	ND	1
PL2-332A		1 U	08/28/02	ND	1
SW-36		1 U	08/13/02	ND	1
SW-38		1 U	09/06/02	ND	1
SW-39	09/06/02	980 J			
SW-40		1 U	09/14/02	ND	1
SW-42		1 U	08/15/02	ND	1
SW-43		1 U	08/14/02	ND	1
SW-44		1 U	08/14/02	ND	1
SW-45		1 U	08/14/02	ND	1
SW-53		1 U	08/14/02	ND	1
B-Level					
GP-06503		1 U	10/31/94	ND	1
GP-06504		1 U	10/28/94	ND	1
PL2-315B		1 U	08/14/02	ND	2
PL2-316B		1 U	08/15/02	ND	2
PL2-325B		1 U	08/05/02	ND	6
PL2-326B		1 U	09/06/02	ND	1
PL2-327B		1 U	09/03/02	ND	1
PL2-328B		1 U	09/05/02	ND	1
PL2-329B		1 U	09/04/02	ND	1
PL2-330B		1 U	09/05/02	ND	1
PL2-331B		1 U	09/04/02	ND	1
C-Level					
GP-06504		1 U	10/28/94	ND	1
PL2-316C		1 U	08/12/02	ND	2

2-60s Area - Maximum Methylene Chloride Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 190 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		2 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908		2 U	08/26/02	ND	1
DP-4909		2 U	08/26/02	ND	1
DP-6201		2 U	09/03/02	ND	1
DP-6202		2 U	09/03/02	ND	1
DP-6203		2 U	08/28/02	ND	1
DP-6204		2 U	09/24/02	ND	1
DP-6205		2 U	09/24/02	ND	1
DP-6206		2 U	09/24/02	ND	1
DP-6207		2 U	09/13/02	ND	1
DP-6208		2 U	09/24/02	ND	1
DP-6209		2 U	08/14/02	ND	1
DP-6301				N/A	
DP-6302				N/A	
DP-6401				N/A	
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		2 U	09/03/02	ND	1
DP-6606		2 U	08/30/02	ND	1
DP-6607		2 U	08/15/02	ND	1
DP-6608		2 U	08/26/02	ND	1
GP-04401		2 U	08/25/94	ND	1
GP-04402		2 U	08/25/94	ND	1
GP-04403		2 U	08/24/94	ND	1
GP-06201		2 U	08/25/94	ND	1
GP-06202		2 U	09/02/94	ND	1
GP-06203		2 U	08/23/94	ND	1
GP-06204		2 U	08/24/94	ND	1
GP-06205		2 U	10/28/94	ND	1
GP-06206		2 U	07/13/95	ND	1
GP-06207		2 U	08/09/95	ND	1
GP-06301	08/18/94	2.5			
GP-06302	08/18/94	2.1			
GP-06303	08/18/94	5.2			
GP-06304	08/18/94	5.5			
GP-06305		2 U	08/24/94	ND	1
GP-06306		2 U	08/24/94	ND	1
GP-06307		2 U	09/22/94	ND	1
GP-06308		2 U	09/21/94	ND	1
GP-06309		2 U	10/31/94	ND	1
GP-06401		2 U	08/23/94	ND	1
GP-06402		2 U	08/23/94	ND	1
GP-06403		2 U	08/23/94	ND	1
GP-06501		2 U	09/21/94	ND	1
GP-06502		2 U	09/21/94	ND	1

2-60s Area - Maximum Methylene Chloride Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 190 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503		2 U	09/21/94	ND	1
GP-06504		2 U	10/28/94	ND	1
GP-08005				N/A	
GP-08006				N/A	
PL2-310A		2 U	12/21/93	ND	1
PL2-311A	12/22/93	310 D			
PL2-312A		2 U	08/22/02	ND	2
PL2-314A		2 U	08/12/02	ND	2
PL2-315A		2 U	08/14/02	ND	3
PL2-316A	12/07/93	4.8			
PL2-317A		2 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A		2 U	08/05/02	ND	6
PL2-326A		2 U	09/06/02	ND	1
PL2-327A		2 U	09/03/02	ND	1
PL2-328A		2 U	09/05/02	ND	1
PL2-329A		2 U	09/04/02	ND	1
PL2-330A		2 U	09/05/02	ND	1
PL2-331A		2 U	09/03/02	ND	1
PL2-332A				N/A	
SW-36		2 U	08/13/02	ND	1
SW-38		2 U	09/06/02	ND	1
SW-39		2 U	09/06/02	ND	1
SW-40		2 U	09/14/02	ND	1
SW-42		2 U	08/15/02	ND	1
SW-43		2 U	08/14/02	ND	1
SW-44		2 U	08/14/02	ND	1
SW-45		2 U	08/14/02	ND	1
SW-53		2 U	08/14/02	ND	1
B-Level					
GP-06503		2 U	10/31/94	ND	1
GP-06504		2 U	10/28/94	ND	1
PL2-315B		2 U	08/14/02	ND	2
PL2-316B		2 U	08/15/02	ND	2
PL2-325B		2 U	08/05/02	ND	6
PL2-326B		2 U	09/06/02	ND	1
PL2-327B		2 U	09/03/02	ND	1
PL2-328B		2 U	09/05/02	ND	1
PL2-329B		2 U	09/04/02	ND	1
PL2-330B		2 U	09/05/02	ND	1
PL2-331B		2 U	09/04/02	ND	1
C-Level					
GP-06504		2 U	10/28/94	ND	1
PL2-316C		2 U	08/12/02	ND	2

2-60s Area - Maximum Tetrachloroethene Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 0.822 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		1 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908		1 U	08/26/02	ND	1
DP-4909		1 U	08/26/02	ND	1
DP-6201	09/03/02	3.1			
DP-6202		1 U	09/03/02	ND	1
DP-6203		1 U	08/28/02	ND	1
DP-6204		1 U	09/24/02	ND	1
DP-6205	09/24/02	1.1			
DP-6206	09/24/02	2.7			
DP-6207		1 U	09/13/02	ND	1
DP-6208		1 U	09/24/02	ND	1
DP-6209		1 U	08/14/02	ND	1
DP-6301				N/A	
DP-6302				N/A	
DP-6401				N/A	
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		1 U	09/03/02	ND	1
DP-6606		1 U	08/30/02	ND	1
DP-6607		1 U	08/15/02	ND	1
DP-6608		1 U	08/26/02	ND	1
GP-04401		1 U	08/25/94	ND	1
GP-04402		1 U	08/25/94	ND	1
GP-04403		1 U	08/24/94	ND	1
GP-06201	08/25/94	9.6			
GP-06202		1 U	09/02/94	ND	1
GP-06203		1 U	08/23/94	ND	1
GP-06204		1 U	08/24/94	ND	1
GP-06205		1 U	10/28/94	ND	1
GP-06206		1 U	07/13/95	ND	1
GP-06207		1 U	08/09/95	ND	1
GP-06301	08/18/94	6			
GP-06302		1 U	08/18/94	ND	1
GP-06303		1 U	08/18/94	ND	1
GP-06304		1 U	08/18/94	ND	1
GP-06305		1 U	08/24/94	ND	1
GP-06306	08/24/94	1.5			
GP-06307		1 U	09/22/94	ND	1
GP-06308		1 U	09/21/94	ND	1
GP-06309	10/31/94	28			
GP-06401		1 U	08/23/94	ND	1
GP-06402		1 U	08/23/94	ND	1
GP-06403		1 U	08/23/94	ND	1
GP-06501		1 U	09/21/94	ND	1
GP-06502		1 U	09/21/94	ND	1

2-60s Area - Maximum Tetrachloroethene Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 0.822 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503	09/21/94	3.8			
GP-06504		1 U	10/28/94	ND	1
GP-08005				N/A	
GP-08006				N/A	
PL2-310A		1 U	12/21/93	ND	1
PL2-311A		1 U	12/22/93	ND	1
PL2-312A		1 U	08/22/02	ND	2
PL2-314A		1 U	08/12/02	ND	2
PL2-315A	03/16/95	14			
PL2-316A	12/21/93	3			
PL2-317A		1 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A		1 U	08/05/02	ND	6
PL2-326A		1 U	09/06/02	ND	1
PL2-327A		1 U	09/03/02	ND	1
PL2-328A		1 U	09/05/02	ND	1
PL2-329A		1 U	09/04/02	ND	1
PL2-330A	09/05/02	4.2			
PL2-331A		1 U	09/03/02	ND	1
PL2-332A				N/A	
SW-36		1 U	08/13/02	ND	1
SW-38		1 U	09/06/02	ND	1
SW-39		1 U	09/06/02	ND	1
SW-40		1 U	09/14/02	ND	1
SW-42		1 U	08/15/02	ND	1
SW-43		1 U	08/14/02	ND	1
SW-44		1 U	08/14/02	ND	1
SW-45		1 U	08/14/02	ND	1
SW-53		1 U	08/14/02	ND	1
B-Level					
GP-06503		1 U	10/31/94	ND	1
GP-06504		1 U	10/28/94	ND	1
PL2-315B		1 U	08/14/02	ND	2
PL2-316B		1 U	08/15/02	ND	2
PL2-325B		1 U	08/05/02	ND	6
PL2-326B		1 U	09/06/02	ND	1
PL2-327B		1 U	09/03/02	ND	1
PL2-328B		1 U	09/05/02	ND	1
PL2-329B		1 U	09/04/02	ND	1
PL2-330B		1 U	09/05/02	ND	1
PL2-331B		1 U	09/04/02	ND	1
C-Level					
GP-06504		1 U	10/28/94	ND	1
PL2-316C		1 U	08/12/02	ND	2

2-60s Area - Maximum Vinyl Chloride Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 0.731 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408		1 U	08/15/02	ND	1
DP-4409				N/A	
DP-4410				N/A	
DP-4908		1 U	08/26/02	ND	1
DP-4909		1 U	08/26/02	ND	1
DP-6201		1 UJ	09/03/02	ND	1
DP-6202		1 UJ	09/03/02	ND	1
DP-6203		1 U	08/28/02	ND	1
DP-6204	09/24/02	38 J			
DP-6205	09/24/02	120 J			
DP-6206	09/24/02	7.9 J			
DP-6207	09/13/02	3.7 J			
DP-6208		1 UJ	09/24/02	ND	1
DP-6209		1 U	08/14/02	ND	1
DP-6301				N/A	
DP-6302				N/A	
DP-6401				N/A	
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		1 UJ	09/03/02	ND	1
DP-6606		1 U	08/30/02	ND	1
DP-6607		1 U	08/15/02	ND	1
DP-6608		1 U	08/26/02	ND	1
GP-04401	08/25/94	0.14			
GP-04402	08/25/94	0.34			
GP-04403	08/24/94	0.43			
GP-06201	08/25/94	0.035			
GP-06202		2 U	09/02/94	ND	1
GP-06203	08/23/94	0.065			
GP-06204		2 U	08/24/94	ND	1
GP-06205	10/28/94	0.48			
GP-06206	07/13/95	0.16			
GP-06207	08/09/95	2.4			
GP-06301	08/18/94	1.1			
GP-06302	08/18/94	13			
GP-06303	08/18/94	1.9			
GP-06304	08/18/94	9.9			
GP-06305	08/24/94	1.2			
GP-06306	08/24/94	73			
GP-06307	09/22/94	1.4			
GP-06308	09/21/94	57			
GP-06309	10/31/94	32			
GP-06401	08/23/94	0.05			
GP-06402		2 U	08/23/94	ND	1
GP-06403	08/23/94	0.06			
GP-06501	09/21/94	1			
GP-06502	09/21/94	16			

2-60s Area - Maximum Vinyl Chloride Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 0.731 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503	09/21/94	0.27			
GP-06504	10/28/94	50			
GP-08005				N/A	
GP-08006				N/A	
PL2-310A		2 U	12/21/93	ND	1
PL2-311A		2 U	12/22/93	ND	1
PL2-312A		1 U	08/22/02	ND	2
PL2-314A		1 U	08/12/02	ND	2
PL2-315A	12/21/93	4.7			
PL2-316A	08/11/95	0.45			
PL2-317A		2 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A	11/14/95	0.057			
PL2-326A		1 U	09/06/02	ND	1
PL2-327A		1 U	09/03/02	ND	1
PL2-328A		1 U	09/05/02	ND	1
PL2-329A		1 U	09/04/02	ND	1
PL2-330A		1 U	09/05/02	ND	1
PL2-331A		1 U	09/03/02	ND	1
PL2-332A				N/A	
SW-36		1 U	08/13/02	ND	1
SW-38		1 UJ	09/06/02	ND	1
SW-39		1 UJ	09/06/02	ND	1
SW-40		1 UJ	09/14/02	ND	1
SW-42		1 UJ	08/15/02	ND	1
SW-43		1 U	08/14/02	ND	1
SW-44		1 U	08/14/02	ND	1
SW-45		1 U	08/14/02	ND	1
SW-53		1 U	08/14/02	ND	1
B-Level					
GP-06503	10/31/94	140			
GP-06504		2 U	10/28/94	ND	1
PL2-315B	08/14/02	4.5			
PL2-316B		1 U	08/15/02	ND	2
PL2-325B	08/24/95	0.52			
PL2-326B		1 U	09/06/02	ND	1
PL2-327B		1 U	09/03/02	ND	1
PL2-328B	09/05/02	5.4			
PL2-329B	09/04/02	4.6			
PL2-330B	09/05/02	5.7			
PL2-331B	09/04/02	3.9			
C-Level					
GP-06504				N/A	
PL2-316C		1 U	08/12/02	ND	2

2-60s Area - Maximum TPH-Diesel Range Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 500 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407	09/24/02	1100			
DP-4408	08/15/02	260 J			
DP-4409	08/15/02	350 J			
DP-4410		250 UJ	08/15/02	ND	1
DP-4908		250 UJ	08/26/02	ND	1
DP-4909		250 UJ	08/26/02	ND	1
DP-6201		250 UJ	09/03/02	ND	1
DP-6202		250 UJ	09/03/02	ND	1
DP-6203				N/A	
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208				N/A	
DP-6209				N/A	
DP-6301		250 U	08/28/02	ND	1
DP-6302		250 UJ	09/03/02	ND	1
DP-6401		250 U	09/06/02	ND	1
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		250 UJ	09/03/02	ND	1
DP-6606				N/A	
DP-6607		250 UJ	08/15/02	ND	1
DP-6608				N/A	
GP-04401				N/A	
GP-04402				N/A	
GP-04403				N/A	
GP-06201				N/A	
GP-06202				N/A	
GP-06203				N/A	
GP-06204				N/A	
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401		10000 U	08/23/94	ND	1
GP-06402		10000 U	08/23/94	ND	1
GP-06403		10000 U	08/23/94	ND	1
GP-06501				N/A	
GP-06502				N/A	

2-60s Area - Maximum TPH-Diesel Range Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 500 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503				N/A	
GP-06504				N/A	
GP-08005		1000 U	09/02/94	ND	1
GP-08006		1000 U	09/02/94	ND	1
PL2-310A		10000 U	12/21/93	ND	1
PL2-311A		10000 U	12/22/93	ND	1
PL2-312A		10000 U	12/21/93	ND	1
PL2-314A				N/A	
PL2-315A		10000 U	12/21/93	ND	1
PL2-316A		10000 U	12/21/93	ND	1
PL2-317A		10000 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A				N/A	
PL2-326A				N/A	
PL2-327A				N/A	
PL2-328A				N/A	
PL2-329A				N/A	
PL2-330A				N/A	
PL2-331A				N/A	
PL2-332A				N/A	
SW-36		250 UJ	08/13/02	ND	1
SW-38		250 U	09/06/02	ND	1
SW-39	09/06/02	4800			
SW-40		250 U	09/14/02	ND	1
SW-42		250 UJ	08/15/02	ND	1
SW-43		250 UJ	08/14/02	ND	1
SW-44		250 UJ	08/14/02	ND	1
SW-45		250 UJ	08/14/02	ND	1
SW-53		250 UJ	08/14/02	ND	1
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B				N/A	
PL2-316B				N/A	
PL2-325B				N/A	
PL2-326B				N/A	
PL2-327B				N/A	
PL2-328B				N/A	
PL2-329B				N/A	
PL2-330B				N/A	
PL2-331B				N/A	
C-Level					
GP-06504				N/A	
PL2-316C				N/A	

2-60s Area - Maximum TPH-Gasoline Range Concentrations in Groundwater
Boeing Plant 2
Screening Level (2004) = 800 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
DP-4407				N/A	
DP-4408				N/A	
DP-4409				N/A	
DP-4410				N/A	
DP-4908				N/A	
DP-4909				N/A	
DP-6201				N/A	
DP-6202				N/A	
DP-6203				N/A	
DP-6204				N/A	
DP-6205				N/A	
DP-6206				N/A	
DP-6207				N/A	
DP-6208				N/A	
DP-6209				N/A	
DP-6301				N/A	
DP-6302				N/A	
DP-6401		250 U	09/06/02	ND	1
DP-6402				N/A	
DP-6403				N/A	
DP-6404				N/A	
DP-6501		250 U	09/03/02	ND	1
DP-6606				N/A	
DP-6607				N/A	
DP-6608				N/A	
GP-04401		250 U	08/25/94	ND	1
GP-04402		250 U	08/25/94	ND	1
GP-04403	08/24/94	200			
GP-06201				N/A	
GP-06202				N/A	
GP-06203				N/A	
GP-06204				N/A	
GP-06205				N/A	
GP-06206				N/A	
GP-06207				N/A	
GP-06301				N/A	
GP-06302				N/A	
GP-06303				N/A	
GP-06304				N/A	
GP-06305				N/A	
GP-06306				N/A	
GP-06307				N/A	
GP-06308				N/A	
GP-06309				N/A	
GP-06401		10000 U	08/23/94	ND	1
GP-06402		10000 U	08/23/94	ND	1
GP-06403		10000 U	08/23/94	ND	1
GP-06501				N/A	
GP-06502				N/A	

2-60s Area - Maximum TPH-Gasoline Range Concentrations in Groundwater
Boeing Plant 2

Screening Level (2004) = 800 µg/L

Well or Probe Location	Maximum Concentration Date	Maximum Concentration or Detection Limit (µg/L)	Most Recent Non-Detect Date	Not Analyzed or Not Detected	Number of Non-Detects
A-Level					
GP-06503				N/A	
GP-06504				N/A	
GP-08005				N/A	
GP-08006				N/A	
PL2-310A	12/21/93	65000			
PL2-311A	12/22/93	65000			
PL2-312A		10000 U	12/21/93	ND	1
PL2-314A				N/A	
PL2-315A		10000 U	12/21/93	ND	1
PL2-316A		10000 U	12/21/93	ND	1
PL2-317A		10000 U	12/17/93	ND	1
PL2-317AR				N/A	
PL2-319A				N/A	
PL2-325A				N/A	
PL2-326A				N/A	
PL2-327A				N/A	
PL2-328A				N/A	
PL2-329A				N/A	
PL2-330A				N/A	
PL2-331A				N/A	
PL2-332A				N/A	
SW-36				N/A	
SW-38				N/A	
SW-39				N/A	
SW-40				N/A	
SW-42				N/A	
SW-43				N/A	
SW-44				N/A	
SW-45				N/A	
SW-53				N/A	
B-Level					
GP-06503				N/A	
GP-06504				N/A	
PL2-315B				N/A	
PL2-316B				N/A	
PL2-325B				N/A	
PL2-326B				N/A	
PL2-327B				N/A	
PL2-328B				N/A	
PL2-329B				N/A	
PL2-330B				N/A	
PL2-331B				N/A	
C-Level					
GP-06504				N/A	
PL2-316C				N/A	

Boeing Plant 2
Seattle/Tukwila, Washington

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Attachment B
Soil Constituents of Concern

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Arsenic in Soil, 2-60s Area: Depth 1 - 6 Ft.
Arsenic in Soil, 2-60s Area: Depth 6 - 12 Ft.
Mercury in Soil, 2-60s Area: Depth 0 - 1 Ft.
Mercury in Soil, 2-60s Area: Depth 1 - 6 Ft.
Mercury in Soil, 2-60s Area: Depth 6 - 12 Ft.
Cyanide in Soil, 2-60s Area: Depth 0 - 1 Ft.
Cyanide in Soil, 2-60s Area: Depth 1 - 6 Ft.
Cyanide in Soil, 2-60s Area: Depth 6 - 12 Ft.
PCBs in Soil, 2-60s Area: Depth 0 - 1 Ft.
PCBs in Soil, 2-60s Area: Depth 1 - 6 Ft.
PCBs in Soil, 2-60s Area: Depth 6 - 12 Ft.
Trichloroethene in Soil, 2-60s Area: Depth 0 - 1 Ft.
Trichloroethene in Soil, 2-60s Area: Depth 1 - 6 Ft.
Trichloroethene in Soil, 2-60s Area: Depth 6 - 12 Ft.

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Arsenic Concentrations in Soil
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Chrysene Concentrations in Soil
Aroclor 1254 Concentrations in Soil
Aroclor 1260 Concentrations in Soil
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n-Butylbenzene Concentrations in Soil
sec-Butylbenzene Concentrations in Soil
Ethylbenzene Concentrations in Soil
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n-Propylbenzene Concentrations in Soil
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TPH Gasoline Range Concentrations in Soil

B1.0 Soil Constituents of Concern

This attachment includes soil data information for the 2-60s Area of Boeing Plant 2 (Plant 2). This information was used to prepare Section 2, Data Gap Analysis, of this Data Gap Investigation Work Plan and includes: tables summarizing site-wide and 2-60s Area soil COCs, maps showing the distribution of COCs in the 2-60s Area, and data tables for each soil COC.

B1.1 IDENTIFICATION OF COCS

Table B-1 summarizes the screening levels for the site-wide soil COCs. All accepted soil data including any qualified data compiled since 1985 were used to prepare the table with two exceptions:

1. Soil data below 12 feet (generally below the water table) were excluded.
2. Soil data from soil that was removed from the site as a result of interim actions were excluded.

A COC was identified when laboratory analysis of a sample resulted in a concentration greater than the screening level at least once in any soil sample from the site. Table B-1 also includes the risk calculation in soil for the direct, air, and surface water exposure pathways. As discussed in detail in Volume II, screening levels for soil are the same as risk calculations. Because no risk information is available, the direct contact pathway screening level for TPH and lead were established according to MTCA Method A. Background soil concentrations are based on *Natural Background in Soil Metals Concentrations in Washington State* (Ecology Pub #94-115). However, because not all detected metals at Plant 2 are included in this reference at the time of this submittal, all background metal concentrations for Plant 2 have not been determined. Additional background metals concentrations will be used in conjunction with screening levels when the values are available later in the CMS process.

Table B-2 presents the current groundwater COCs for the 2-60s Area. COCs were identified by the same method as described above for Table B-1. All accepted soil data, including any qualified data compiled from the 2-60s Area since 1989, were used to prepare the table.

Table B-3 presents the data qualifiers and associated explanations that are applied to the data presented in the data tables discussed in Section B1.3, below.

B1.2 SPATIAL DISTRIBUTION OF COCS

Included in this attachment are maps showing the spatial distribution of each COC in soil at the 2-60s Area.

Maps showing the spatial distribution of each COC in soil (at three different depth intervals) in the 2-60s are included in this attachment. The maps show the spatial distribution of each COC at three depth intervals: 0 to 1 foot, 1 to 6 feet, and 6 to 12 feet below ground surface. The accepted maximum concentration of each COC for each interval was used to generate the

maps. If a constituent was never detected at a particular location, then the reporting limit for the non-detect is presented, with the exception of Total PCBs, where only the sum of all detected aroclors is shown.

B1.3 DATA TABLES

The data tables show all of the accepted maximum concentrations each soil COC. The data tables include data from all soil intervals, regardless of the frequency of detection.

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
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Attachment B
Tables

Table B-1 Screening Levels for Constituents of Concern in Site-wide Soils
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Maximum Detected	Soil Units	Laboratory RL	Direct Contact Risk Calculation[a]	Direct Contact Screening Level	Air Risk Calculation[b]	Air Screening Level	Surface Water Risk Calculation[c]	Surface Water Screening Level
Metals and Cyanide										
7440-36-0	Antimony	5.76E+02	mg/kg	5.00E+00	***5.33E+02***	***5.33E+02***	- -	- -	***3.40E+02***	***3.40E+02***
7440-38-2	Arsenic	7.60E+01	mg/kg	5.00E+00	***3.33E+01***	***3.33E+01***	3.22E+04	3.22E+04	***1.13E-02***	***5.00E+00***
7440-43-9	Cadmium	7.10E+03	mg/kg	2.00E-01	***6.67E+02***	***6.67E+02***	7.70E+04	7.70E+04	***1.01E+00***	***1.01E+00***
18540-29-9	Chromium (VI)	2.40E+03	mg/kg	2.00E-01	4.00E+03	4.00E+03	1.06E+04	1.06E+04	***1.92E+01***	***1.92E+01***
7440-50-8	Copper	2.81E+04	mg/kg	2.00E-01	4.93E+04	4.93E+04	- -	- -	***1.38E+00***	***1.38E+00***
7439-92-1	Lead	1.73E+04	mg/kg	2.00E+00	***1.00E+03***	***1.00E+03***	- -	- -	***1.62E+03***	***1.62E+03***
7439-96-5	Manganese	3.17E+03	mg/kg	1.00E-01	1.87E+05	1.87E+05	- -	- -	***1.30E+02***	***1.30E+02***
7439-97-6	Mercury	3.00E+01	mg/kg	5.00E-02	4.19E+01	4.19E+01	***6.39E-03***	***5.00E-02***	***2.61E-02***	***5.00E-02***
7440-02-0	Nickel (soluble salts)	1.77E+03	mg/kg	1.00E+00	2.67E+04	2.67E+04	- -	- -	***1.07E+01***	***1.07E+01***
7782-49-2	Selenium	9.00E+00	mg/kg	5.00E+00	6.67E+03	6.67E+03	- -	- -	***7.38E+00***	***7.38E+00***
7440-22-4	Silver	2.74E+02	mg/kg	3.00E-01	6.67E+03	6.67E+03	- -	- -	***3.23E-01***	***3.23E-01***
7440-28-0	Thallium (soluble salts)	5.60E+01	mg/kg	2.00E-01	8.64E+01	8.64E+01	- -	- -	***6.69E-01***	***6.69E-01***
7440-66-6	Zinc	3.10E+04	mg/kg	6.00E-01	4.00E+05	4.00E+05	- -	- -	***1.01E+02***	***1.01E+02***
57-12-5	Cyanide	4.60E+03	mg/kg	1.00E-01	2.67E+04	2.67E+04	- -	- -	***2.02E-01***	***2.02E-01***
Semivolatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs)										
56-55-3	Benzo(a)anthracene	2.00E+05	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	- -	- -	***4.19E+01***	***4.19E+01***
205-99-2	Benzo(b)fluoranthene	1.00E+05	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	- -	- -	***1.44E+02***	***1.44E+02***
207-08-9	Benzo(k)fluoranthene	1.60E+05	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	- -	- -	***1.44E+02***	***1.44E+02***
50-32-8	Benzo(a)pyrene	2.10E+05	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	7.95E+07	7.95E+07	***1.13E+02***	***1.13E+02***
218-01-9	Chrysene	2.40E+05	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	- -	- -	***4.66E+01***	***4.66E+01***
53-70-3	Dibenz(a,h)anthracene	3.30E+04	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	- -	- -	***2.10E+02***	***2.10E+02***
105-67-9	2,4-Dimethylphenol	1.30E+05	µg/kg	2.00E+02	1.33E+07	1.33E+07	- -	- -	***1.64E+03***	***1.64E+03***
131-11-3	Dimethylphthalate	1.50E+05	µg/kg	6.70E+01	6.67E+08	6.67E+08	- -	- -	***1.24E+05***	***1.24E+05***
117-81-7	bis(2-Ethylhexyl)phthalate	5.20E+05	µg/kg	6.70E+01	1.79E+06	1.79E+06	- -	- -	***1.57E+03***	***1.57E+03***
206-44-0	Fluoranthene	4.10E+05	µg/kg	6.70E+01	2.67E+07	2.67E+07	- -	- -	***3.23E+04***	***3.23E+04***
193-39-5	Indeno(1,2,3-cd)pyrene	8.30E+04	µg/kg	6.70E+00	***3.42E+03***	***3.42E+03***	- -	- -	***4.06E+02***	***4.06E+02***
-	Aroclor 1016/1242	9.00E+02	µg/kg	3.30E+01	4.67E+04	4.67E+04	- -	- -	***1.38E-01***	***3.30E+01***
11097-69-1	Aroclor 1254	8.10E+04	µg/kg	3.30E+01	***1.33E+04***	***1.33E+04***	- -	- -	***1.08E+00***	***3.30E+01***
11096-82-5	Aroclor 1260	6.60E+05	µg/kg	3.30E+01	- -	- -	- -	- -	***1.05E+00***	***3.30E+01***
-	Total PCBs	6.60E+05	µg/kg	3.30E+01	- -	- -	- -	- -	***3.96E-01***	***3.30E+01***
Volatile Organic Compounds (VOCs)										
71-43-2	Benzene	4.90E+04	µg/kg	1.00E+00	1.36E+06	1.36E+06	***1.04E+02***	***1.04E+02***	***2.53E+01***	***2.53E+01***
104-51-8	n-Butylbenzene	3.70E+04	µg/kg	1.00E+00	- -	- -	***4.64E+03***	***4.64E+03***	- -	- -
135-98-8	sec-Butylbenzene	1.00E+04	µg/kg	1.00E+00	- -	- -	***7.86E+03***	***7.86E+03***	- -	- -
67-66-3	Chloroform	4.80E+02	µg/kg	1.00E+00	7.03E+06	7.03E+06	***3.96E+01***	***3.96E+01***	***2.98E+02***	***2.98E+02***
75-35-4	1,1-Dichloroethene	1.70E+03	µg/kg	1.00E+00	1.24E+05	1.24E+05	***1.23E+03***	***1.23E+03***	***2.73E+00***	***2.73E+00***
156-59-2	cis-1,2-Dichloroethene	7.30E+05	µg/kg	1.00E+00	7.99E+06	7.99E+06	***7.94E+02***	***7.94E+02***	***5.66E+03***	***5.66E+03***
156-60-5	trans-1,2-Dichloroethene	7.10E+03	µg/kg	1.00E+00	1.31E+07	1.31E+07	***8.99E+02***	***8.99E+02***	5.43E+04	5.43E+04
100-41-4	Ethylbenzene	2.60E+05	µg/kg	1.00E+00	1.45E+08	1.45E+08	***2.52E+03***	***2.52E+03***	***1.81E+04***	***1.81E+04***
98-82-8	Isopropylbenzene	1.80E+04	µg/kg	1.00E+00	1.45E+08	1.45E+08	***1.27E+03***	***1.27E+03***	- -	- -
75-09-2	Methylene Chloride	2.40E+04	µg/kg	2.00E+00	9.94E+06	9.94E+06	***1.89E+03***	***1.89E+03***	***8.28E+02***	***8.28E+02***
91-20-3	Naphthalene	5.20E+05	µg/kg	5.00E+00	1.44E+07	1.44E+07	***2.48E+04***	***2.48E+04***	***4.99E+04***	***4.99E+04***
103-65-1	n-Propylbenzene	4.20E+04	µg/kg	1.00E+00	- -	- -	***1.36E+04***	***1.36E+04***	- -	- -
79-34-5	1,1,2,2-Tetrachloroethane	1.70E+02	µg/kg	1.00E+00	2.73E+05	2.73E+05	3.48E+02	3.48E+02	***7.19E+00***	***7.19E+00***
127-18-4	Tetrachloroethene	2.00E+04	µg/kg	1.00E+00	1.07E+06	1.07E+06	***1.99E+02***	***1.99E+02***	***8.72E+00***	***8.72E+00***

Table B-1 Screening Levels for Constituents of Concern in Site-wide Soils
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Maximum Detected	Soil Units	Laboratory RL	Direct Contact Risk Calculation[a]	Direct Contact Screening Level	Air Risk Calculation[b]	Air Screening Level	Surface Water Risk Calculation[c]	Surface Water Screening Level
VOCs (cont'd)										
108-88-3	Toluene	6.50E+05	µg/kg	1.00E+00	1.34E+08	1.34E+08	***1.90E+04***	***1.90E+04***	***1.09E+05***	***1.09E+05***
71-55-6	1,1,1-Trichloroethane	1.10E+05	µg/kg	1.00E+00	4.12E+08	4.12E+08	***2.78E+04***	***2.78E+04***	1.20E+06	1.20E+06
79-00-5	1,1,2-Trichloroethane	3.30E+03	µg/kg	1.00E+00	9.57E+05	9.57E+05	***2.90E+02***	***2.90E+02***	***2.78E+01***	***2.78E+01***
79-01-6	Trichloroethene	1.10E+07	µg/kg	1.00E+00	***1.36E+05***	***1.36E+05***	***8.86E+00***	***8.86E+00***	***2.00E+00***	***2.00E+00***
95-63-6	1,2,4-Trimethylbenzene	3.20E+05	µg/kg	1.00E+00	7.27E+07	7.27E+07	***2.36E+03***	***2.36E+03***	- -	- -
108-67-8	1,3,5-Trimethylbenzene	1.20E+05	µg/kg	1.00E+00	7.27E+07	7.27E+07	***2.47E+03***	***2.47E+03***	- -	- -
75-01-4	Vinyl Chloride	1.80E+04	µg/kg	1.00E+00	4.97E+04	4.97E+04	***1.64E+01***	***1.64E+01***	***4.59E+00***	***4.59E+00***
Total Petroleum Hydrocarbons (TPH)										
-	TPH - Diesel Range	1.10E+05	mg/kg	5.00E+00	***2.00E+03***					
-	TPH - Gasoline Range	2.50E+04	mg/kg	5.00E+00	***3.00E+01***					
-	TPH - Oil Range	2.00E+04	mg/kg	1.00E+01	***2.00E+03***					

Notes:

	Screening levels adjust risk calculations up to the reporting limit (RL) where applicable.
Bolded	**Bolded** risk based and screening level concentrations are below maximum detect.
a	Lowest soil concentration protective of dermal contact, ingestion and trenching.
b	Lowest soil concentration protective of indoor and outdoor air (inclusive of fugitive dust).
c	Lowest soil concentration protective of human ingestion of aquatic organisms and protection of aquatic organisms.
*	Constituent not listed.
- -	Not calculated.
RL	Reporting Limit as detailed in Analytical Resources Inc. Laboratory Quality Assurance Plan, Version 11-022, dated 5/17/04 (generally equivalent to the practical quantitation limit in a clean matrix).
TPH	Total Petroleum Hydrocarbon.

Table B-2: Constituents of Concern Detected in Soil
2-60s Area
Boeing Plant 2

CAS Number	Constituent of Concern	Soil Units	Maximum Detected	Samples Analyzed	Detects	Samples above Direct Contact Screening Level	Samples above Air Screening Level	Samples above Surface Water Screening Level
Metals and Cyanide								
7440-38-2	Arsenic	mg/kg	7.60E+01	125	109	1	0	16
7440-43-9	Cadmium	mg/kg	3.40E+00	125	17	0	0	1
7440-50-8	Copper	mg/kg	5.53E+01	125	125	0	- -	125
7439-96-5	Manganese	mg/kg	3.46E+02	75	75	0	- -	28
7439-97-6	Mercury	mg/kg	2.80E-01	125	13	0	12	12
7440-02-0	Nickel (soluble salts)	mg/kg	4.27E+01	125	125	0	- -	49
7440-22-4	Silver	mg/kg	5.00E-01	125	4	0	- -	4
7440-28-0	Thallium (soluble salts)	mg/kg	7.00E-01	125	41	0	- -	1
7440-66-6	Zinc	mg/kg	7.57E+02	125	125	0	- -	3
57-12-5	Cyanide	mg/kg	1.20E+00	72	15	0	- -	7
Semivolatile Organic Compounds (SVOCs) and Polychlorinated Biphenyls (PCBs)								
56-55-3	Benzo(a)anthracene	µg/kg	1.30E+02	95	11	0	- -	4
50-32-8	Benzo(a)pyrene	µg/kg	2.00E+02	95	10	0	0	2
205-99-2	Benzo(b)fluoranthene	µg/kg	1.60E+02	95	9	0	0	1
117-81-7	bis(2-Ethylhexyl)phthalate	µg/kg	1.60E+03	95	7	0	- -	1
218-01-9	Chrysene	µg/kg	1.60E+02	95	13	0	- -	5
11097-69-1	Aroclor 1254	µg/kg	5.10E+02	85	6	0	- -	6
11096-82-5	Aroclor 1260	µg/kg	9.40E+01	84	4	- -	- -	4
-	Total PCBs	µg/kg	5.10E+02	85	8	- -	- -	8
VOCs								
71-43-2	Benzene	µg/kg	2.00E+03	138	6	0	1	3
104-51-8	n-Butylbenzene	µg/kg	3.70E+04	60	2	- -	1	- -
135-98-8	sec-Butylbenzene	µg/kg	1.00E+04	60	3	- -	1	- -
100-41-4	Ethylbenzene	µg/kg	1.00E+05	138	11	0	3	2
98-82-8	Isopropylbenzene	µg/kg	1.80E+04	60	2	0	2	- -
91-20-3	Naphthalene	µg/kg	1.20E+05	109	9	0	2	1
103-65-1	n-Propylbenzene	µg/kg	4.20E+04	60	2	- -	1	- -
127-18-4	Tetrachloroethene	µg/kg	8.80E+00	136	18	0	0	1
79-01-6	Trichloroethene	µg/kg	3.00E+02	136	26	0	5	20
95-63-6	1,2,4-Trimethylbenzene	µg/kg	3.20E+05	60	3	0	2	- -
108-67-8	1,3,5-Trimethylbenzene	µg/kg	1.20E+05	60	2	0	2	- -
Petroleum Hydrocarbons								
-	TPH - Gasoline Range	mg/kg	1.50E+04	59	11	10		

NOTES:

Sample population is defined as soil samples collected from within the 2-60s Area, where coordinates of sample station are known.

Table B-3 Explanation of Data Qualifiers
2-60s Area
Boeing Plant 2

Data Qualifier	Explanation
Data Qualifiers Used by the Contract Laboratory – Analytical Resources, Inc.	
U	The compound was analyzed for, but not detected at the reported concentration.
J	Indicates an estimated concentration when a value is less than the calculated reporting limit.
D	Indicates the surrogate/spike(s) was not detected, due to dilution of extract.
NR	Indicates the surrogate recovery cannot be reported due to matrix interference.
E	Indicates a value above the linear range of the detector, sample dilution is required.
S	Indicates no value reported due to saturation of the detector, sample dilution required.
NA	Indicates compound was not analyzed for.
M	Indicates an estimated value of analyte found and confirmed by the analyst but with a low spectral match (GC-MS).
B	Indicates possible/probable blank contamination. Flagged when the analyte is detected in the blank as well as in the sample.
Y	Indicates raised reporting limit due to background interference or to activity in the instrument. Compound is still not detected at or above the raised level.
C	Indicates a probably detection that cannot be confirmed due to matrix interferences.
P	Indicates a high RPD between detected concentrations for dual column GC analyses without obvious interference.
Data Validation Qualifiers for Organic Analyses	
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a “tentative identification”.
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table B-3 Explanation of Data Qualifiers
2-60s Area
Boeing Plant 2

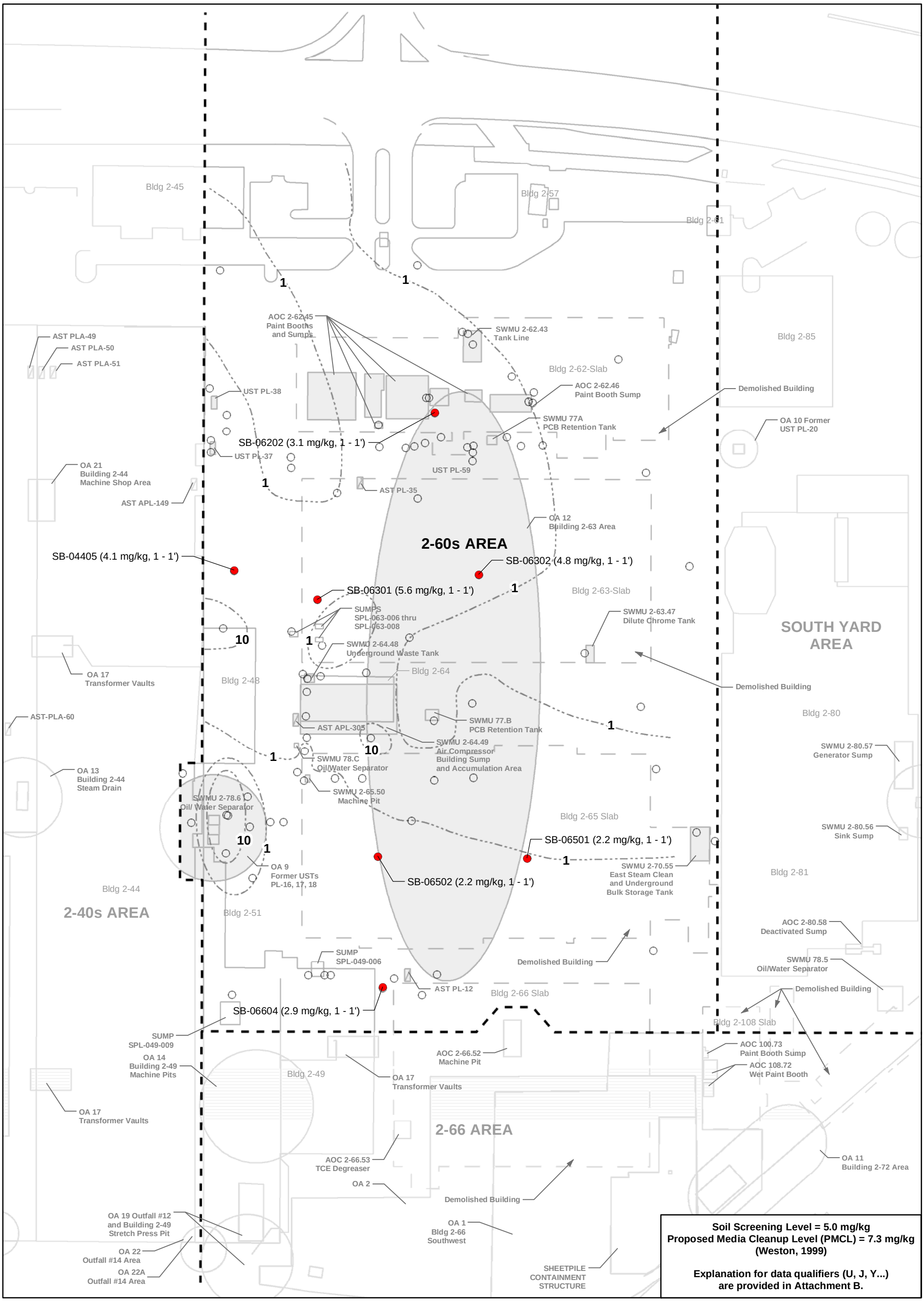
Data Qualifier	Explanation
Data Validation Qualifiers for Inorganic Analyses	
U	The compound was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment B
Maps



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100

Scale 1" = 160 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

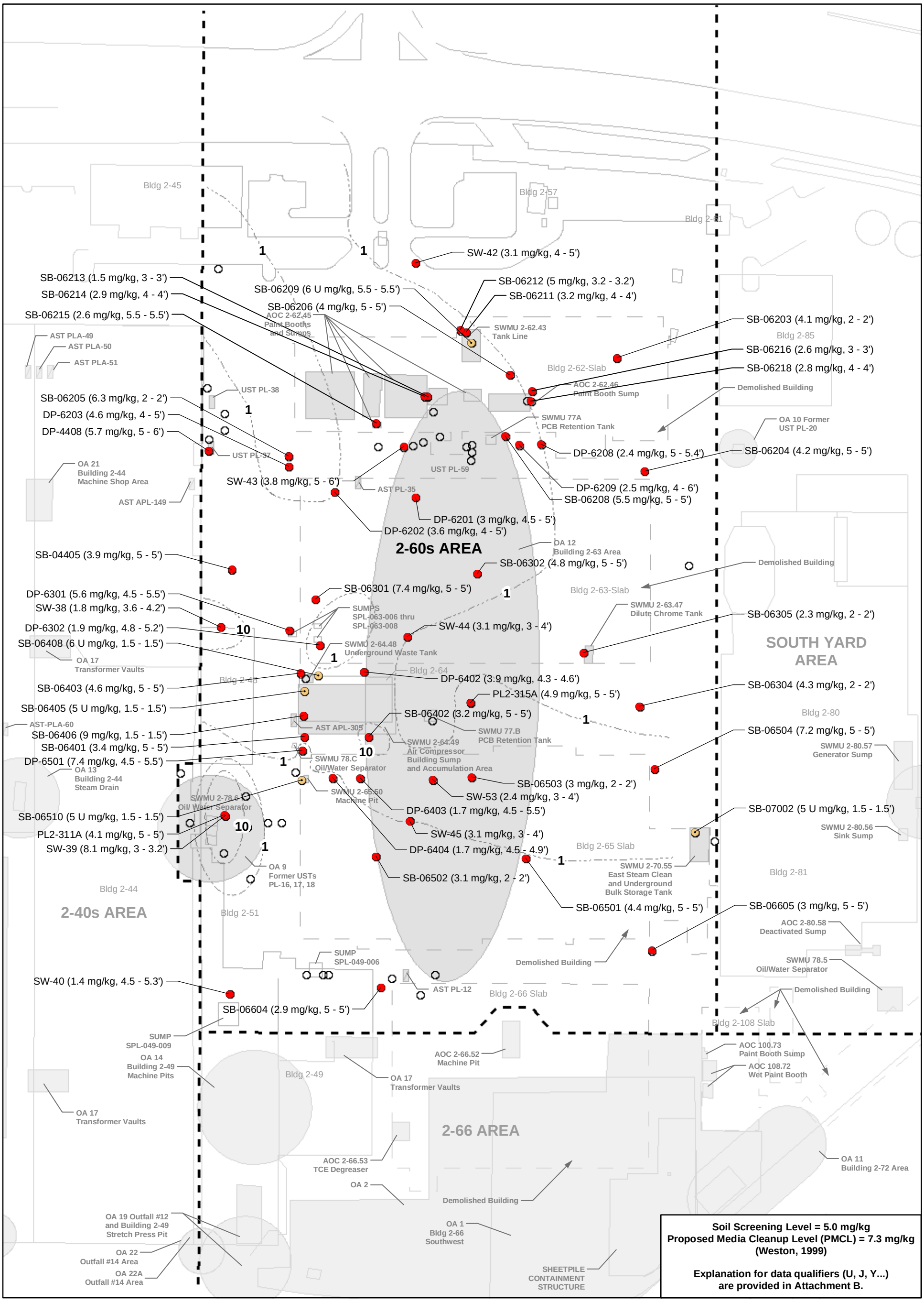
2-60s AREA
ARSENIC IN SOIL: DEPTH 0 - 1 FT

BOEING PLANT 2

Drawn: BBA	Revision: 3	Date: Sept. 15, 2004	Figure: 1

0131646001600_ARSENIC_1_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 160 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

DRAFT

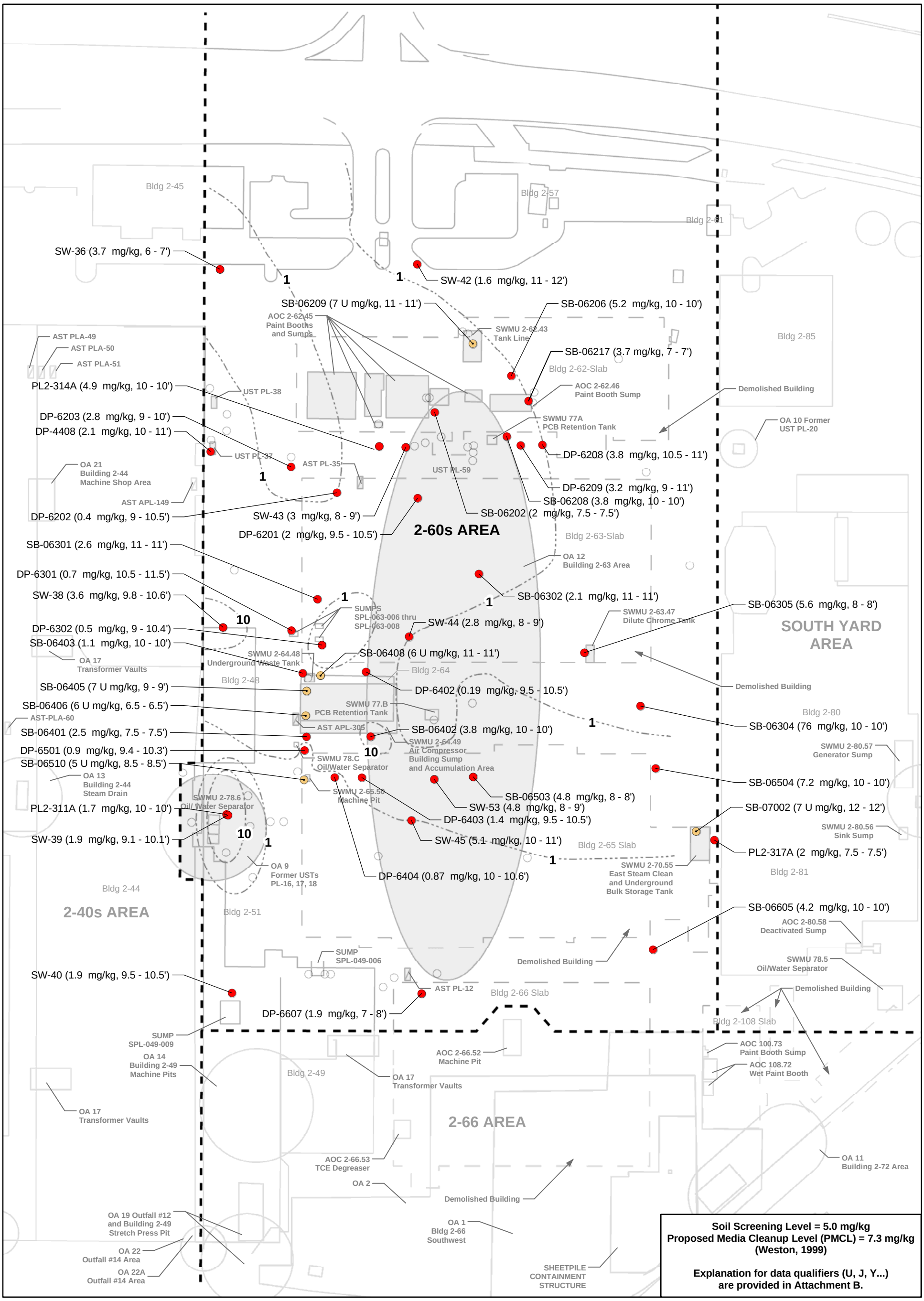
2-60s AREA
ARSENIC IN SOIL: DEPTH 1 - 6 FT

BOEING PLANT 2

Drawn: BBA	Revision: 3	Date: Sept. 15, 2004	Figure: 2

0131646001600_ARSENIC_2_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100

Scale 1" = 160 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

DRAFT

2-60s AREA

ARSENIC IN SOIL: DEPTH 6 - 12 FT

BOEING PLANT 2

Drawn: BBA	Revision: 3	Date: Sept. 15, 2004	Figure: 3

0131646001600_ARSENIC_3_061604.mxd

Golder Associates

Bldg 2-45
Bldg 2-57
Bldg 2-61
Bldg 2-85
AOC 2-62.45 Paint Booths and Sumps
SWMU 2-62.43 Tank Line
AST PLA-49
AST PLA-50
AST PLA-51
Bldg 2-62-Slab
AOC 2-62.46 Paint Booth Sump
Demolished Building
UST PL-38
SWMU 77A PCB Retention Tank
OA 10 Former UST PL-20
SB-06202 (0.05 U mg/kg, 1 - 1')
UST PL-37
UST PL-59
OA 21 Building 2-44 Machine Shop Area
AST PL-35
AST APL-149
2-60s AREA
OA 12 Building 2-63 Area
SB-04405 (0.06 U mg/kg, 1 - 1')
SB-06302 (0.05 U mg/kg, 1 - 1')
SB-06301 (0.06 U mg/kg, 1 - 1')
Bldg 2-63-Slab
SUMPS SPL-063-006 thru SPL-063-008
SWMU 2-63.47 Dilute Chrome Tank
SOUTH YARD AREA
SWMU 2-64.48 Underground Waste Tank
OA 17 Transformer Vaults
Bldg 2-48
Bldg 2-64
Demolished Building
AST-PLA-60
Bldg 2-80
AST APL-305
SWMU 77.B PCB Retention Tank
SWMU 2-64.49 Air Compressor Building Sump and Accumulation Area
SWMU 2-80.57 Generator Sump
SWMU 78.C Oil/Water Separator
OA 13 Building 2-44 Steam Drain
SWMU 2-65.50 Machine Pit
SWMU 2-78.6 Oil/ Water Separator
Bldg 2-65 Slab
SWMU 2-80.56 Sink Sump
SB-06502 (0.06 U mg/kg, 1 - 1')
SB-06501 (0.05 U mg/kg, 1 - 1')
OA 9 Former USTs PL-16, 17, 18
SWMU 2-70.55 East Steam Clean and Underground Bulk Storage Tank
Bldg 2-81
Bldg 2-44
2-40s AREA
Bldg 2-51
AOC 2-80.58 Deactivated Sump
SUMP SPL-049-006
Demolished Building
SWMU 78.5 Oil/Water Separator
AST PL-12
Bldg 2-66 Slab
Demolished Building
SB-06604 (0.06 mg/kg, 1 - 1')
Bldg 2-108 Slab
SUMP SPL-049-009
AOC 100.73 Paint Booth Sump
OA 14 Building 2-49 Machine Pits
AOC 2-66.52 Machine Pit
AOC 108.72 Wet Paint Booth
Bldg 2-49
OA 17 Transformer Vaults
OA 17 Transformer Vaults
2-66 AREA
AOC 2-66.53 TCE Degreaser
OA 11 Building 2-72 Area
OA 2
Demolished Building
OA 19 Outfall #12 and Building 2-49 Stretch Press Pit
OA 1 Bldg 2-66 Southwest
OA 22 Outfall #14 Area
OA 22A Outfall #14 Area
SHEETPILE CONTAINMENT STRUCTURE

Soil Screening Level = 0.05 mg/kg
Proposed Media Cleanup Level (PMCL) = 0.07 mg/kg (Weston, 1999)

Explanation for data qualifiers (U, J, Y...) are provided in Attachment B.

LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Plant 2 Sub-Area Boundary.

0 160
Scale 1" = 100 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

DRAFT

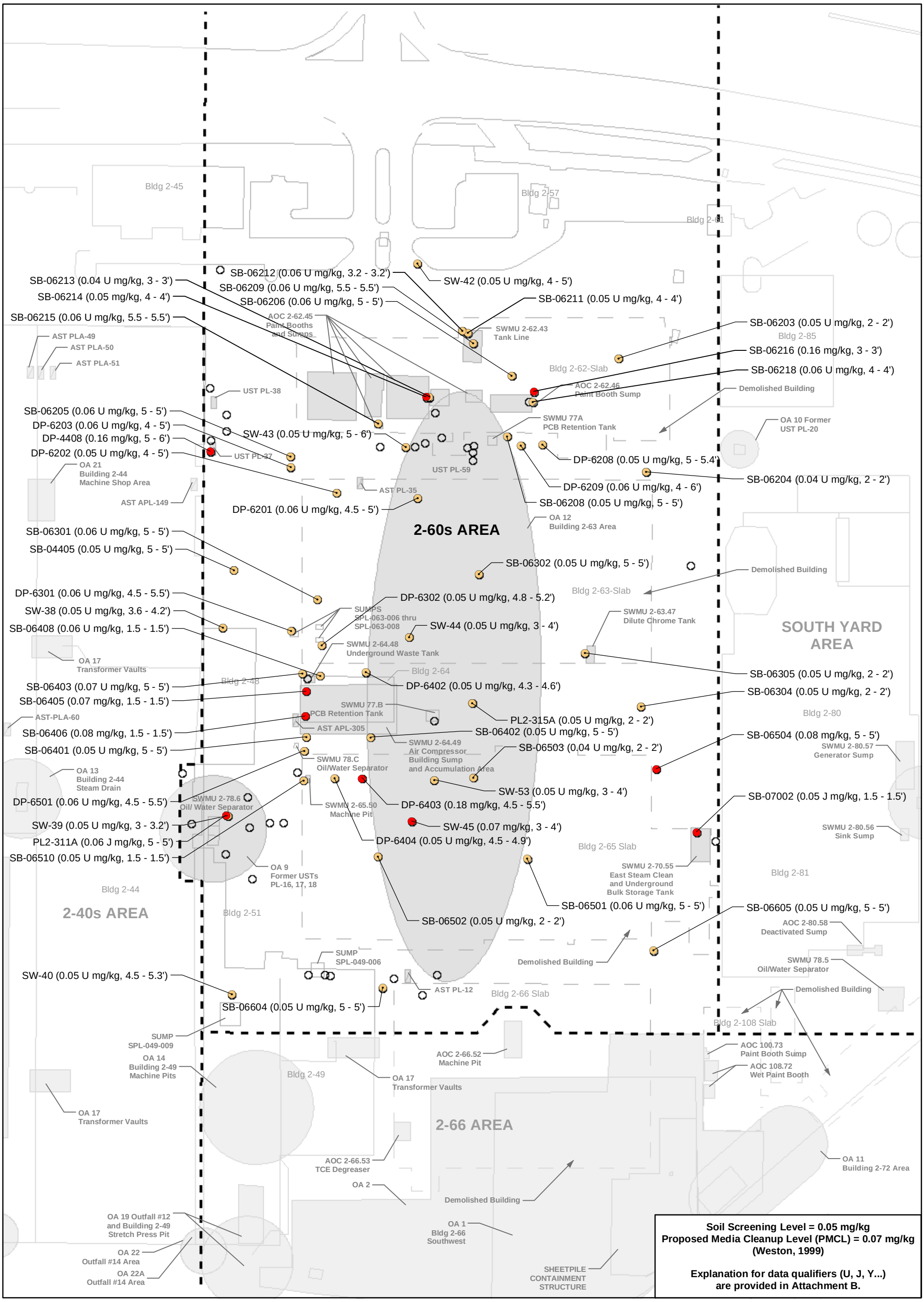
2-60s AREA
MERCURY IN SOIL: DEPTH 0 - 1 FT

BOEING PLANT 2

Drawn: BBA	Revision: 2	Date: Sept. 15, 2004	Figure: 1

013164600160O_MERCURY_1_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Plant 2 Sub-Area Boundary.

0 160
Scale 1" = 100 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

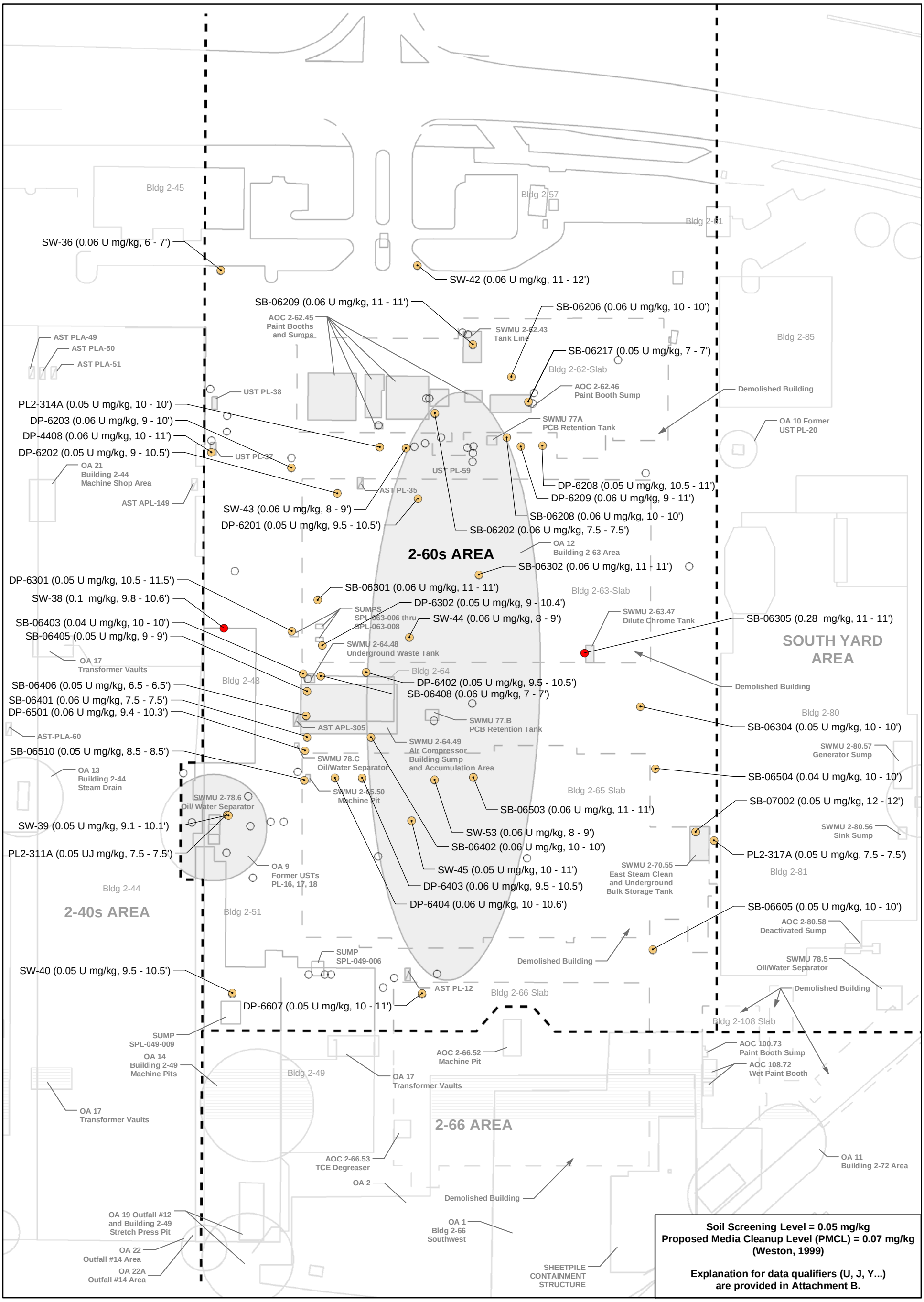
DRAFT

2-60s AREA
MERCURY IN SOIL: DEPTH 1 - 6 FT
BOEING PLANT 2

Drawn: BBA	Revision: 2	Date: Sept. 15, 2004	Figure: 2

0131646001600_MERCURY_2_061604.mxd

Golder Associates



Soil Screening Level = 0.05 mg/kg
Proposed Media Cleanup Level (PMCL) = 0.07 mg/kg (Weston, 1999)

Explanation for data qualifiers (U, J, Y...) are provided in Attachment B.

LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Plant 2 Sub-Area Boundary.

0 160
Scale 1" = 100 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

DRAFT

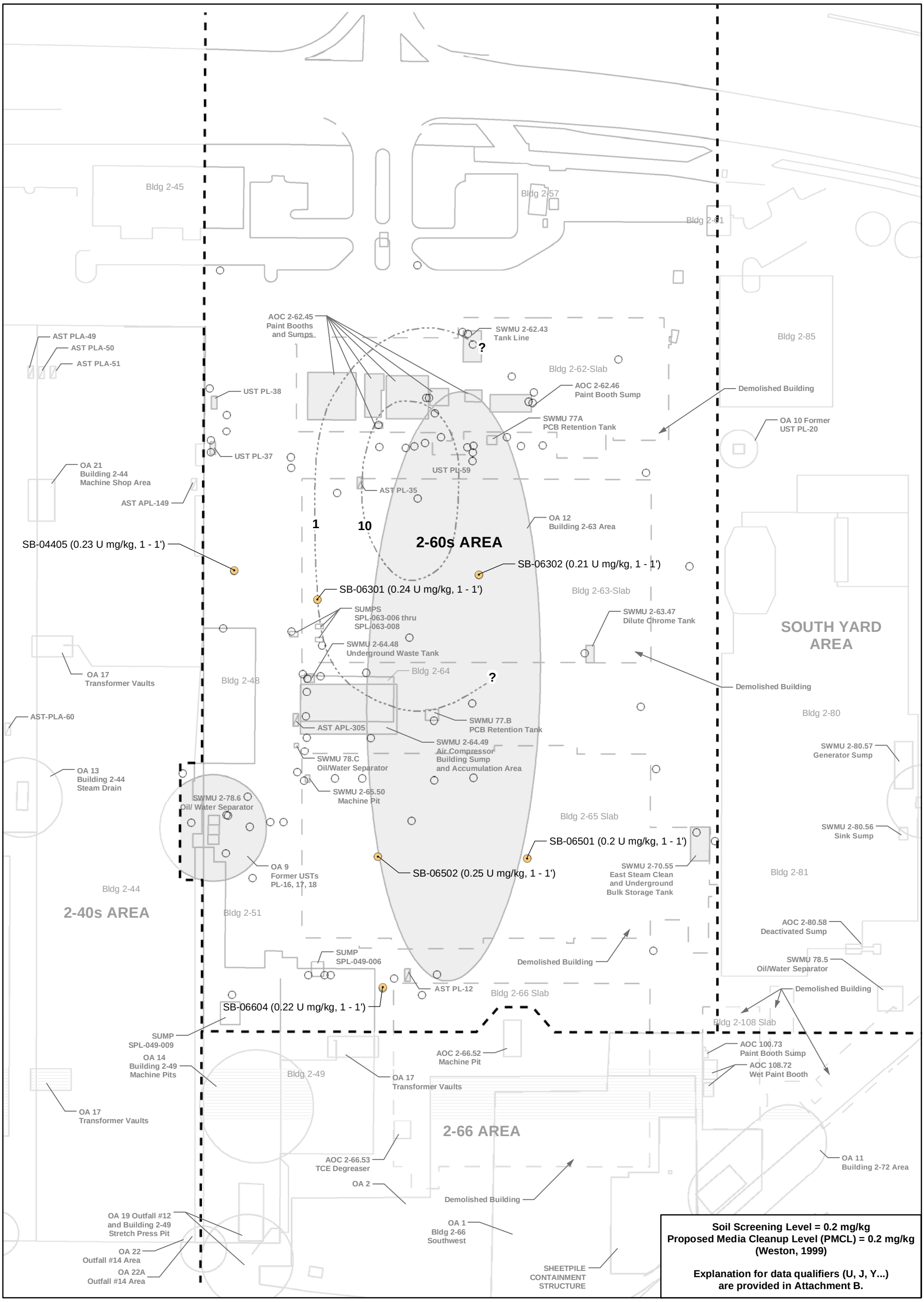
2-60s AREA
MERCURY IN SOIL: DEPTH 6 - 12 FT

BOEING PLANT 2

Drawn: BBA	Revision: 2	Date: Sept. 15, 2004	Figure: 3

0131646001600_MERCURY_3_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

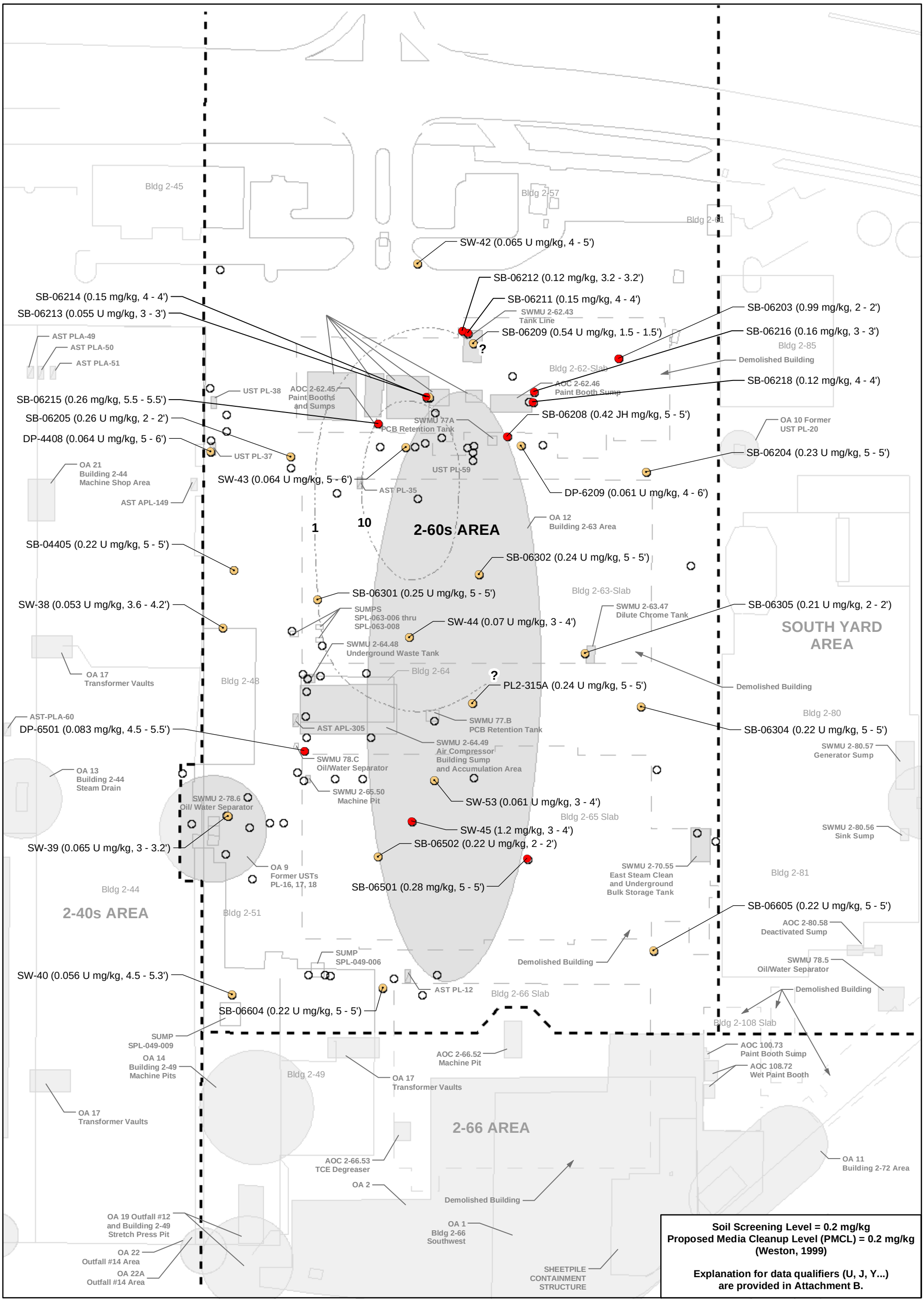
2-60s AREA
CYANIDE IN SOIL: DEPTH 0 - 1 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 1

0131646001600_CYANIDE_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

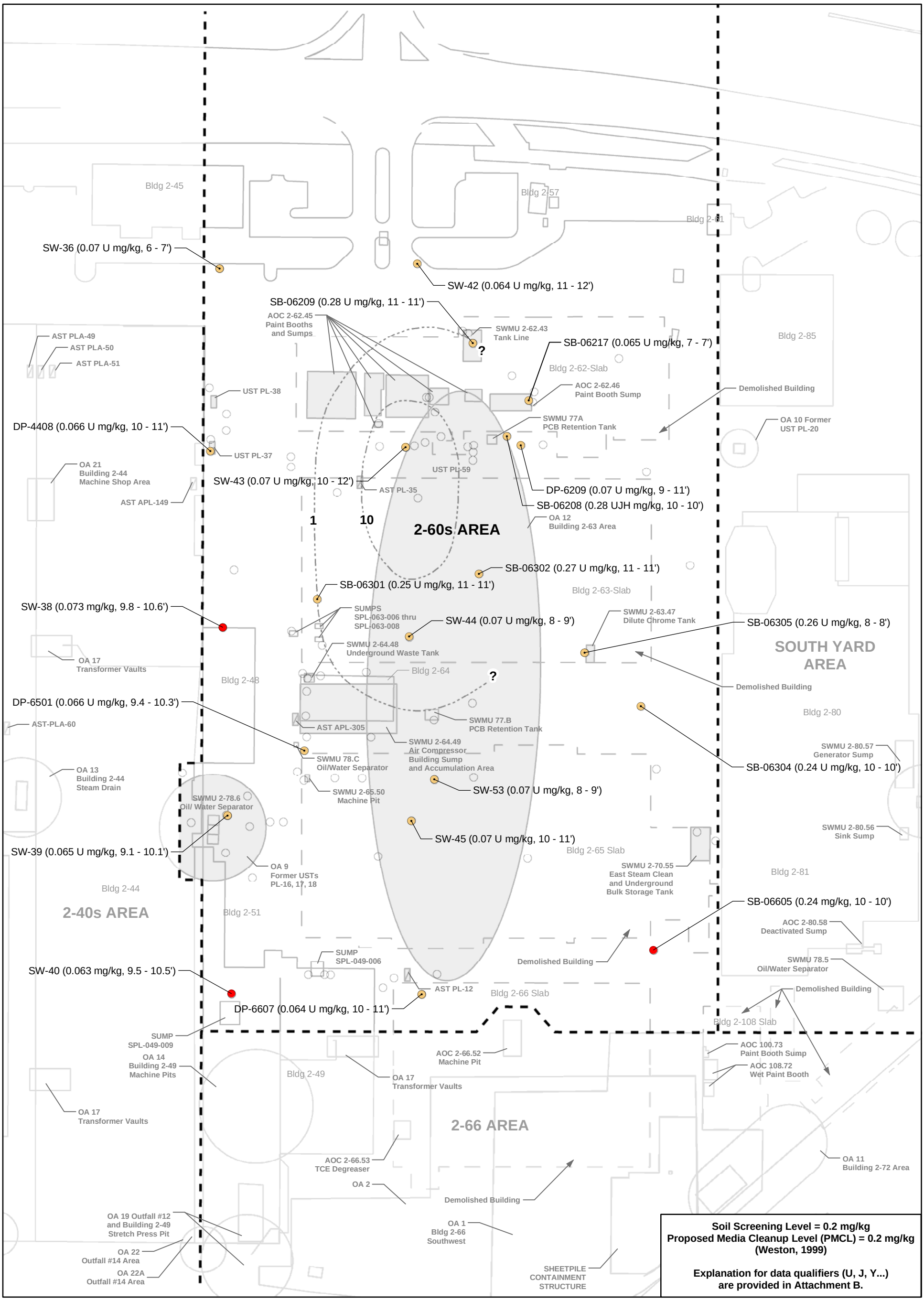
2-60s AREA
CYANIDE IN SOIL: DEPTH 1 - 6 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 2

0131646001600_CYANIDE_2_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; mg/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

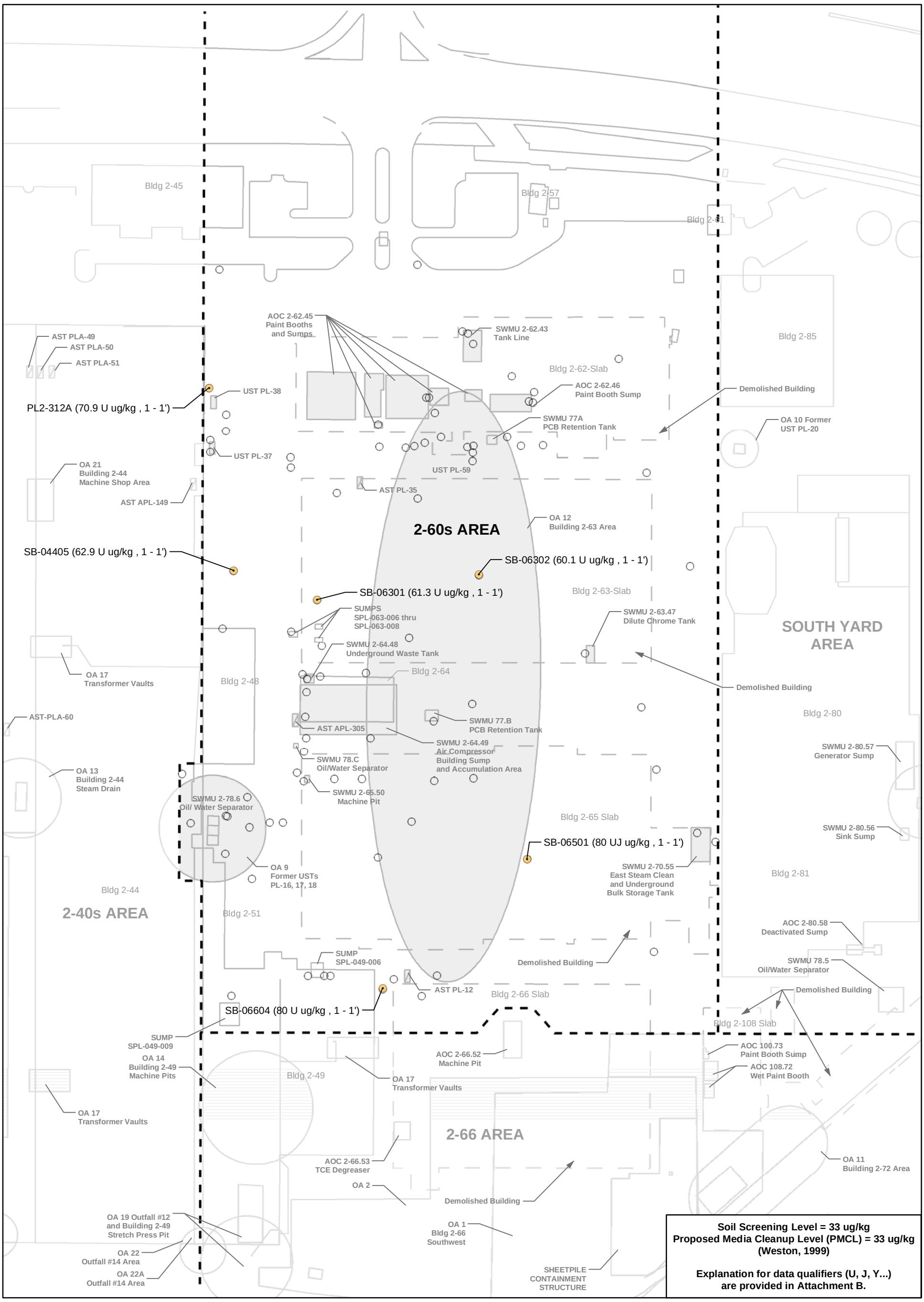
DRAFT

2-60s AREA
CYANIDE IN SOIL: DEPTH 6 - 12 FT
BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 3

0131646001600_CYANIDE_3_061604.mxd

Golder Associates



Soil Screening Level = 33 ug/kg
Proposed Media Cleanup Level (PMCL) = 33 ug/kg
(Weston, 1999)

Explanation for data qualifiers (U, J, Y...)
are provided in Attachment B.

LEGEND

- Sample location where constituent was detected. (Concentration; ug/kg, Depth; feet bgs).
- Sample location where constituent was not detected. (U indicates the highest Reporting Limit of the individual Aroclors not detected)
- Sample location where constituent was not analyzed.
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

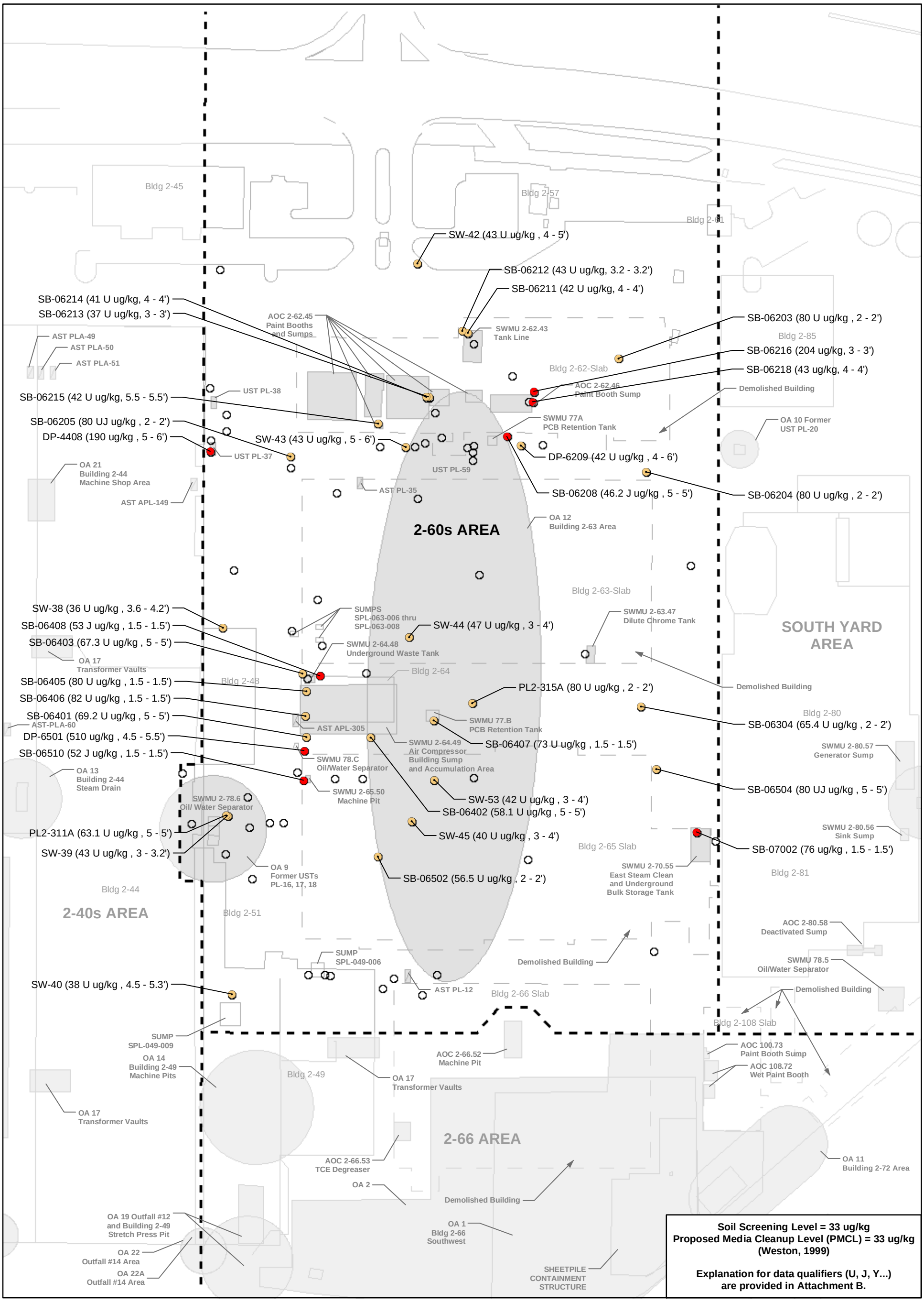
2-60s AREA
TOTAL PCBs IN SOIL: DEPTH 0 - 1 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 1

0131646001600_PCBS_061604.mxd

Golder Associates



Soil Screening Level = 33 ug/kg
Proposed Media Cleanup Level (PMCL) = 33 ug/kg
(Weston, 1999)

Explanation for data qualifiers (U, J, Y...)
are provided in Attachment B.

LEGEND

- Sample location where constituent was detected. (Concentration; ug/kg, Depth; feet bgs).
- Sample location where constituent was not detected. (U indicates the highest Reporting Limit of the individual Aroclors not detected)
- Sample location where constituent was not analyzed.
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

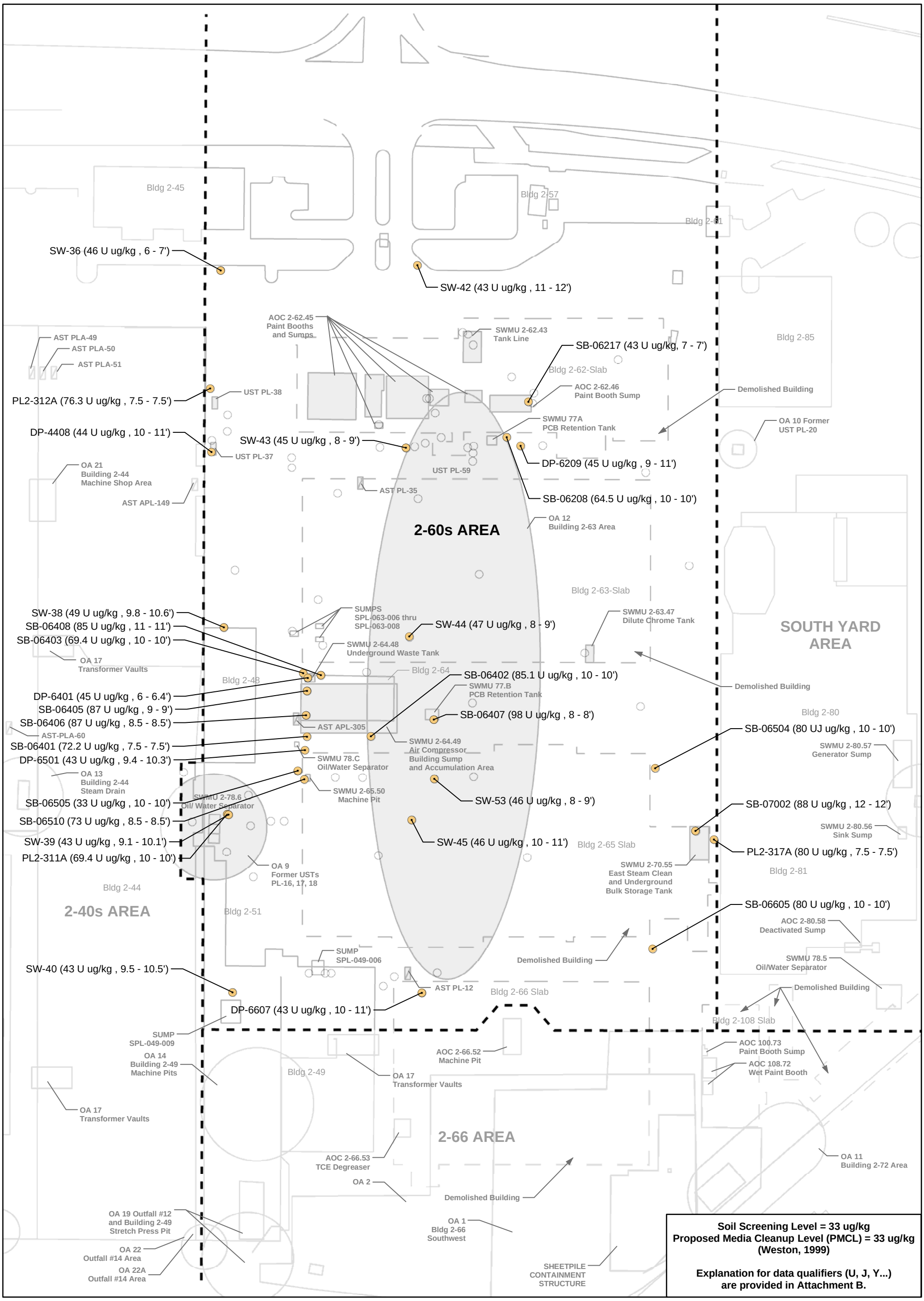
2-60s AREA
TOTAL PCBs IN SOIL: DEPTH 1 - 6 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 2

0131646001600_PCBS_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; ug/kg, Depth; feet bgs).
- Sample location where constituent was not detected. (U indicates the highest Reporting Limit of the individual Aroclors not detected)
- Sample location where constituent was not analyzed.
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

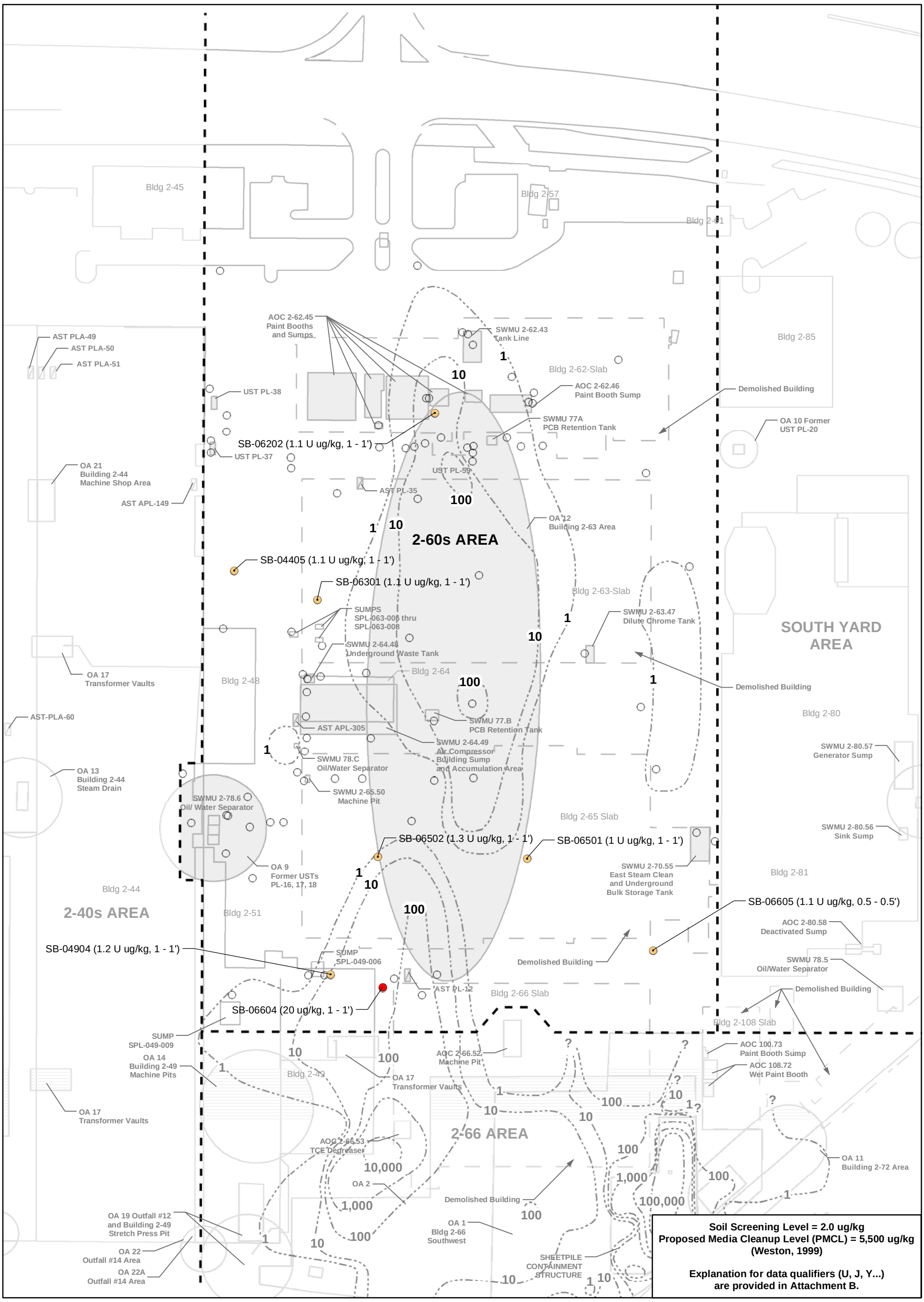
2-60s AREA
TOTAL PCBs IN SOIL: DEPTH 6 - 12 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 3

0131646001600_PCBS_3_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; ug/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

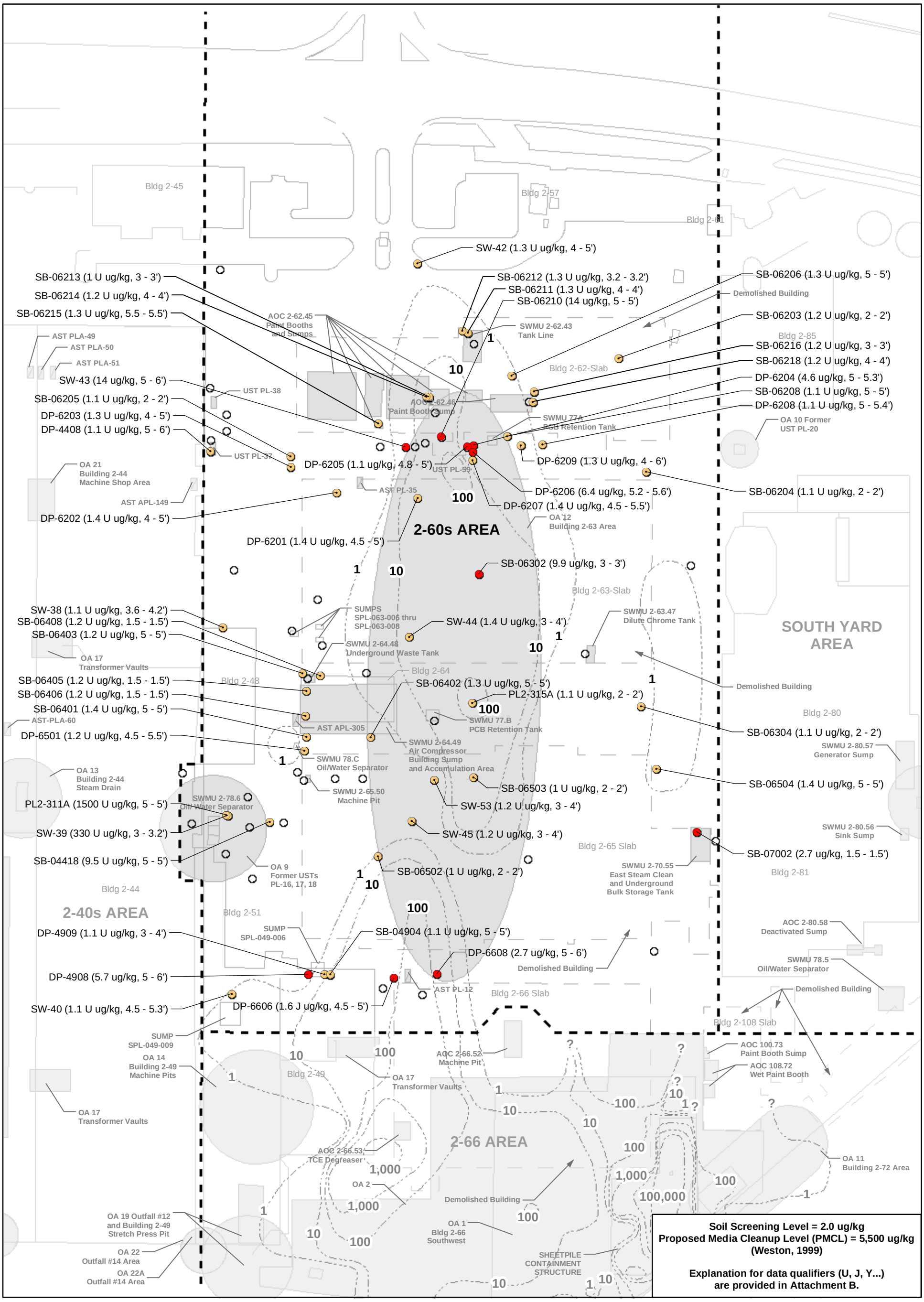
2-60s AREA
TRICHLOROETHENE IN SOIL: DEPTH 0 - 1 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 1

0131646001600_TCE_1_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; ug/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection:
Washington State Plane
North Zone, NAD 83, Feet

Source: Weston,
Golder Associates

DRAFT

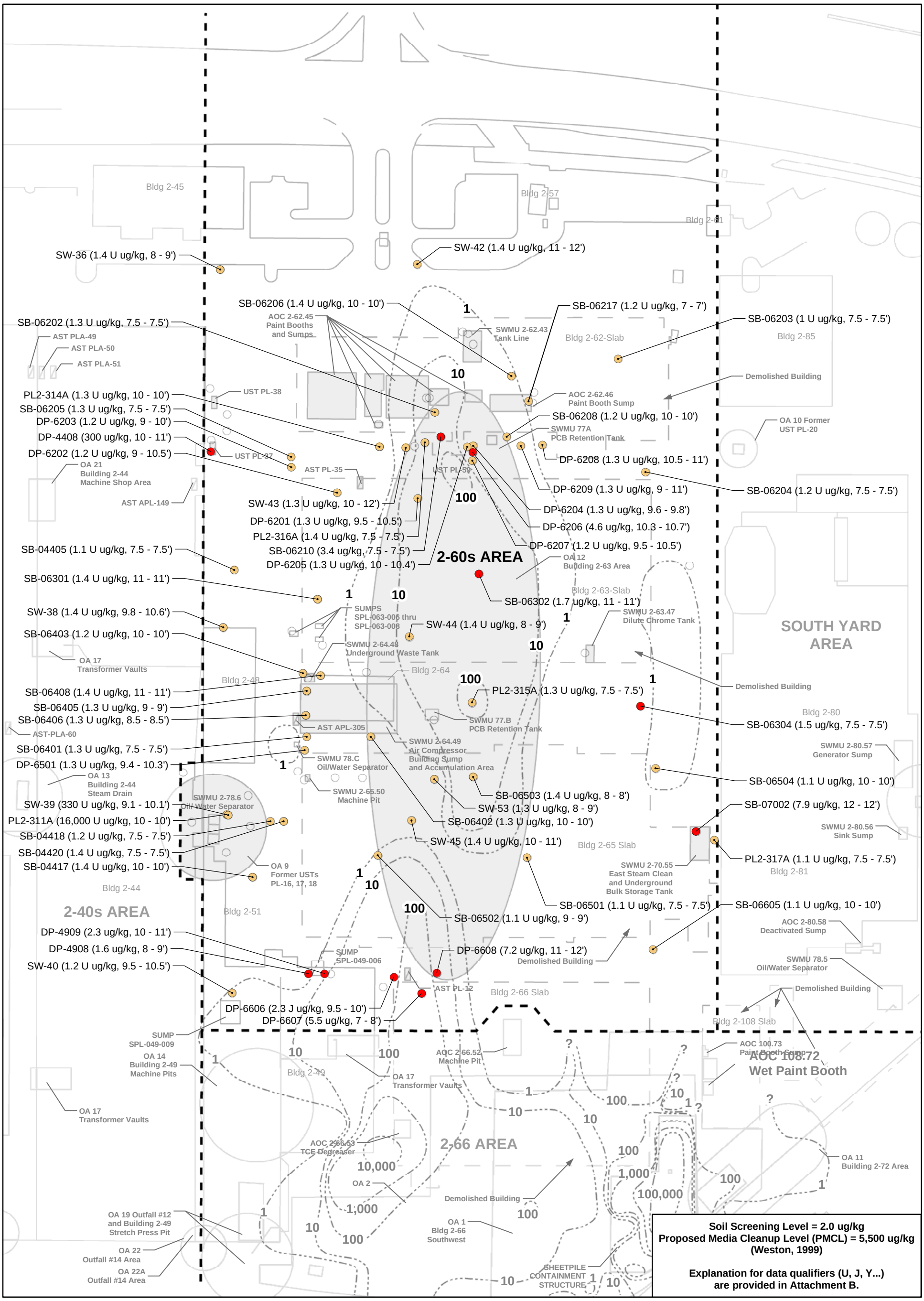
2-60s AREA
TRICHLOROETHENE IN SOIL: DEPTH 1 - 6 FT

BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 2

0131646001600_TCE_2_061604.mxd

Golder Associates



LEGEND

- Sample location where constituent was detected. (Concentration; ug/kg, Depth; feet bgs).
- Sample location where constituent was not detected.
- Sample location where constituent was not analyzed.
- Groundwater isoconcentration line within the A-zone Aquifer (ug/L).
- Plant 2 Sub-Area Boundary.

0 100
Scale 1" = 100 Feet

Map Projection: Washington State Plane North Zone, NAD 83, Feet

Source: Weston, Golder Associates

DRAFT

2-60s AREA
TRICHLOROETHENE IN SOIL: DEPTH 6 - 12 FT
BOEING PLANT 2

Drawn: BBA	Revision: 1	Date: Sept. 15, 2004	Figure: 3

0131646001600_TCE_3_061604.mxd

Golder Associates

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment B
Data Tables

2-60 Area COC Results
Arsenic Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Arsenic (mg/kg) - 2004 Soil Screening Level = 5.0 mg/kg; PMCL[3] = 7.3 mg/kg				
DP-4408	5 - 6	8/15/2002	5.7	
DP-4408	10 - 11	8/15/2002	2.1	
DP-6201	4.5 - 5	9/3/2002	3	
DP-6201	9.5 - 10.5	9/3/2002	2	
DP-6202	4 - 5	9/3/2002	3.6	
DP-6202	9 - 10.5	9/3/2002	0.4	
DP-6203	4 - 5	8/28/2002	4.6	
DP-6203	9 - 10	8/28/2002	2.8	
DP-6208	5 - 5.4	9/24/2002	2.4	
DP-6208	10.5 - 11	9/24/2002	3.8	
DP-6209	4 - 6	8/14/2002	2.5	
DP-6209	9 - 11	8/14/2002	3.2	
DP-6301	4.5 - 5.5	8/28/2002	5.6	
DP-6301	10.5 - 11.5	8/28/2002	0.7	
DP-6302	4.8 - 5.2	9/3/2002	1.9	
DP-6302	9 - 10.4	9/3/2002	0.5	
DP-6302	9 - 10.4	9/3/2002	0.2	
DP-6402	4.3 - 4.6	9/3/2002	3.9	
DP-6402	9.5 - 10.5	9/3/2002	0.19	
DP-6403	4.5 - 5.5	9/3/2002	1.7	
DP-6403	9.5 - 10.5	9/3/2002	1.4	
DP-6404	4.5 - 4.9	9/3/2002	1.7	
DP-6404	10 - 10.6	9/3/2002	0.87	
DP-6501	4.5 - 5.5	9/3/2002	7.4	
DP-6501	9.4 - 10.3	9/3/2002	0.9	
DP-6607	7 - 8	8/15/2002	1.9	
DP-6607	10 - 11	8/15/2002	1.2	
PL2-311A	5 - 5	12/15/1993	4.1	
PL2-311A	7.5 - 7.5	12/15/1993	1.6	
PL2-311A	10 - 10	12/15/1993	1.7	
PL2-314A	7.5 - 7.5	12/7/1993	3.1	
PL2-314A	10 - 10	12/7/1993	4.9	
PL2-315A	2 - 2	12/8/1993	3.8	
PL2-315A	5 - 5	12/8/1993	4.9	
PL2-317A	7.5 - 7.5	11/24/1993	2	
SB-04405	1 - 1	12/9/1993	4.1	
SB-04405	5 - 5	12/9/1993	3.9	
SB-06202	1 - 1	12/6/1993	3.1	
SB-06202	7.5 - 7.5	12/6/1993	2	
SB-06203	2 - 2	11/30/1993	4.1	
SB-06203	5 - 5	11/30/1993	1	
SB-06204	2 - 2	11/30/1993	2.6	
SB-06204	5 - 5	11/30/1993	4.2	
SB-06205	2 - 2	12/8/1993	6.3	
SB-06205	5 - 5	12/8/1993	5.5	
SB-06206	5 - 5	12/6/1993	4	
SB-06206	10 - 10	12/6/1993	5.2	
SB-06208	5 - 5	12/6/1993	5.5	
SB-06208	10 - 10	12/6/1993	3.8	

2-60 Area COC Results
Arsenic Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Arsenic (mg/kg) - 2004 Soil Screening Level = 5.0 mg/kg; PMCL[3] = 7.3 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	5	U
SB-06209	5.5 - 5.5	9/16/1994	6	U
SB-06209	11 - 11	9/16/1994	7	U
SB-06211	4 - 4	11/13/2003	3.2	
SB-06212	3.2 - 3.2	11/13/2003	5	
SB-06213	3 - 3	11/13/2003	1.5	
SB-06214	4 - 4	11/13/2003	2.9	
SB-06215	5.5 - 5.5	11/13/2003	2.6	
SB-06216	3 - 3	12/30/2003	2.6	
SB-06217	7 - 7	12/30/2003	3.7	
SB-06218	4 - 4	12/30/2003	2.8	
SB-06301	1 - 1	12/14/1993	5.6	
SB-06301	5 - 5	12/14/1993	7.4	
SB-06301	11 - 11	12/14/1993	2.6	
SB-06302	1 - 1	12/14/1993	4.8	
SB-06302	5 - 5	12/14/1993	4.8	
SB-06302	11 - 11	12/14/1993	2.1	
SB-06304	2 - 2	12/3/1993	4.3	
SB-06304	5 - 5	12/3/1993	3.3	
SB-06304	10 - 10	12/3/1993	76	
SB-06305	2 - 2	12/16/1993	2.3	
SB-06305	8 - 8	12/16/1993	5.6	
SB-06305	11 - 11	12/16/1993	2.8	
SB-06401	5 - 5	12/3/1993	3.4	
SB-06401	7.5 - 7.5	12/3/1993	2.5	
SB-06402	5 - 5	12/2/1993	3.2	
SB-06402	10 - 10	12/2/1993	3.8	
SB-06403	5 - 5	12/3/1993	4.6	
SB-06403	10 - 10	12/3/1993	1.1	
SB-06405	1.5 - 1.5	8/19/1994	5	U
SB-06405	7 - 7	8/19/1994	5	U
SB-06405	9 - 9	8/19/1994	7	U
SB-06406	1.5 - 1.5	8/19/1994	9	
SB-06406	6.5 - 6.5	8/19/1994	6	U
SB-06406	8.5 - 8.5	8/19/1994	6	U
SB-06408	1.5 - 1.5	9/19/1994	6	U
SB-06408	7 - 7	9/19/1994	6	U
SB-06408	11 - 11	9/19/1994	6	U
SB-06408	11 - 11	9/19/1994	6	U
SB-06501	1 - 1	12/8/1993	2.2	
SB-06501	5 - 5	12/8/1993	4.4	
SB-06502	1 - 1	12/20/1993	2.2	
SB-06502	2 - 2	12/20/1993	3.1	
SB-06502	5 - 5	12/20/1993	2.1	
SB-06503	2 - 2	12/16/1993	3	
SB-06503	8 - 8	12/16/1993	4.8	
SB-06503	11 - 11	12/16/1993	3.7	
SB-06504	5 - 5	12/8/1993	7.2	
SB-06504	10 - 10	12/8/1993	7.2	

2-60 Area COC Results
Arsenic Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Arsenic (mg/kg) - 2004 Soil Screening Level = 5.0 mg/kg; PMCL[3] = 7.3 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	5	U
SB-06510	8.5 - 8.5	8/19/1994	5	U
SB-06604	1 - 1	11/19/1993	2.9	
SB-06604	5 - 5	11/19/1993	2.9	
SB-06605	5 - 5	11/18/1993	3	
SB-06605	10 - 10	11/18/1993	4.2	
SB-07002	1.5 - 1.5	8/18/1994	5	U
SB-07002	7 - 7	8/18/1994	5	U
SB-07002	12 - 12	8/18/1994	7	U
SW-36	6 - 7	8/13/2002	3.7	
SW-36	8 - 9	8/13/2002	1.5	
SW-38	3.6 - 4.2	9/6/2002	1.8	
SW-38	6.7 - 7.6	9/6/2002	3.3	
SW-38	9.8 - 10.6	9/6/2002	3.6	
SW-39	3 - 3.2	9/6/2002	8.1	
SW-39	9.1 - 10.1	9/6/2002	1.9	
SW-39	9.1 - 10.1	9/6/2002	1.4	
SW-40	4.5 - 5.3	9/4/2002	1.4	
SW-40	9.5 - 10.5	9/4/2002	1.9	
SW-42	4 - 5	8/15/2002	3.1	
SW-42	11 - 12	8/15/2002	1.6	
SW-43	5 - 6	8/14/2002	3.8	
SW-43	8 - 9	8/14/2002	3	
SW-43	10 - 12	8/14/2002	2.1	
SW-44	3 - 4	8/14/2002	3.1	
SW-44	8 - 9	8/14/2002	2.8	
SW-45	3 - 4	8/14/2002	3.1	
SW-45	10 - 11	8/14/2002	5.1	
SW-53	3 - 4	8/14/2002	2.4	
SW-53	8 - 9	8/14/2002	4.8	

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60s Area COC Results
Cadmium Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Cadmium (mg/kg) - 2004 Soil Screening Level = 1.01 mg/kg; PMCL = 1.28 mg/kg[3]				
DP-4408	5 - 6	8/15/2002	0.2	
DP-4408	10 - 11	8/15/2002	0.2	U
DP-6201	4.5 - 5	9/3/2002	0.2	U
DP-6201	9.5 - 10.5	9/3/2002	0.3	U
DP-6202	4 - 5	9/3/2002	0.3	U
DP-6202	9 - 10.5	9/3/2002	0.2	U
DP-6203	4 - 5	8/28/2002	0.3	U
DP-6203	9 - 10	8/28/2002	0.2	U
DP-6208	5 - 5.4	9/24/2002	0.2	U
DP-6208	10.5 - 11	9/24/2002	0.3	U
DP-6209	4 - 6	8/14/2002	0.2	U
DP-6209	9 - 11	8/14/2002	0.3	U
DP-6301	4.5 - 5.5	8/28/2002	0.3	U
DP-6301	10.5 - 11.5	8/28/2002	0.2	U
DP-6302	4.8 - 5.2	9/3/2002	0.2	U
DP-6302	9 - 10.4	9/3/2002	0.2	U
DP-6302	9 - 10.4	9/3/2002	0.2	U
DP-6402	4.3 - 4.6	9/3/2002	0.3	U
DP-6402	9.5 - 10.5	9/3/2002	0.2	U
DP-6403	4.5 - 5.5	9/3/2002	0.2	U
DP-6403	9.5 - 10.5	9/3/2002	0.3	U
DP-6404	4.5 - 4.9	9/3/2002	0.2	U
DP-6404	10 - 10.6	9/3/2002	0.2	U
DP-6501	4.5 - 5.5	9/3/2002	0.4	
DP-6501	9.4 - 10.3	9/3/2002	0.3	U
DP-6607	7 - 8	8/15/2002	0.2	U
DP-6607	10 - 11	8/15/2002	0.3	U
PL2-311A	5 - 5	12/15/1993	0.2	
PL2-311A	7.5 - 7.5	12/15/1993	0.2	U
PL2-311A	10 - 10	12/15/1993	0.2	U
PL2-314A	7.5 - 7.5	12/7/1993	0.2	U
PL2-314A	10 - 10	12/7/1993	0.3	U
PL2-315A	2 - 2	12/8/1993	0.2	U
PL2-315A	5 - 5	12/8/1993	0.3	
PL2-317A	7.5 - 7.5	11/24/1993	0.2	U
SB-04405	1 - 1	12/9/1993	0.4	
SB-04405	5 - 5	12/9/1993	0.2	U
SB-06202	1 - 1	12/6/1993	0.2	U
SB-06202	7.5 - 7.5	12/6/1993	0.2	U
SB-06203	2 - 2	11/30/1993	0.3	UB
SB-06203	5 - 5	11/30/1993	0.2	U
SB-06204	2 - 2	11/30/1993	0.2	U
SB-06204	5 - 5	11/30/1993	0.2	U
SB-06205	2 - 2	12/8/1993	0.2	U
SB-06205	5 - 5	12/8/1993	0.2	U
SB-06206	5 - 5	12/6/1993	0.2	U
SB-06206	10 - 10	12/6/1993	0.2	U
SB-06208	5 - 5	12/6/1993	0.4	
SB-06208	10 - 10	12/6/1993	0.3	U

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Cadmium (mg/kg) - 2004 Soil Screening Level = 1.01 mg/kg; PMCL = 1.28 mg/kg[3]				
SB-06209	1.5 - 1.5	9/16/1994	0.2	U
SB-06209	5.5 - 5.5	9/16/1994	0.2	U
SB-06209	11 - 11	9/16/1994	0.3	U
SB-06211	4 - 4	11/13/2003	0.2	U
SB-06212	3.2 - 3.2	11/13/2003	0.2	U
SB-06213	3 - 3	11/13/2003	0.2	U
SB-06214	4 - 4	11/13/2003	0.2	U
SB-06215	5.5 - 5.5	11/13/2003	0.3	U
SB-06216	3 - 3	12/30/2003	3.4	
SB-06217	7 - 7	12/30/2003	0.2	U
SB-06218	4 - 4	12/30/2003	0.5	
SB-06301	1 - 1	12/14/1993	0.3	
SB-06301	5 - 5	12/14/1993	0.2	U
SB-06301	11 - 11	12/14/1993	0.3	U
SB-06302	1 - 1	12/14/1993	0.2	U
SB-06302	5 - 5	12/14/1993	0.2	U
SB-06302	11 - 11	12/14/1993	0.3	U
SB-06304	2 - 2	12/3/1993	0.2	U
SB-06304	5 - 5	12/3/1993	0.2	U
SB-06304	10 - 10	12/3/1993	0.2	U
SB-06305	2 - 2	12/16/1993	0.2	U
SB-06305	8 - 8	12/16/1993	0.2	U
SB-06305	11 - 11	12/16/1993	0.2	U
SB-06401	5 - 5	12/3/1993	0.2	U
SB-06401	7.5 - 7.5	12/3/1993	0.2	U
SB-06402	5 - 5	12/2/1993	0.2	U
SB-06402	10 - 10	12/2/1993	0.3	
SB-06403	5 - 5	12/3/1993	0.3	U
SB-06403	10 - 10	12/3/1993	0.3	
SB-06405	1.5 - 1.5	8/19/1994	0.2	U
SB-06405	7 - 7	8/19/1994	0.2	U
SB-06405	9 - 9	8/19/1994	0.3	U
SB-06406	1.5 - 1.5	8/19/1994	0.2	U
SB-06406	6.5 - 6.5	8/19/1994	0.2	U
SB-06406	8.5 - 8.5	8/19/1994	0.3	U
SB-06408	1.5 - 1.5	9/19/1994	0.2	U
SB-06408	7 - 7	9/19/1994	0.4	
SB-06408	11 - 11	9/19/1994	0.3	U
SB-06408	11 - 11	9/19/1994	0.3	U
SB-06501	1 - 1	12/8/1993	0.2	U
SB-06501	5 - 5	12/8/1993	0.3	
SB-06502	1 - 1	12/20/1993	0.2	U
SB-06502	2 - 2	12/20/1993	0.2	U
SB-06502	5 - 5	12/20/1993	0.2	U
SB-06503	2 - 2	12/16/1993	0.2	U
SB-06503	8 - 8	12/16/1993	0.3	U
SB-06503	11 - 11	12/16/1993	0.2	U
SB-06504	5 - 5	12/8/1993	0.5	
SB-06504	10 - 10	12/8/1993	0.2	U
SB-06510	1.5 - 1.5	8/19/1994	0.2	U

2-60s Area COC Results
Cadmium Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Cadmium (mg/kg) - 2004 Soil Screening Level = 1.01 mg/kg; PMCL = 1.28 mg/kg[3]				
SB-06510	8.5 - 8.5	8/19/1994	0.2	U
SB-06604	1 - 1	11/19/1993	0.3	
SB-06604	5 - 5	11/19/1993	0.2	U
SB-06605	5 - 5	11/18/1993	0.2	
SB-06605	10 - 10	11/18/1993	0.2	U
SB-07002	1.5 - 1.5	8/18/1994	0.5	J
SB-07002	7 - 7	8/18/1994	0.2	U
SB-07002	12 - 12	8/18/1994	0.3	U
SW-36	6 - 7	8/13/2002	0.3	U
SW-36	8 - 9	8/13/2002	0.3	U
SW-38	3.6 - 4.2	9/6/2002	0.2	U
SW-38	6.7 - 7.6	9/6/2002	0.3	U
SW-38	9.8 - 10.6	9/6/2002	0.3	U
SW-39	3 - 3.2	9/6/2002	0.3	U
SW-39	9.1 - 10.1	9/6/2002	0.2	U
SW-39	9.1 - 10.1	9/6/2002	0.2	U
SW-40	4.5 - 5.3	9/4/2002	0.2	U
SW-40	9.5 - 10.5	9/4/2002	0.2	U
SW-42	4 - 5	8/15/2002	0.3	U
SW-42	11 - 12	8/15/2002	0.2	U
SW-43	5 - 6	8/14/2002	0.2	U
SW-43	8 - 9	8/14/2002	0.3	U
SW-43	10 - 12	8/14/2002	0.2	U
SW-44	3 - 4	8/14/2002	0.2	U
SW-44	8 - 9	8/14/2002	0.3	U
SW-45	3 - 4	8/14/2002	0.2	U
SW-45	10 - 11	8/14/2002	0.3	U
SW-53	3 - 4	8/14/2002	0.2	U
SW-53	8 - 9	8/14/2002	0.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999)

2-60 Area COC Results
Copper Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Copper (mg/kg) - 2004 Soil Screening Level = 1.38 mg/kg; PMCL[3] = 36.4 mg/kg				
DP-4408	5 - 6	8/15/2002	30.6	
DP-4408	10 - 11	8/15/2002	22.5	
DP-6201	4.5 - 5	9/3/2002	19.7	
DP-6201	9.5 - 10.5	9/3/2002	16.5	
DP-6202	4 - 5	9/3/2002	19.8	
DP-6202	9 - 10.5	9/3/2002	10.7	
DP-6203	4 - 5	8/28/2002	18.4	
DP-6203	9 - 10	8/28/2002	24.7	
DP-6208	5 - 5.4	9/24/2002	22.3	
DP-6208	10.5 - 11	9/24/2002	19.1	
DP-6209	4 - 6	8/14/2002	20.2	
DP-6209	9 - 11	8/14/2002	23.6	
DP-6301	4.5 - 5.5	8/28/2002	29.1	
DP-6301	10.5 - 11.5	8/28/2002	8.1	
DP-6302	4.8 - 5.2	9/3/2002	11	
DP-6302	9 - 10.4	9/3/2002	8	
DP-6302	9 - 10.4	9/3/2002	7.8	
DP-6402	4.3 - 4.6	9/3/2002	23.5	
DP-6402	9.5 - 10.5	9/3/2002	9.7	
DP-6403	4.5 - 5.5	9/3/2002	12.3	
DP-6403	9.5 - 10.5	9/3/2002	13.4	
DP-6404	4.5 - 4.9	9/3/2002	14.8	
DP-6404	10 - 10.6	9/3/2002	11	
DP-6501	4.5 - 5.5	9/3/2002	55.3	
DP-6501	9.4 - 10.3	9/3/2002	11.1	
DP-6607	7 - 8	8/15/2002	14.6	
DP-6607	10 - 11	8/15/2002	15.6	
PL2-311A	5 - 5	12/15/1993	18.6	
PL2-311A	7.5 - 7.5	12/15/1993	12.4	
PL2-311A	10 - 10	12/15/1993	11.3	
PL2-314A	7.5 - 7.5	12/7/1993	10.5	
PL2-314A	10 - 10	12/7/1993	22.9	
PL2-315A	2 - 2	12/8/1993	15.3	
PL2-315A	5 - 5	12/8/1993	19.2	
PL2-317A	7.5 - 7.5	11/24/1993	10.1	
SB-04405	1 - 1	12/9/1993	14.2	
SB-04405	5 - 5	12/9/1993	12.1	
SB-06202	1 - 1	12/6/1993	13	
SB-06202	7.5 - 7.5	12/6/1993	10.4	
SB-06203	2 - 2	11/30/1993	14.8	
SB-06203	5 - 5	11/30/1993	11	
SB-06204	2 - 2	11/30/1993	11.5	
SB-06204	5 - 5	11/30/1993	14.7	
SB-06205	2 - 2	12/8/1993	16.5	
SB-06205	5 - 5	12/8/1993	16.7	
SB-06206	5 - 5	12/6/1993	16.7	
SB-06206	10 - 10	12/6/1993	28.7	
SB-06208	5 - 5	12/6/1993	19	
SB-06208	10 - 10	12/6/1993	20.5	

2-60 Area COC Results
Copper Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Copper (mg/kg) - 2004 Soil Screening Level = 1.38 mg/kg; PMCL[3] = 36.4 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	13.5	
SB-06209	5.5 - 5.5	9/16/1994	17.4	
SB-06209	11 - 11	9/16/1994	20.4	
SB-06211	4 - 4	11/13/2003	22.6	
SB-06212	3.2 - 3.2	11/13/2003	24.9	
SB-06213	3 - 3	11/13/2003	12.6	
SB-06214	4 - 4	11/13/2003	17.9	
SB-06215	5.5 - 5.5	11/13/2003	18.2	
SB-06216	3 - 3	12/30/2003	42.7	
SB-06217	7 - 7	12/30/2003	20.6	
SB-06218	4 - 4	12/30/2003	21.3	
SB-06301	1 - 1	12/14/1993	17.1	
SB-06301	5 - 5	12/14/1993	17.9	
SB-06301	11 - 11	12/14/1993	8.3	
SB-06302	1 - 1	12/14/1993	18.6	
SB-06302	5 - 5	12/14/1993	13.9	
SB-06302	11 - 11	12/14/1993	13.2	
SB-06304	2 - 2	12/3/1993	14.8	
SB-06304	5 - 5	12/3/1993	16.7	
SB-06304	10 - 10	12/3/1993	7.2	
SB-06305	2 - 2	12/16/1993	11.3	
SB-06305	8 - 8	12/16/1993	24.8	
SB-06305	11 - 11	12/16/1993	16.7	
SB-06401	5 - 5	12/3/1993	11.7	
SB-06401	7.5 - 7.5	12/3/1993	12.8	
SB-06402	5 - 5	12/2/1993	13.2	
SB-06402	10 - 10	12/2/1993	17.3	
SB-06403	5 - 5	12/3/1993	36.5	
SB-06403	10 - 10	12/3/1993	7.4	
SB-06405	1.5 - 1.5	8/19/1994	17.7	
SB-06405	7 - 7	8/19/1994	7.2	
SB-06405	9 - 9	8/19/1994	8.6	
SB-06406	1.5 - 1.5	8/19/1994	18.9	
SB-06406	6.5 - 6.5	8/19/1994	14.7	
SB-06406	8.5 - 8.5	8/19/1994	13.7	
SB-06408	1.5 - 1.5	9/19/1994	15.5	
SB-06408	7 - 7	9/19/1994	17.7	
SB-06408	11 - 11	9/19/1994	8.7	
SB-06408	11 - 11	9/19/1994	8.6	
SB-06501	1 - 1	12/8/1993	8.9	
SB-06501	5 - 5	12/8/1993	14.8	
SB-06502	1 - 1	12/20/1993	11.3	
SB-06502	2 - 2	12/20/1993	14.1	
SB-06502	5 - 5	12/20/1993	12.1	
SB-06503	2 - 2	12/16/1993	14.3	
SB-06503	8 - 8	12/16/1993	42.4	
SB-06503	11 - 11	12/16/1993	16	
SB-06504	5 - 5	12/8/1993	31.2	
SB-06504	10 - 10	12/8/1993	9.6	

2-60 Area COC Results
Copper Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Copper (mg/kg) - 2004 Soil Screening Level = 1.38 mg/kg; PMCL[3] = 36.4 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	10.3	
SB-06510	8.5 - 8.5	8/19/1994	10.7	
SB-06604	1 - 1	11/19/1993	15.6	
SB-06604	5 - 5	11/19/1993	12.9	
SB-06605	5 - 5	11/18/1993	9.7	J
SB-06605	10 - 10	11/18/1993	13.4	J
SB-07002	1.5 - 1.5	8/18/1994	12.9	
SB-07002	7 - 7	8/18/1994	9.4	
SB-07002	12 - 12	8/18/1994	7.8	
SW-36	6 - 7	8/13/2002	20.6	
SW-36	8 - 9	8/13/2002	21.7	
SW-38	3.6 - 4.2	9/6/2002	10.4	
SW-38	6.7 - 7.6	9/6/2002	20.1	
SW-38	9.8 - 10.6	9/6/2002	30.9	
SW-39	3 - 3.2	9/6/2002	33.2	
SW-39	9.1 - 10.1	9/6/2002	19.9	
SW-39	9.1 - 10.1	9/6/2002	15.4	
SW-40	4.5 - 5.3	9/4/2002	19	
SW-40	9.5 - 10.5	9/4/2002	13.3	
SW-42	4 - 5	8/15/2002	19.9	
SW-42	11 - 12	8/15/2002	26.1	
SW-43	5 - 6	8/14/2002	18.3	
SW-43	8 - 9	8/14/2002	18.7	
SW-43	10 - 12	8/14/2002	16.9	
SW-44	3 - 4	8/14/2002	20.5	
SW-44	8 - 9	8/14/2002	24.3	
SW-45	3 - 4	8/14/2002	19.1	
SW-45	10 - 11	8/14/2002	23.8	
SW-53	3 - 4	8/14/2002	16.8	
SW-53	8 - 9	8/14/2002	24.3	

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Manganese Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Manganese (mg/kg) - 2004 Soil Screening Level = 130 mg/kg; PMCL[3] = 1,146 mg/kg				
DP-4408	5 - 6	8/15/2002	197	
DP-4408	10 - 11	8/15/2002	75.6	
DP-6201	4.5 - 5	9/3/2002	90.3	
DP-6201	9.5 - 10.5	9/3/2002	58.8	
DP-6202	4 - 5	9/3/2002	92.8	
DP-6202	9 - 10.5	9/3/2002	57.8	
DP-6203	4 - 5	8/28/2002	88.5	
DP-6203	9 - 10	8/28/2002	63.4	
DP-6208	5 - 5.4	9/24/2002	93.6	
DP-6208	10.5 - 11	9/24/2002	61.2	
DP-6209	4 - 6	8/14/2002	94.2	
DP-6209	9 - 11	8/14/2002	73.7	
DP-6301	4.5 - 5.5	8/28/2002	106	
DP-6301	10.5 - 11.5	8/28/2002	52.8	
DP-6302	4.8 - 5.2	9/3/2002	55.2	
DP-6302	9 - 10.4	9/3/2002	58.7	
DP-6302	9 - 10.4	9/3/2002	58.1	
DP-6402	4.3 - 4.6	9/3/2002	97.1	
DP-6402	9.5 - 10.5	9/3/2002	60.6	
DP-6403	4.5 - 5.5	9/3/2002	142	
DP-6403	9.5 - 10.5	9/3/2002	81.0	
DP-6404	4.5 - 4.9	9/3/2002	144	
DP-6404	10 - 10.6	9/3/2002	109	
DP-6501	4.5 - 5.5	9/3/2002	346	
DP-6501	9.4 - 10.3	9/3/2002	132	
DP-6607	7 - 8	8/15/2002	157	
DP-6607	10 - 11	8/15/2002	96.5	
SB-06209	1.5 - 1.5	9/16/1994	231	
SB-06209	5.5 - 5.5	9/16/1994	82.4	
SB-06209	11 - 11	9/16/1994	66.5	
SB-06211	4 - 4	11/13/2003	183	
SB-06212	3.2 - 3.2	11/13/2003	297	
SB-06213	3 - 3	11/13/2003	122	
SB-06214	4 - 4	11/13/2003	155	
SB-06215	5.5 - 5.5	11/13/2003	100	
SB-06216	3 - 3	12/30/2003	209	
SB-06217	7 - 7	12/30/2003	76.9	
SB-06218	4 - 4	12/30/2003	147	
SB-06405	1.5 - 1.5	8/19/1994	200	
SB-06405	7 - 7	8/19/1994	72	
SB-06405	9 - 9	8/19/1994	69.4	
SB-06406	1.5 - 1.5	8/19/1994	233	
SB-06406	6.5 - 6.5	8/19/1994	158	
SB-06406	8.5 - 8.5	8/19/1994	133	
SB-06408	1.5 - 1.5	9/19/1994	162	
SB-06408	7 - 7	9/19/1994	91.5	
SB-06408	11 - 11	9/19/1994	77.5	
SB-06408	11 - 11	9/19/1994	67.2	
SB-06510	1.5 - 1.5	8/19/1994	200	

2-60 Area COC Results
Manganese Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Manganese (mg/kg) - 2004 Soil Screening Level = 130 mg/kg; PMCL[3] = 1,146 mg/kg				
SB-06510	8.5 - 8.5	8/19/1994	110	
SB-06604	1 - 1	11/19/1993	207	
SB-06604	5 - 5	11/19/1993	268	J
SB-06605	5 - 5	11/18/1993	95	
SB-06605	10 - 10	11/18/1993	116	
SB-07002	1.5 - 1.5	8/18/1994	145	
SB-07002	7 - 7	8/18/1994	127	
SB-07002	12 - 12	8/18/1994	96.6	
SW-36	6 - 7	8/13/2002	75.2	
SW-36	8 - 9	8/13/2002	55.5	
SW-38	3.6 - 4.2	9/6/2002	119	
SW-38	6.7 - 7.6	9/6/2002	170	
SW-38	9.8 - 10.6	9/6/2002	195	
SW-39	3 - 3.2	9/6/2002	178	
SW-39	9.1 - 10.1	9/6/2002	130	
SW-39	9.1 - 10.1	9/6/2002	105	
SW-40	4.5 - 5.3	9/4/2002	155	
SW-40	9.5 - 10.5	9/4/2002	101	
SW-42	4 - 5	8/15/2002	101	
SW-42	11 - 12	8/15/2002	66.6	
SW-43	5 - 6	8/14/2002	106	
SW-43	8 - 9	8/14/2002	71.5	
SW-43	10 - 12	8/14/2002	60.9	
SW-44	3 - 4	8/14/2002	197	
SW-44	8 - 9	8/14/2002	72.4	
SW-45	3 - 4	8/14/2002	265	
SW-45	10 - 11	8/14/2002	105	
SW-53	3 - 4	8/14/2002	169	
SW-53	8 - 9	8/14/2002	67.3	

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Mercury Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Mercury (mg/kg) - 2004 Soil Screening Level = 0.05 mg/kg; PMCL[3] = 0.07 mg/kg				
DP-4408	5 - 6	8/15/2002	0.16	
DP-4408	10 - 11	8/15/2002	0.06	U
DP-6201	4.5 - 5	9/3/2002	0.06	U
DP-6201	9.5 - 10.5	9/3/2002	0.05	U
DP-6202	4 - 5	9/3/2002	0.05	U
DP-6202	9 - 10.5	9/3/2002	0.05	U
DP-6203	4 - 5	8/28/2002	0.06	U
DP-6203	9 - 10	8/28/2002	0.06	U
DP-6208	5 - 5.4	9/24/2002	0.05	U
DP-6208	10.5 - 11	9/24/2002	0.05	U
DP-6209	4 - 6	8/14/2002	0.06	U
DP-6209	9 - 11	8/14/2002	0.06	U
DP-6301	4.5 - 5.5	8/28/2002	0.06	U
DP-6301	10.5 - 11.5	8/28/2002	0.05	U
DP-6302	4.8 - 5.2	9/3/2002	0.05	U
DP-6302	9 - 10.4	9/3/2002	0.05	U
DP-6302	9 - 10.4	9/3/2002	0.04	U
DP-6402	4.3 - 4.6	9/3/2002	0.05	U
DP-6402	9.5 - 10.5	9/3/2002	0.05	U
DP-6403	4.5 - 5.5	9/3/2002	0.18	
DP-6403	9.5 - 10.5	9/3/2002	0.06	U
DP-6404	4.5 - 4.9	9/3/2002	0.05	U
DP-6404	10 - 10.6	9/3/2002	0.06	U
DP-6501	4.5 - 5.5	9/3/2002	0.06	U
DP-6501	9.4 - 10.3	9/3/2002	0.06	U
DP-6607	7 - 8	8/15/2002	0.05	U
DP-6607	10 - 11	8/15/2002	0.05	U
PL2-311A	5 - 5	12/15/1993	0.06	J
PL2-311A	7.5 - 7.5	12/15/1993	0.05	UJ
PL2-311A	10 - 10	12/15/1993	0.05	UJ
PL2-314A	7.5 - 7.5	12/7/1993	0.04	U
PL2-314A	10 - 10	12/7/1993	0.05	U
PL2-315A	2 - 2	12/8/1993	0.05	U
PL2-315A	5 - 5	12/8/1993	0.05	U
PL2-317A	7.5 - 7.5	11/24/1993	0.05	U
SB-04405	1 - 1	12/9/1993	0.06	U
SB-04405	5 - 5	12/9/1993	0.05	U
SB-06202	1 - 1	12/6/1993	0.05	U
SB-06202	7.5 - 7.5	12/6/1993	0.06	U
SB-06203	2 - 2	11/30/1993	0.05	U
SB-06203	5 - 5	11/30/1993	0.05	U
SB-06204	2 - 2	11/30/1993	0.04	U
SB-06204	5 - 5	11/30/1993	0.04	U
SB-06205	2 - 2	12/8/1993	0.05	U
SB-06205	5 - 5	12/8/1993	0.06	U
SB-06206	5 - 5	12/6/1993	0.06	U
SB-06206	10 - 10	12/6/1993	0.06	U
SB-06208	5 - 5	12/6/1993	0.05	U
SB-06208	10 - 10	12/6/1993	0.06	U

2-60 Area COC Results
Mercury Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Mercury (mg/kg) - 2004 Soil Screening Level = 0.05 mg/kg; PMCL[3] = 0.07 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	0.05	U
SB-06209	5.5 - 5.5	9/16/1994	0.06	U
SB-06209	11 - 11	9/16/1994	0.06	U
SB-06211	4 - 4	11/13/2003	0.05	U
SB-06212	3.2 - 3.2	11/13/2003	0.06	U
SB-06213	3 - 3	11/13/2003	0.04	U
SB-06214	4 - 4	11/13/2003	0.05	
SB-06215	5.5 - 5.5	11/13/2003	0.06	U
SB-06216	3 - 3	12/30/2003	0.16	
SB-06217	7 - 7	12/30/2003	0.05	U
SB-06218	4 - 4	12/30/2003	0.06	U
SB-06301	1 - 1	12/14/1993	0.06	U
SB-06301	5 - 5	12/14/1993	0.06	U
SB-06301	11 - 11	12/14/1993	0.06	U
SB-06302	1 - 1	12/14/1993	0.05	U
SB-06302	5 - 5	12/14/1993	0.05	U
SB-06302	11 - 11	12/14/1993	0.06	U
SB-06304	2 - 2	12/3/1993	0.05	U
SB-06304	5 - 5	12/3/1993	0.05	U
SB-06304	10 - 10	12/3/1993	0.05	U
SB-06305	2 - 2	12/16/1993	0.05	U
SB-06305	8 - 8	12/16/1993	0.07	U
SB-06305	11 - 11	12/16/1993	0.28	
SB-06401	5 - 5	12/3/1993	0.05	U
SB-06401	7.5 - 7.5	12/3/1993	0.06	U
SB-06402	5 - 5	12/2/1993	0.05	U
SB-06402	10 - 10	12/2/1993	0.06	U
SB-06403	5 - 5	12/3/1993	0.07	U
SB-06403	10 - 10	12/3/1993	0.04	U
SB-06405	1.5 - 1.5	8/19/1994	0.07	
SB-06405	7 - 7	8/19/1994	0.04	U
SB-06405	9 - 9	8/19/1994	0.05	U
SB-06406	1.5 - 1.5	8/19/1994	0.08	
SB-06406	6.5 - 6.5	8/19/1994	0.05	U
SB-06406	8.5 - 8.5	8/19/1994	0.05	U
SB-06408	1.5 - 1.5	9/19/1994	0.06	U
SB-06408	7 - 7	9/19/1994	0.06	U
SB-06408	11 - 11	9/19/1994	0.05	U
SB-06408	11 - 11	9/19/1994	0.05	U
SB-06501	1 - 1	12/8/1993	0.05	U
SB-06501	5 - 5	12/8/1993	0.06	U
SB-06502	1 - 1	12/20/1993	0.06	U
SB-06502	2 - 2	12/20/1993	0.05	U
SB-06502	5 - 5	12/20/1993	0.05	U
SB-06503	2 - 2	12/16/1993	0.04	U
SB-06503	8 - 8	12/16/1993	0.05	U
SB-06503	11 - 11	12/16/1993	0.06	U
SB-06504	5 - 5	12/8/1993	0.08	
SB-06504	10 - 10	12/8/1993	0.04	U

2-60 Area COC Results
Mercury Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Mercury (mg/kg) - 2004 Soil Screening Level = 0.05 mg/kg; PMCL[3] = 0.07 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	0.05	U
SB-06510	8.5 - 8.5	8/19/1994	0.05	U
SB-06604	1 - 1	11/19/1993	0.06	
SB-06604	5 - 5	11/19/1993	0.05	U
SB-06605	5 - 5	11/18/1993	0.05	U
SB-06605	10 - 10	11/18/1993	0.05	U
SB-07002	1.5 - 1.5	8/18/1994	0.05	J
SB-07002	7 - 7	8/18/1994	0.05	U
SB-07002	12 - 12	8/18/1994	0.05	U
SW-36	6 - 7	8/13/2002	0.06	U
SW-36	8 - 9	8/13/2002	0.06	U
SW-38	3.6 - 4.2	9/6/2002	0.05	U
SW-38	6.7 - 7.6	9/6/2002	0.05	U
SW-38	9.8 - 10.6	9/6/2002	0.1	
SW-39	3 - 3.2	9/6/2002	0.05	U
SW-39	9.1 - 10.1	9/6/2002	0.05	U
SW-39	9.1 - 10.1	9/6/2002	0.05	U
SW-40	4.5 - 5.3	9/4/2002	0.05	U
SW-40	9.5 - 10.5	9/4/2002	0.05	U
SW-42	4 - 5	8/15/2002	0.05	U
SW-42	11 - 12	8/15/2002	0.06	U
SW-43	5 - 6	8/14/2002	0.05	U
SW-43	8 - 9	8/14/2002	0.06	U
SW-43	10 - 12	8/14/2002	0.05	U
SW-44	3 - 4	8/14/2002	0.05	U
SW-44	8 - 9	8/14/2002	0.06	U
SW-45	3 - 4	8/14/2002	0.07	
SW-45	10 - 11	8/14/2002	0.05	U
SW-53	3 - 4	8/14/2002	0.05	U
SW-53	8 - 9	8/14/2002	0.06	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Nickel Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Nickel (mg/kg) - 2004 Soil Screening Level = 10.7 mg/kg; PMCL[3] = 38.2 mg/kg				
DP-4408	5 - 6	8/15/2002	21	
DP-4408	10 - 11	8/15/2002	6	
DP-6201	4.5 - 5	9/3/2002	7.1	
DP-6201	9.5 - 10.5	9/3/2002	4.6	
DP-6202	4 - 5	9/3/2002	6.9	
DP-6202	9 - 10.5	9/3/2002	4.3	
DP-6203	4 - 5	8/28/2002	6.7	
DP-6203	9 - 10	8/28/2002	5.2	
DP-6208	5 - 5.4	9/24/2002	8	
DP-6208	10.5 - 11	9/24/2002	5	
DP-6209	4 - 6	8/14/2002	7	
DP-6209	9 - 11	8/14/2002	6	
DP-6301	4.5 - 5.5	8/28/2002	7.3	
DP-6301	10.5 - 11.5	8/28/2002	3.1	
DP-6302	4.8 - 5.2	9/3/2002	5	
DP-6302	9 - 10.4	9/3/2002	4.2	
DP-6302	9 - 10.4	9/3/2002	3.6	
DP-6402	4.3 - 4.6	9/3/2002	7.7	
DP-6402	9.5 - 10.5	9/3/2002	3.8	
DP-6403	4.5 - 5.5	9/3/2002	7.5	
DP-6403	9.5 - 10.5	9/3/2002	6.3	
DP-6404	4.5 - 4.9	9/3/2002	11.2	
DP-6404	10 - 10.6	9/3/2002	6.4	
DP-6501	4.5 - 5.5	9/3/2002	33	
DP-6501	9.4 - 10.3	9/3/2002	6.6	
DP-6607	7 - 8	8/15/2002	9	
DP-6607	10 - 11	8/15/2002	8	
PL2-311A	5 - 5	12/15/1993	13	
PL2-311A	7.5 - 7.5	12/15/1993	7	
PL2-311A	10 - 10	12/15/1993	9	
PL2-314A	7.5 - 7.5	12/7/1993	14	
PL2-314A	10 - 10	12/7/1993	6	
PL2-315A	2 - 2	12/8/1993	11	
PL2-315A	5 - 5	12/8/1993	12	
PL2-317A	7.5 - 7.5	11/24/1993	8	
SB-04405	1 - 1	12/9/1993	15	
SB-04405	5 - 5	12/9/1993	11	
SB-06202	1 - 1	12/6/1993	31.8	
SB-06202	7.5 - 7.5	12/6/1993	4	
SB-06203	2 - 2	11/30/1993	11	
SB-06203	5 - 5	11/30/1993	7	
SB-06204	2 - 2	11/30/1993	40	
SB-06204	5 - 5	11/30/1993	18	
SB-06205	2 - 2	12/8/1993	14	
SB-06205	5 - 5	12/8/1993	9	
SB-06206	5 - 5	12/6/1993	6	
SB-06206	10 - 10	12/6/1993	7	
SB-06208	5 - 5	12/6/1993	14	
SB-06208	10 - 10	12/6/1993	8	

2-60 Area COC Results
Nickel Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Nickel (mg/kg) - 2004 Soil Screening Level = 10.7 mg/kg; PMCL[3] = 38.2 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	30	
SB-06209	5.5 - 5.5	9/16/1994	8	
SB-06209	11 - 11	9/16/1994	6	
SB-06211	4 - 4	11/13/2003	14	
SB-06212	3.2 - 3.2	11/13/2003	19	
SB-06213	3 - 3	11/13/2003	11	
SB-06214	4 - 4	11/13/2003	16	
SB-06215	5.5 - 5.5	11/13/2003	8	
SB-06216	3 - 3	12/30/2003	15	
SB-06217	7 - 7	12/30/2003	6	
SB-06218	4 - 4	12/30/2003	10	
SB-06301	1 - 1	12/14/1993	12	
SB-06301	5 - 5	12/14/1993	8	
SB-06301	11 - 11	12/14/1993	4	
SB-06302	1 - 1	12/14/1993	17	
SB-06302	5 - 5	12/14/1993	10	
SB-06302	11 - 11	12/14/1993	6	
SB-06304	2 - 2	12/3/1993	10	
SB-06304	5 - 5	12/3/1993	26	
SB-06304	10 - 10	12/3/1993	7	
SB-06305	2 - 2	12/16/1993	42.7	
SB-06305	8 - 8	12/16/1993	20	
SB-06305	11 - 11	12/16/1993	16	
SB-06401	5 - 5	12/3/1993	6	
SB-06401	7.5 - 7.5	12/3/1993	6	
SB-06402	5 - 5	12/2/1993	9	
SB-06402	10 - 10	12/2/1993	12	
SB-06403	5 - 5	12/3/1993	9	
SB-06403	10 - 10	12/3/1993	5	
SB-06405	1.5 - 1.5	8/19/1994	20	
SB-06405	7 - 7	8/19/1994	5	
SB-06405	9 - 9	8/19/1994	5	
SB-06406	1.5 - 1.5	8/19/1994	16	
SB-06406	6.5 - 6.5	8/19/1994	11	
SB-06406	8.5 - 8.5	8/19/1994	9	
SB-06408	1.5 - 1.5	9/19/1994	21	
SB-06408	7 - 7	9/19/1994	12	
SB-06408	11 - 11	9/19/1994	5	
SB-06408	11 - 11	9/19/1994	5	
SB-06501	1 - 1	12/8/1993	8	
SB-06501	5 - 5	12/8/1993	23	
SB-06502	1 - 1	12/20/1993	11	
SB-06502	2 - 2	12/20/1993	16	
SB-06502	5 - 5	12/20/1993	11	
SB-06503	2 - 2	12/16/1993	42	
SB-06503	8 - 8	12/16/1993	10	
SB-06503	11 - 11	12/16/1993	10	
SB-06504	5 - 5	12/8/1993	17	
SB-06504	10 - 10	12/8/1993	8	

2-60 Area COC Results
Nickel Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Nickel (mg/kg) - 2004 Soil Screening Level = 10.7 mg/kg; PMCL[3] = 38.2 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	21	
SB-06510	8.5 - 8.5	8/19/1994	9	
SB-06604	1 - 1	11/19/1993	20	
SB-06604	5 - 5	11/19/1993	32	
SB-06605	5 - 5	11/18/1993	8	
SB-06605	10 - 10	11/18/1993	10	
SB-07002	1.5 - 1.5	8/18/1994	12	
SB-07002	7 - 7	8/18/1994	9	
SB-07002	12 - 12	8/18/1994	8	
SW-36	6 - 7	8/13/2002	4	
SW-36	8 - 9	8/13/2002	4	
SW-38	3.6 - 4.2	9/6/2002	9	
SW-38	6.7 - 7.6	9/6/2002	13	
SW-38	9.8 - 10.6	9/6/2002	15	
SW-39	3 - 3.2	9/6/2002	20	
SW-39	9.1 - 10.1	9/6/2002	11	
SW-39	9.1 - 10.1	9/6/2002	10	
SW-40	4.5 - 5.3	9/4/2002	10	
SW-40	9.5 - 10.5	9/4/2002	7	
SW-42	4 - 5	8/15/2002	8	
SW-42	11 - 12	8/15/2002	6	
SW-43	5 - 6	8/14/2002	9	
SW-43	8 - 9	8/14/2002	6	
SW-43	10 - 12	8/14/2002	5	
SW-44	3 - 4	8/14/2002	23	
SW-44	8 - 9	8/14/2002	6	
SW-45	3 - 4	8/14/2002	13	
SW-45	10 - 11	8/14/2002	9	
SW-53	3 - 4	8/14/2002	10	
SW-53	8 - 9	8/14/2002	5	

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Silver Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Silver (mg/kg) - 2004 Soil Screening Level = 0.32 mg/kg; PMCL[3] = 0.2 mg/kg				
DP-4408	5 - 6	8/15/2002	0.4	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-6201	4.5 - 5	9/3/2002	0.4	U
DP-6201	9.5 - 10.5	9/3/2002	0.4	U
DP-6202	4 - 5	9/3/2002	0.4	U
DP-6202	9 - 10.5	9/3/2002	0.3	U
DP-6203	4 - 5	8/28/2002	0.4	U
DP-6203	9 - 10	8/28/2002	0.4	U
DP-6208	5 - 5.4	9/24/2002	0.4	U
DP-6208	10.5 - 11	9/24/2002	0.4	U
DP-6209	4 - 6	8/14/2002	0.3	U
DP-6209	9 - 11	8/14/2002	0.4	U
DP-6301	4.5 - 5.5	8/28/2002	0.4	U
DP-6301	10.5 - 11.5	8/28/2002	0.4	U
DP-6302	4.8 - 5.2	9/3/2002	0.3	U
DP-6302	9 - 10.4	9/3/2002	0.3	U
DP-6302	9 - 10.4	9/3/2002	0.3	U
DP-6402	4.3 - 4.6	9/3/2002	0.4	U
DP-6402	9.5 - 10.5	9/3/2002	0.3	U
DP-6403	4.5 - 5.5	9/3/2002	0.3	U
DP-6403	9.5 - 10.5	9/3/2002	0.4	U
DP-6404	4.5 - 4.9	9/3/2002	0.3	U
DP-6404	10 - 10.6	9/3/2002	0.4	U
DP-6501	4.5 - 5.5	9/3/2002	0.3	U
DP-6501	9.4 - 10.3	9/3/2002	0.4	U
DP-6607	7 - 8	8/15/2002	0.3	U
DP-6607	10 - 11	8/15/2002	0.4	U
PL2-311A	5 - 5	12/15/1993	0.4	U
PL2-311A	7.5 - 7.5	12/15/1993	0.3	U
PL2-311A	10 - 10	12/15/1993	0.4	U
PL2-314A	7.5 - 7.5	12/7/1993	0.3	U
PL2-314A	10 - 10	12/7/1993	0.4	U
PL2-315A	2 - 2	12/8/1993	0.3	U
PL2-315A	5 - 5	12/8/1993	0.3	U
PL2-317A	7.5 - 7.5	11/24/1993	0.3	U
SB-04405	1 - 1	12/9/1993	0.3	U
SB-04405	5 - 5	12/9/1993	0.3	U
SB-06202	1 - 1	12/6/1993	0.3	U
SB-06202	7.5 - 7.5	12/6/1993	0.3	U
SB-06203	2 - 2	11/30/1993	0.3	U
SB-06203	5 - 5	11/30/1993	0.3	U
SB-06204	2 - 2	11/30/1993	0.3	U
SB-06204	5 - 5	11/30/1993	0.4	U
SB-06205	2 - 2	12/8/1993	0.3	U
SB-06205	5 - 5	12/8/1993	0.3	U
SB-06206	5 - 5	12/6/1993	0.4	U
SB-06206	10 - 10	12/6/1993	0.5	
SB-06208	5 - 5	12/6/1993	0.4	
SB-06208	10 - 10	12/6/1993	0.4	U

2-60 Area COC Results
Silver Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Silver (mg/kg) - 2004 Soil Screening Level = 0.32 mg/kg; PMCL[3] = 0.2 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	0.3	U
SB-06209	5.5 - 5.5	9/16/1994	0.4	U
SB-06209	11 - 11	9/16/1994	0.4	U
SB-06211	4 - 4	11/13/2003	0.4	U
SB-06212	3.2 - 3.2	11/13/2003	0.4	U
SB-06213	3 - 3	11/13/2003	0.3	U
SB-06214	4 - 4	11/13/2003	0.3	U
SB-06215	5.5 - 5.5	11/13/2003	0.4	U
SB-06216	3 - 3	12/30/2003	0.4	U
SB-06217	7 - 7	12/30/2003	0.4	U
SB-06218	4 - 4	12/30/2003	0.4	U
SB-06301	1 - 1	12/14/1993	0.3	U
SB-06301	5 - 5	12/14/1993	0.4	U
SB-06301	11 - 11	12/14/1993	0.4	U
SB-06302	1 - 1	12/14/1993	0.3	U
SB-06302	5 - 5	12/14/1993	0.4	U
SB-06302	11 - 11	12/14/1993	0.4	U
SB-06304	2 - 2	12/3/1993	0.3	U
SB-06304	5 - 5	12/3/1993	0.3	U
SB-06304	10 - 10	12/3/1993	0.4	
SB-06305	2 - 2	12/16/1993	0.3	U
SB-06305	8 - 8	12/16/1993	0.4	U
SB-06305	11 - 11	12/16/1993	0.4	U
SB-06401	5 - 5	12/3/1993	0.3	U
SB-06401	7.5 - 7.5	12/3/1993	0.4	U
SB-06402	5 - 5	12/2/1993	0.3	U
SB-06402	10 - 10	12/2/1993	0.3	U
SB-06403	5 - 5	12/3/1993	0.4	
SB-06403	10 - 10	12/3/1993	0.4	U
SB-06405	1.5 - 1.5	8/19/1994	0.3	U
SB-06405	7 - 7	8/19/1994	0.3	U
SB-06405	9 - 9	8/19/1994	0.4	U
SB-06406	1.5 - 1.5	8/19/1994	0.4	U
SB-06406	6.5 - 6.5	8/19/1994	0.3	U
SB-06406	8.5 - 8.5	8/19/1994	0.4	U
SB-06408	1.5 - 1.5	9/19/1994	0.3	U
SB-06408	7 - 7	9/19/1994	0.4	U
SB-06408	11 - 11	9/19/1994	0.4	U
SB-06408	11 - 11	9/19/1994	0.4	U
SB-06501	1 - 1	12/8/1993	0.3	U
SB-06501	5 - 5	12/8/1993	0.3	U
SB-06502	1 - 1	12/20/1993	0.4	U
SB-06502	2 - 2	12/20/1993	0.3	U
SB-06502	5 - 5	12/20/1993	0.3	U
SB-06503	2 - 2	12/16/1993	0.3	U
SB-06503	8 - 8	12/16/1993	0.4	U
SB-06503	11 - 11	12/16/1993	0.3	U
SB-06504	5 - 5	12/8/1993	0.4	U
SB-06504	10 - 10	12/8/1993	0.3	U

2-60 Area COC Results
Silver Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Silver (mg/kg) - 2004 Soil Screening Level = 0.32 mg/kg; PMCL[3] = 0.2 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	0.3	U
SB-06510	8.5 - 8.5	8/19/1994	0.3	U
SB-06604	1 - 1	11/19/1993	0.3	U
SB-06604	5 - 5	11/19/1993	0.3	U
SB-06605	5 - 5	11/18/1993	0.3	U
SB-06605	10 - 10	11/18/1993	0.3	U
SB-07002	1.5 - 1.5	8/18/1994	0.3	U
SB-07002	7 - 7	8/18/1994	0.3	U
SB-07002	12 - 12	8/18/1994	0.4	U
SW-36	6 - 7	8/13/2002	0.4	U
SW-36	8 - 9	8/13/2002	0.4	U
SW-38	3.6 - 4.2	9/6/2002	0.3	U
SW-38	6.7 - 7.6	9/6/2002	0.4	U
SW-38	9.8 - 10.6	9/6/2002	0.4	U
SW-39	3 - 3.2	9/6/2002	0.4	U
SW-39	9.1 - 10.1	9/6/2002	0.4	U
SW-39	9.1 - 10.1	9/6/2002	0.4	U
SW-40	4.5 - 5.3	9/4/2002	0.3	U
SW-40	9.5 - 10.5	9/4/2002	0.4	U
SW-42	4 - 5	8/15/2002	0.4	U
SW-42	11 - 12	8/15/2002	0.4	U
SW-43	5 - 6	8/14/2002	0.4	U
SW-43	8 - 9	8/14/2002	0.4	U
SW-43	10 - 12	8/14/2002	0.4	U
SW-44	3 - 4	8/14/2002	0.4	U
SW-44	8 - 9	8/14/2002	0.4	U
SW-45	3 - 4	8/14/2002	0.3	U
SW-45	10 - 11	8/14/2002	0.4	U
SW-53	3 - 4	8/14/2002	0.4	U
SW-53	8 - 9	8/14/2002	0.4	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Thallium Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Thallium (mg/kg) - 2004 Soil Screening Level = 0.67 mg/kg; PMCL[3] = 8.9 mg/kg				
DP-4408	5 - 6	8/15/2002	0.2	
DP-4408	10 - 11	8/15/2002	0.1	U
DP-6201	4.5 - 5	9/3/2002	0.23	
DP-6201	9.5 - 10.5	9/3/2002	0.2	
DP-6202	4 - 5	9/3/2002	0.31	
DP-6202	9 - 10.5	9/3/2002	0.11	U
DP-6203	4 - 5	8/28/2002	0.7	
DP-6203	9 - 10	8/28/2002	0.28	
DP-6208	5 - 5.4	9/24/2002	0.06	U
DP-6208	10.5 - 11	9/24/2002	0.06	U
DP-6209	4 - 6	8/14/2002	0.2	
DP-6209	9 - 11	8/14/2002	0.1	
DP-6301	4.5 - 5.5	8/28/2002	0.45	
DP-6301	10.5 - 11.5	8/28/2002	0.12	
DP-6302	4.8 - 5.2	9/3/2002	0.23	
DP-6302	9 - 10.4	9/3/2002	0.11	
DP-6302	9 - 10.4	9/3/2002	0.1	U
DP-6402	4.3 - 4.6	9/3/2002	0.26	
DP-6402	9.5 - 10.5	9/3/2002	0.12	U
DP-6403	4.5 - 5.5	9/3/2002	0.25	
DP-6403	9.5 - 10.5	9/3/2002	0.17	
DP-6404	4.5 - 4.9	9/3/2002	0.15	
DP-6404	10 - 10.6	9/3/2002	0.16	
DP-6501	4.5 - 5.5	9/3/2002	0.24	
DP-6501	9.4 - 10.3	9/3/2002	0.19	
DP-6607	7 - 8	8/15/2002	0.1	U
DP-6607	10 - 11	8/15/2002	0.1	U
PL2-311A	5 - 5	12/15/1993	0.1	U
PL2-311A	7.5 - 7.5	12/15/1993	0.1	U
PL2-311A	10 - 10	12/15/1993	0.1	U
PL2-314A	7.5 - 7.5	12/7/1993	0.1	U
PL2-314A	10 - 10	12/7/1993	0.1	U
PL2-315A	2 - 2	12/8/1993	0.1	U
PL2-315A	5 - 5	12/8/1993	0.6	U
PL2-317A	7.5 - 7.5	11/24/1993	0.1	U
SB-04405	1 - 1	12/9/1993	0.1	U
SB-04405	5 - 5	12/9/1993	0.1	U
SB-06202	1 - 1	12/6/1993	0.1	U
SB-06202	7.5 - 7.5	12/6/1993	0.1	
SB-06203	2 - 2	11/30/1993	0.1	U
SB-06203	5 - 5	11/30/1993	0.1	U
SB-06204	2 - 2	11/30/1993	0.1	U
SB-06204	5 - 5	11/30/1993	0.1	U
SB-06205	2 - 2	12/8/1993	0.5	U
SB-06205	5 - 5	12/8/1993	0.6	U
SB-06206	5 - 5	12/6/1993	0.6	U
SB-06206	10 - 10	12/6/1993	0.1	U
SB-06208	5 - 5	12/6/1993	0.6	U
SB-06208	10 - 10	12/6/1993	0.1	

2-60 Area COC Results
Thallium Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Thallium (mg/kg) - 2004 Soil Screening Level = 0.67 mg/kg; PMCL[3] = 8.9 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	5	U
SB-06209	5.5 - 5.5	9/16/1994	6	U
SB-06209	11 - 11	9/16/1994	7	U
SB-06211	4 - 4	11/13/2003	0.1	U
SB-06212	3.2 - 3.2	11/13/2003	0.1	U
SB-06213	3 - 3	11/13/2003	0.2	
SB-06214	4 - 4	11/13/2003	0.1	U
SB-06215	5.5 - 5.5	11/13/2003	0.1	U
SB-06216	3 - 3	12/30/2003	0.2	
SB-06217	7 - 7	12/30/2003	0.1	U
SB-06218	4 - 4	12/30/2003	0.1	
SB-06301	1 - 1	12/14/1993	0.1	
SB-06301	5 - 5	12/14/1993	0.6	U
SB-06301	11 - 11	12/14/1993	0.1	U
SB-06302	1 - 1	12/14/1993	0.6	U
SB-06302	5 - 5	12/14/1993	0.6	U
SB-06302	11 - 11	12/14/1993	0.6	U
SB-06304	2 - 2	12/3/1993	0.1	U
SB-06304	5 - 5	12/3/1993	0.1	U
SB-06304	10 - 10	12/3/1993	0.1	U
SB-06305	2 - 2	12/16/1993	0.1	U
SB-06305	8 - 8	12/16/1993	0.1	U
SB-06305	11 - 11	12/16/1993	0.1	U
SB-06401	5 - 5	12/3/1993	0.5	U
SB-06401	7.5 - 7.5	12/3/1993	0.6	U
SB-06402	5 - 5	12/2/1993	0.1	U
SB-06402	10 - 10	12/2/1993	0.1	U
SB-06403	5 - 5	12/3/1993	0.6	U
SB-06403	10 - 10	12/3/1993	0.1	U
SB-06405	1.5 - 1.5	8/19/1994	5	U
SB-06405	7 - 7	8/19/1994	5	U
SB-06405	9 - 9	8/19/1994	7	U
SB-06406	1.5 - 1.5	8/19/1994	6	U
SB-06406	6.5 - 6.5	8/19/1994	6	U
SB-06406	8.5 - 8.5	8/19/1994	6	U
SB-06408	1.5 - 1.5	9/19/1994	6	U
SB-06408	7 - 7	9/19/1994	6	U
SB-06408	11 - 11	9/19/1994	6	U
SB-06408	11 - 11	9/19/1994	6	U
SB-06501	1 - 1	12/8/1993	0.09	U
SB-06501	5 - 5	12/8/1993	0.6	U
SB-06502	1 - 1	12/20/1993	0.1	
SB-06502	2 - 2	12/20/1993	0.1	
SB-06502	5 - 5	12/20/1993	0.1	
SB-06503	2 - 2	12/16/1993	0.1	U
SB-06503	8 - 8	12/16/1993	0.7	U
SB-06503	11 - 11	12/16/1993	0.6	U
SB-06504	5 - 5	12/8/1993	0.7	U
SB-06504	10 - 10	12/8/1993	0.1	U

2-60 Area COC Results
Thallium Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Thallium (mg/kg) - 2004 Soil Screening Level = 0.67 mg/kg; PMCL[3] = 8.9 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	5	U
SB-06510	8.5 - 8.5	8/19/1994	5	U
SB-06604	1 - 1	11/19/1993	0.1	U
SB-06604	5 - 5	11/19/1993	0.2	
SB-06605	5 - 5	11/18/1993	0.1	
SB-06605	10 - 10	11/18/1993	0.1	U
SB-07002	1.5 - 1.5	8/18/1994	5	U
SB-07002	7 - 7	8/18/1994	5	U
SB-07002	12 - 12	8/18/1994	7	U
SW-36	6 - 7	8/13/2002	0.3	
SW-36	8 - 9	8/13/2002	0.2	
SW-38	3.6 - 4.2	9/6/2002	0.1	
SW-38	6.7 - 7.6	9/6/2002	0.2	
SW-38	9.8 - 10.6	9/6/2002	0.2	
SW-39	3 - 3.2	9/6/2002	0.1	U
SW-39	9.1 - 10.1	9/6/2002	0.2	
SW-39	9.1 - 10.1	9/6/2002	0.1	U
SW-40	4.5 - 5.3	9/4/2002	0.1	U
SW-40	9.5 - 10.5	9/4/2002	0.1	U
SW-42	4 - 5	8/15/2002	0.1	U
SW-42	11 - 12	8/15/2002	0.1	U
SW-43	5 - 6	8/14/2002	0.2	
SW-43	8 - 9	8/14/2002	0.1	
SW-43	10 - 12	8/14/2002	0.1	U
SW-44	3 - 4	8/14/2002	0.1	
SW-44	8 - 9	8/14/2002	0.1	U
SW-45	3 - 4	8/14/2002	0.1	U
SW-45	10 - 11	8/14/2002	0.2	
SW-53	3 - 4	8/14/2002	0.1	U
SW-53	8 - 9	8/14/2002	0.1	

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Zinc Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Zinc (mg/kg) - 2004 Soil Screening Level = 101 mg/kg; PMCL[3] = 107 mg/kg				
DP-4408	5 - 6	8/15/2002	74.5	
DP-4408	10 - 11	8/15/2002	18.9	
DP-6201	4.5 - 5	9/3/2002	19.2	
DP-6201	9.5 - 10.5	9/3/2002	12.7	
DP-6202	4 - 5	9/3/2002	18.5	
DP-6202	9 - 10.5	9/3/2002	15.1	
DP-6203	4 - 5	8/28/2002	18.9	
DP-6203	9 - 10	8/28/2002	12	
DP-6208	5 - 5.4	9/24/2002	49.3	
DP-6208	10.5 - 11	9/24/2002	17.1	
DP-6209	4 - 6	8/14/2002	21.5	
DP-6209	9 - 11	8/14/2002	17.3	
DP-6301	4.5 - 5.5	8/28/2002	16.9	
DP-6301	10.5 - 11.5	8/28/2002	15.4	
DP-6302	4.8 - 5.2	9/3/2002	11.1	
DP-6302	9 - 10.4	9/3/2002	12.9	
DP-6302	9 - 10.4	9/3/2002	12.5	
DP-6402	4.3 - 4.6	9/3/2002	20.3	
DP-6402	9.5 - 10.5	9/3/2002	14.6	
DP-6403	4.5 - 5.5	9/3/2002	24.1	
DP-6403	9.5 - 10.5	9/3/2002	18.6	
DP-6404	4.5 - 4.9	9/3/2002	26	
DP-6404	10 - 10.6	9/3/2002	19.7	
DP-6501	4.5 - 5.5	9/3/2002	402	
DP-6501	9.4 - 10.3	9/3/2002	20.3	
DP-6607	7 - 8	8/15/2002	28.8	
DP-6607	10 - 11	8/15/2002	26.1	
PL2-311A	5 - 5	12/15/1993	57	
PL2-311A	7.5 - 7.5	12/15/1993	20.2	
PL2-311A	10 - 10	12/15/1993	23.6	
PL2-314A	7.5 - 7.5	12/7/1993	22.7	
PL2-314A	10 - 10	12/7/1993	20.3	
PL2-315A	2 - 2	12/8/1993	34.8	
PL2-315A	5 - 5	12/8/1993	29.4	
PL2-317A	7.5 - 7.5	11/24/1993	22.3	
SB-04405	1 - 1	12/9/1993	35.7	
SB-04405	5 - 5	12/9/1993	26.7	
SB-06202	1 - 1	12/6/1993	39.2	
SB-06202	7.5 - 7.5	12/6/1993	12.8	
SB-06203	2 - 2	11/30/1993	32.3	
SB-06203	5 - 5	11/30/1993	22.7	
SB-06204	2 - 2	11/30/1993	30	
SB-06204	5 - 5	11/30/1993	33.9	
SB-06205	2 - 2	12/8/1993	57.7	
SB-06205	5 - 5	12/8/1993	26.3	
SB-06206	5 - 5	12/6/1993	20.1	
SB-06206	10 - 10	12/6/1993	26.5	
SB-06208	5 - 5	12/6/1993	48.9	
SB-06208	10 - 10	12/6/1993	29.4	

2-60 Area COC Results
Zinc Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Zinc (mg/kg) - 2004 Soil Screening Level = 101 mg/kg; PMCL[3] = 107 mg/kg				
SB-06209	1.5 - 1.5	9/16/1994	46.4	
SB-06209	5.5 - 5.5	9/16/1994	20.2	
SB-06209	11 - 11	9/16/1994	15.4	
SB-06211	4 - 4	11/13/2003	43.2	
SB-06212	3.2 - 3.2	11/13/2003	68.7	
SB-06213	3 - 3	11/13/2003	29.3	
SB-06214	4 - 4	11/13/2003	55	
SB-06215	5.5 - 5.5	11/13/2003	84.1	
SB-06216	3 - 3	12/30/2003	757	
SB-06217	7 - 7	12/30/2003	20.3	
SB-06218	4 - 4	12/30/2003	122	
SB-06301	1 - 1	12/14/1993	30.8	
SB-06301	5 - 5	12/14/1993	15.6	
SB-06301	11 - 11	12/14/1993	12.8	
SB-06302	1 - 1	12/14/1993	33.8	
SB-06302	5 - 5	12/14/1993	17.7	
SB-06302	11 - 11	12/14/1993	14.3	
SB-06304	2 - 2	12/3/1993	34.1	
SB-06304	5 - 5	12/3/1993	44.8	
SB-06304	10 - 10	12/3/1993	18.3	
SB-06305	2 - 2	12/16/1993	31.2	
SB-06305	8 - 8	12/16/1993	32.6	
SB-06305	11 - 11	12/16/1993	27.6	
SB-06401	5 - 5	12/3/1993	20.4	
SB-06401	7.5 - 7.5	12/3/1993	16	
SB-06402	5 - 5	12/2/1993	34.9	
SB-06402	10 - 10	12/2/1993	31	
SB-06403	5 - 5	12/3/1993	19.7	
SB-06403	10 - 10	12/3/1993	15.6	
SB-06405	1.5 - 1.5	8/19/1994	55.5	J
SB-06405	7 - 7	8/19/1994	14.2	J
SB-06405	9 - 9	8/19/1994	20.5	J
SB-06406	1.5 - 1.5	8/19/1994	53	J
SB-06406	6.5 - 6.5	8/19/1994	28.4	J
SB-06406	8.5 - 8.5	8/19/1994	27	J
SB-06408	1.5 - 1.5	9/19/1994	32.6	
SB-06408	7 - 7	9/19/1994	21.3	
SB-06408	11 - 11	9/19/1994	17.3	
SB-06408	11 - 11	9/19/1994	16.7	
SB-06501	1 - 1	12/8/1993	23.5	
SB-06501	5 - 5	12/8/1993	39.1	
SB-06502	1 - 1	12/20/1993	24.3	
SB-06502	2 - 2	12/20/1993	33.7	
SB-06502	5 - 5	12/20/1993	26	
SB-06503	2 - 2	12/16/1993	34	
SB-06503	8 - 8	12/16/1993	21.3	
SB-06503	11 - 11	12/16/1993	16.5	
SB-06504	5 - 5	12/8/1993	50.1	
SB-06504	10 - 10	12/8/1993	23.4	

2-60 Area COC Results
Zinc Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Zinc (mg/kg) - 2004 Soil Screening Level = 101 mg/kg; PMCL[3] = 107 mg/kg				
SB-06510	1.5 - 1.5	8/19/1994	35.4	J
SB-06510	8.5 - 8.5	8/19/1994	23.6	J
SB-06604	1 - 1	11/19/1993	51.9	
SB-06604	5 - 5	11/19/1993	45	
SB-06605	5 - 5	11/18/1993	24.2	
SB-06605	10 - 10	11/18/1993	31.9	
SB-07002	1.5 - 1.5	8/18/1994	55.6	
SB-07002	7 - 7	8/18/1994	24.5	
SB-07002	12 - 12	8/18/1994	22.7	
SW-36	6 - 7	8/13/2002	13.3	
SW-36	8 - 9	8/13/2002	12.2	
SW-38	3.6 - 4.2	9/6/2002	26.5	
SW-38	6.7 - 7.6	9/6/2002	35.7	
SW-38	9.8 - 10.6	9/6/2002	60.6	
SW-39	3 - 3.2	9/6/2002	75.3	
SW-39	9.1 - 10.1	9/6/2002	29	
SW-39	9.1 - 10.1	9/6/2002	24.3	
SW-40	4.5 - 5.3	9/4/2002	38.7	
SW-40	9.5 - 10.5	9/4/2002	20.2	
SW-42	4 - 5	8/15/2002	25.7	
SW-42	11 - 12	8/15/2002	18.5	
SW-43	5 - 6	8/14/2002	24.7	
SW-43	8 - 9	8/14/2002	14	
SW-43	10 - 12	8/14/2002	12	
SW-44	3 - 4	8/14/2002	30.3	
SW-44	8 - 9	8/14/2002	16.3	
SW-45	3 - 4	8/14/2002	42.2	
SW-45	10 - 11	8/14/2002	18.5	
SW-53	3 - 4	8/14/2002	27.3	
SW-53	8 - 9	8/14/2002	13.2	

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Cyanide Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Cyanide (mg/kg) - 2004 Soil Screening Level = 0.2 mg/kg; PMCL[3] = 0.2 mg/kg				
DP-4408	5 - 6	8/15/2002	0.064	U
DP-4408	10 - 11	8/15/2002	0.066	U
DP-6209	4 - 6	8/14/2002	0.061	U
DP-6209	9 - 11	8/14/2002	0.07	U
DP-6501	4.5 - 5.5	9/3/2002	0.083	
DP-6501	9.4 - 10.3	9/3/2002	0.066	U
DP-6607	7 - 8	8/15/2002	0.06	U
DP-6607	10 - 11	8/15/2002	0.064	U
PL2-315A	2 - 2	12/8/1993	0.23	U
PL2-315A	5 - 5	12/8/1993	0.24	U
SB-04405	1 - 1	12/9/1993	0.23	U
SB-04405	5 - 5	12/9/1993	0.22	U
SB-06203	2 - 2	11/30/1993	0.99	
SB-06203	5 - 5	11/30/1993	0.48	
SB-06204	2 - 2	11/30/1993	0.21	U
SB-06204	5 - 5	11/30/1993	0.23	U
SB-06205	2 - 2	12/8/1993	0.26	U
SB-06205	5 - 5	12/8/1993	0.26	U
SB-06208	5 - 5	12/6/1993	0.42	JH
SB-06208	10 - 10	12/6/1993	0.28	UJH
SB-06209	1.5 - 1.5	9/16/1994	0.54	U
SB-06209	5.5 - 5.5	9/16/1994	0.23	U
SB-06209	11 - 11	9/16/1994	0.28	U
SB-06211	4 - 4	11/13/2003	0.15	
SB-06212	3.2 - 3.2	11/13/2003	0.12	
SB-06213	3 - 3	11/13/2003	0.055	U
SB-06214	4 - 4	11/13/2003	0.15	
SB-06215	5.5 - 5.5	11/13/2003	0.26	
SB-06216	3 - 3	12/30/2003	0.16	
SB-06217	7 - 7	12/30/2003	0.065	U
SB-06218	4 - 4	12/30/2003	0.12	
SB-06301	1 - 1	12/14/1993	0.24	U
SB-06301	5 - 5	12/14/1993	0.25	U
SB-06301	11 - 11	12/14/1993	0.25	U
SB-06302	1 - 1	12/14/1993	0.21	U
SB-06302	5 - 5	12/14/1993	0.24	U
SB-06302	11 - 11	12/14/1993	0.27	U
SB-06304	2 - 2	12/3/1993	0.22	U
SB-06304	5 - 5	12/3/1993	0.22	U
SB-06304	10 - 10	12/3/1993	0.24	U
SB-06305	2 - 2	12/16/1993	0.21	U
SB-06305	8 - 8	12/16/1993	0.26	U
SB-06305	11 - 11	12/16/1993	0.23	U
SB-06501	1 - 1	12/8/1993	0.2	U
SB-06501	5 - 5	12/8/1993	0.28	
SB-06502	1 - 1	12/20/1993	0.25	U
SB-06502	2 - 2	12/20/1993	0.22	U
SB-06502	5 - 5	12/20/1993	0.22	U
SB-06604	1 - 1	11/19/1993	0.22	U

2-60 Area COC Results
Cyanide Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Cyanide (mg/kg) - 2004 Soil Screening Level = 0.2 mg/kg; PMCL[3] = 0.2 mg/kg				
SB-06604	5 - 5	11/19/1993	0.22	U
SB-06605	5 - 5	11/18/1993	0.22	U
SB-06605	10 - 10	11/18/1993	0.24	
SW-36	6 - 7	8/13/2002	0.07	U
SW-36	8 - 9	8/13/2002	0.07	U
SW-38	3.6 - 4.2	9/6/2002	0.053	U
SW-38	6.7 - 7.6	9/6/2002	0.067	U
SW-38	9.8 - 10.6	9/6/2002	0.073	
SW-39	3 - 3.2	9/6/2002	0.065	U
SW-39	9.1 - 10.1	9/6/2002	0.065	U
SW-39	9.1 - 10.1	9/6/2002	0.065	U
SW-40	4.5 - 5.3	9/4/2002	0.056	U
SW-40	9.5 - 10.5	9/4/2002	0.063	
SW-42	4 - 5	8/15/2002	0.065	U
SW-42	11 - 12	8/15/2002	0.064	U
SW-43	5 - 6	8/14/2002	0.064	U
SW-43	8 - 9	8/14/2002	0.07	U
SW-43	10 - 12	8/14/2002	0.07	U
SW-44	3 - 4	8/14/2002	0.07	U
SW-44	8 - 9	8/14/2002	0.07	U
SW-45	3 - 4	8/14/2002	1.2	
SW-45	10 - 11	8/14/2002	0.07	U
SW-53	3 - 4	8/14/2002	0.061	U
SW-53	8 - 9	8/14/2002	0.07	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results

Benzo(a)anthracene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(a)anthracene (µg/kg) - 2004 Soil Screening Level = 41.9 µg/kg; PMCL[3] = 2.9 µg/kg				
DP-4408	5 - 6	8/15/2002	13	
DP-4408	10 - 11	8/15/2002	8.8	U
DP-4410	5 - 6	8/15/2002	9.3	U
DP-4410	11 - 12	8/15/2002	8	U
DP-4908	5 - 6	8/26/2002	7.6	U
DP-4908	8 - 9	8/26/2002	7.6	U
DP-4909	3 - 4	8/26/2002	7.3	U
DP-4909	10 - 11	8/26/2002	8.3	U
DP-6201	4.5 - 5	9/3/2002	8.9	U
DP-6201	9.5 - 10.5	9/3/2002	8.8	U
DP-6202	4 - 5	9/3/2002	9	U
DP-6202	9 - 10.5	9/3/2002	7.8	U
DP-6203	4 - 5	8/28/2002	9.2	U
DP-6203	9 - 10	8/28/2002	8.6	U
DP-6208	5 - 5.4	9/24/2002	8.2	U
DP-6208	10.5 - 11	9/24/2002	8.6	U
DP-6209	4 - 6	8/14/2002	8.3	U
DP-6209	9 - 11	8/14/2002	9	U
DP-6301	4.5 - 5.5	8/28/2002	9.3	U
DP-6301	10.5 - 11.5	8/28/2002	8.2	U
DP-6302	4.8 - 5.2	9/3/2002	8.1	U
DP-6302	9 - 10.4	9/3/2002	7.3	UJ
DP-6302	9 - 10.4	9/3/2002	7.1	U
DP-6401	6 - 6.4	9/6/2002	9	U
DP-6401	9.5 - 10.2	9/6/2002	7.8	U
DP-6501	4.5 - 5.5	9/3/2002	78	UJ
DP-6501	4.5 - 5.5	9/3/2002	55	
DP-6501	9.4 - 10.3	9/3/2002	86	UJ
DP-6501	9.4 - 10.3	9/3/2002	8.6	U
DP-6607	7 - 8	8/15/2002	81	U
DP-6607	7 - 8	8/15/2002	8.1	U
DP-6607	10 - 11	8/15/2002	86	U
DP-6607	10 - 11	8/15/2002	8.6	U
PL2-311A	5 - 5	12/15/1993	1300	U
PL2-311A	7.5 - 7.5	12/15/1993	580	U
PL2-311A	10 - 10	12/15/1993	350	U
PL2-314A	7.5 - 7.5	12/7/1993	64	U
PL2-314A	10 - 10	12/7/1993	73	U
PL2-315A	2 - 2	12/8/1993	60	U
PL2-317A	7.5 - 7.5	11/24/1993	68	U
SB-04405	1 - 1	12/9/1993	63	U
SB-04904	1 - 1	11/19/1993	72	U
SB-04904	5 - 5	11/19/1993	63	U
SB-06202	1 - 1	12/6/1993	63	U
SB-06202	7.5 - 7.5	12/6/1993	81	U
SB-06203	2 - 2	11/30/1993	71	U
SB-06204	2 - 2	11/30/1993	64	U
SB-06205	2 - 2	12/8/1993	130	
SB-06206	5 - 5	12/6/1993	68	U

2-60 Area COC Results

Benzo(a)anthracene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(a)anthracene (µg/kg) - 2004 Soil Screening Level = 41.9 µg/kg; PMCL[3] = 2.9 µg/kg				
SB-06206	10 - 10	12/6/1993	81	U
SB-06208	5 - 5	12/6/1993	66	U
SB-06211	4 - 4	11/13/2003	24	
SB-06212	3.2 - 3.2	11/13/2003	18	
SB-06213	3 - 3	11/13/2003	7.3	U
SB-06214	4 - 4	11/13/2003	8.1	U
SB-06215	5.5 - 5.5	11/13/2003	8.5	U
SB-06216	3 - 3	12/30/2003	51	
SB-06217	7 - 7	12/30/2003	8.6	U
SB-06218	4 - 4	12/30/2003	63	
SB-06301	1 - 1	12/14/1993	61	U
SB-06302	1 - 1	12/14/1993	60	U
SB-06304	2 - 2	12/3/1993	66	U
SB-06401	5 - 5	12/3/1993	68	U
SB-06401	7.5 - 7.5	12/3/1993	78	U
SB-06402	5 - 5	12/2/1993	62	U
SB-06402	10 - 10	12/2/1993	81	U
SB-06403	5 - 5	12/3/1993	66	U
SB-06403	10 - 10	12/3/1993	71	U
SB-06501	1 - 1	12/8/1993	50	U
SB-06502	2 - 2	12/20/1993	56	U
SB-06503	2 - 2	12/16/1993	59	U
SB-06503	8 - 8	12/16/1993	76	U
SB-06503	11 - 11	12/16/1993	68	U
SB-06504	5 - 5	12/8/1993	69	U
SB-06504	10 - 10	12/8/1993	57	U
SB-06604	1 - 1	11/19/1993	64	U
SB-06605	10 - 10	11/18/1993	67	U
SB-07002	1.5 - 1.5	8/18/1994	73	U
SB-07002	7 - 7	8/18/1994	71	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	9.2	U
SW-36	8 - 9	8/13/2002	9	U
SW-38	3.6 - 4.2	9/6/2002	7.1	U
SW-38	6.7 - 7.6	9/6/2002	8.8	
SW-38	9.8 - 10.6	9/6/2002	9.9	U
SW-39	3 - 3.2	9/6/2002	9.5	
SW-39	9.1 - 10.1	9/6/2002	26	UJ
SW-39	9.1 - 10.1	9/6/2002	8.5	UJ
SW-40	4.5 - 5.3	9/4/2002	7.5	U
SW-40	9.5 - 10.5	9/4/2002	8.6	U
SW-42	4 - 5	8/15/2002	8.6	U
SW-42	11 - 12	8/15/2002	8.5	U
SW-43	5 - 6	8/14/2002	12	
SW-43	8 - 9	8/14/2002	8.9	U
SW-43	10 - 12	8/14/2002	8.7	U
SW-44	3 - 4	8/14/2002	9.4	U
SW-44	8 - 9	8/14/2002	9.4	U
SW-45	3 - 4	8/14/2002	14	

2-60 Area COC Results

Benzo(a)anthracene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(a)anthracene (µg/kg) - 2004 Soil Screening Level = 41.9 µg/kg; PMCL[3] = 2.9 µg/kg				
SW-45	10 - 11	8/14/2002	9.1	U
SW-53	3 - 4	8/14/2002	8.5	U
SW-53	8 - 9	8/14/2002	9.2	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Benzo(a)pyrene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(a)pyrene (µg/kg) - 2004 Soil Screening Level = 113 µg/kg; PMCL[3] = 2.9 µg/kg				
Loc_Name	Sample Interval	Samp_Date	Value	DV_Qual
DP-4408	5 - 6	8/15/2002	21	
DP-4408	10 - 11	8/15/2002	8.8	U
DP-4410	5 - 6	8/15/2002	9.3	U
DP-4410	11 - 12	8/15/2002	8	U
DP-4908	5 - 6	8/26/2002	7.6	U
DP-4908	8 - 9	8/26/2002	7.6	U
DP-4909	3 - 4	8/26/2002	7.3	U
DP-4909	10 - 11	8/26/2002	8.3	U
DP-6201	4.5 - 5	9/3/2002	8.9	U
DP-6201	9.5 - 10.5	9/3/2002	8.8	U
DP-6202	4 - 5	9/3/2002	9	U
DP-6202	9 - 10.5	9/3/2002	7.8	U
DP-6203	4 - 5	8/28/2002	9.2	U
DP-6203	9 - 10	8/28/2002	8.6	U
DP-6208	5 - 5.4	9/24/2002	8.2	U
DP-6208	10.5 - 11	9/24/2002	8.6	U
DP-6209	4 - 6	8/14/2002	8.3	U
DP-6209	9 - 11	8/14/2002	9	U
DP-6301	4.5 - 5.5	8/28/2002	9.3	U
DP-6301	10.5 - 11.5	8/28/2002	8.2	U
DP-6302	4.8 - 5.2	9/3/2002	8.1	U
DP-6302	9 - 10.4	9/3/2002	7.3	UJ
DP-6302	9 - 10.4	9/3/2002	7.1	U
DP-6401	6 - 6.4	9/6/2002	9	U
DP-6401	9.5 - 10.2	9/6/2002	7.8	U
DP-6501	4.5 - 5.5	9/3/2002	78	UJ
DP-6501	4.5 - 5.5	9/3/2002	54	
DP-6501	9.4 - 10.3	9/3/2002	86	UJ
DP-6501	9.4 - 10.3	9/3/2002	8.6	U
DP-6607	7 - 8	8/15/2002	81	U
DP-6607	7 - 8	8/15/2002	8.1	U
DP-6607	10 - 11	8/15/2002	86	U
DP-6607	10 - 11	8/15/2002	8.6	U
PL2-311A	5 - 5	12/15/1993	1300	U
PL2-311A	7.5 - 7.5	12/15/1993	580	U
PL2-311A	10 - 10	12/15/1993	350	U
PL2-314A	7.5 - 7.5	12/7/1993	64	U
PL2-314A	10 - 10	12/7/1993	73	U
PL2-315A	2 - 2	12/8/1993	60	U
PL2-317A	7.5 - 7.5	11/24/1993	68	U
SB-04405	1 - 1	12/9/1993	63	U
SB-04904	1 - 1	11/19/1993	72	U
SB-04904	5 - 5	11/19/1993	63	U
SB-06202	1 - 1	12/6/1993	63	U
SB-06202	7.5 - 7.5	12/6/1993	81	U
SB-06203	2 - 2	11/30/1993	71	U
SB-06204	2 - 2	11/30/1993	64	U
SB-06205	2 - 2	12/8/1993	140	

2-60 Area COC Results
Benzo(a)pyrene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(a)pyrene (µg/kg) - 2004 Soil Screening Level = 113 µg/kg; PMCL[3] = 2.9 µg/kg				
SB-06206	5 - 5	12/6/1993	68	U
SB-06206	10 - 10	12/6/1993	81	U
SB-06208	5 - 5	12/6/1993	66	U
SB-06211	4 - 4	11/13/2003	29	
SB-06212	3.2 - 3.2	11/13/2003	31	
SB-06213	3 - 3	11/13/2003	7.3	U
SB-06214	4 - 4	11/13/2003	8.1	U
SB-06215	5.5 - 5.5	11/13/2003	8.5	U
SB-06216	3 - 3	12/30/2003	200	
SB-06217	7 - 7	12/30/2003	8.6	U
SB-06218	4 - 4	12/30/2003	73	
SB-06301	1 - 1	12/14/1993	61	U
SB-06302	1 - 1	12/14/1993	60	U
SB-06304	2 - 2	12/3/1993	66	U
SB-06401	5 - 5	12/3/1993	68	U
SB-06401	7.5 - 7.5	12/3/1993	78	U
SB-06402	5 - 5	12/2/1993	62	U
SB-06402	10 - 10	12/2/1993	81	U
SB-06403	5 - 5	12/3/1993	66	U
SB-06403	10 - 10	12/3/1993	71	U
SB-06501	1 - 1	12/8/1993	50	U
SB-06502	2 - 2	12/20/1993	56	U
SB-06503	2 - 2	12/16/1993	59	U
SB-06503	8 - 8	12/16/1993	76	U
SB-06503	11 - 11	12/16/1993	68	U
SB-06504	5 - 5	12/8/1993	69	U
SB-06504	10 - 10	12/8/1993	57	U
SB-06604	1 - 1	11/19/1993	64	U
SB-06605	10 - 10	11/18/1993	67	U
SB-07002	1.5 - 1.5	8/18/1994	73	U
SB-07002	7 - 7	8/18/1994	71	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	9.2	U
SW-36	8 - 9	8/13/2002	9	U
SW-38	3.6 - 4.2	9/6/2002	7.1	U
SW-38	6.7 - 7.6	9/6/2002	8.8	U
SW-38	9.8 - 10.6	9/6/2002	9.9	U
SW-39	3 - 3.2	9/6/2002	8.6	
SW-39	9.1 - 10.1	9/6/2002	26	UJ
SW-39	9.1 - 10.1	9/6/2002	8.5	UJ
SW-40	4.5 - 5.3	9/4/2002	7.5	U
SW-40	9.5 - 10.5	9/4/2002	8.6	U
SW-42	4 - 5	8/15/2002	8.6	U
SW-42	11 - 12	8/15/2002	8.5	U
SW-43	5 - 6	8/14/2002	13	
SW-43	8 - 9	8/14/2002	8.9	U
SW-43	10 - 12	8/14/2002	8.7	U
SW-44	3 - 4	8/14/2002	9.4	U
SW-44	8 - 9	8/14/2002	9.4	U

2-60 Area COC Results
Benzo(a)pyrene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(a)pyrene (µg/kg) - 2004 Soil Screening Level = 113 µg/kg; PMCL[3] = 2.9 µg/kg				
SW-45	3 - 4	8/14/2002	14	
SW-45	10 - 11	8/14/2002	9.1	U
SW-53	3 - 4	8/14/2002	8.5	U
SW-53	8 - 9	8/14/2002	9.2	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Benzo(b)fluoranthene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(b)fluoranthene (µg/kg) - 2004 Soil Screening Level = 144 µg/kg; PMCL[3] = 2.9 µg/kg				
DP-4408	5 - 6	8/15/2002	17	
DP-4408	10 - 11	8/15/2002	8.8	U
DP-4410	5 - 6	8/15/2002	9.3	U
DP-4410	11 - 12	8/15/2002	8	U
DP-4908	5 - 6	8/26/2002	7.6	U
DP-4908	8 - 9	8/26/2002	7.6	U
DP-4909	3 - 4	8/26/2002	7.3	U
DP-4909	10 - 11	8/26/2002	8.3	U
DP-6201	4.5 - 5	9/3/2002	8.9	U
DP-6201	9.5 - 10.5	9/3/2002	8.8	U
DP-6202	4 - 5	9/3/2002	9	U
DP-6202	9 - 10.5	9/3/2002	7.8	U
DP-6203	4 - 5	8/28/2002	9.2	U
DP-6203	9 - 10	8/28/2002	8.6	U
DP-6208	5 - 5.4	9/24/2002	8.2	U
DP-6208	10.5 - 11	9/24/2002	8.6	U
DP-6209	4 - 6	8/14/2002	8.3	U
DP-6209	9 - 11	8/14/2002	9	U
DP-6301	4.5 - 5.5	8/28/2002	9.3	U
DP-6301	10.5 - 11.5	8/28/2002	8.2	U
DP-6302	4.8 - 5.2	9/3/2002	8.1	U
DP-6302	9 - 10.4	9/3/2002	7.3	UJ
DP-6302	9 - 10.4	9/3/2002	7.1	U
DP-6401	6 - 6.4	9/6/2002	9	U
DP-6401	9.5 - 10.2	9/6/2002	7.8	U
DP-6501	4.5 - 5.5	9/3/2002	78	UJ
DP-6501	4.5 - 5.5	9/3/2002	65	
DP-6501	9.4 - 10.3	9/3/2002	86	UJ
DP-6501	9.4 - 10.3	9/3/2002	8.6	U
DP-6607	7 - 8	8/15/2002	81	U
DP-6607	7 - 8	8/15/2002	8.1	U
DP-6607	10 - 11	8/15/2002	86	U
DP-6607	10 - 11	8/15/2002	8.6	U
PL2-311A	5 - 5	12/15/1993	1300	U
PL2-311A	7.5 - 7.5	12/15/1993	580	U
PL2-311A	10 - 10	12/15/1993	350	U
PL2-314A	7.5 - 7.5	12/7/1993	64	U
PL2-314A	10 - 10	12/7/1993	73	U
PL2-315A	2 - 2	12/8/1993	60	U
PL2-317A	7.5 - 7.5	11/24/1993	68	U
SB-04405	1 - 1	12/9/1993	63	U
SB-04904	1 - 1	11/19/1993	72	U
SB-04904	5 - 5	11/19/1993	63	U
SB-06202	1 - 1	12/6/1993	63	U
SB-06202	7.5 - 7.5	12/6/1993	81	U
SB-06203	2 - 2	11/30/1993	71	U
SB-06204	2 - 2	11/30/1993	64	U
SB-06205	2 - 2	12/8/1993	140	
SB-06206	5 - 5	12/6/1993	68	U

2-60 Area COC Results
Benzo(b)fluoranthene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(b)fluoranthene (µg/kg) - 2004 Soil Screening Level = 144 µg/kg; PMCL[3] = 2.9 µg/kg				
SB-06206	10 - 10	12/6/1993	81	U
SB-06208	5 - 5	12/6/1993	66	U
SB-06211	4 - 4	11/13/2003	22	
SB-06212	3.2 - 3.2	11/13/2003	26	
SB-06213	3 - 3	11/13/2003	7.3	U
SB-06214	4 - 4	11/13/2003	8.1	U
SB-06215	5.5 - 5.5	11/13/2003	8.5	U
SB-06216	3 - 3	12/30/2003	160	
SB-06217	7 - 7	12/30/2003	8.6	U
SB-06218	4 - 4	12/30/2003	48	
SB-06301	1 - 1	12/14/1993	61	U
SB-06302	1 - 1	12/14/1993	60	U
SB-06304	2 - 2	12/3/1993	66	U
SB-06401	5 - 5	12/3/1993	68	U
SB-06401	7.5 - 7.5	12/3/1993	78	U
SB-06402	5 - 5	12/2/1993	62	U
SB-06402	10 - 10	12/2/1993	81	U
SB-06403	5 - 5	12/3/1993	66	U
SB-06403	10 - 10	12/3/1993	71	U
SB-06501	1 - 1	12/8/1993	50	U
SB-06502	2 - 2	12/20/1993	56	U
SB-06503	2 - 2	12/16/1993	59	U
SB-06503	8 - 8	12/16/1993	76	U
SB-06503	11 - 11	12/16/1993	68	U
SB-06504	5 - 5	12/8/1993	69	U
SB-06504	10 - 10	12/8/1993	57	U
SB-06604	1 - 1	11/19/1993	64	U
SB-06605	10 - 10	11/18/1993	67	U
SB-07002	1.5 - 1.5	8/18/1994	73	U
SB-07002	7 - 7	8/18/1994	71	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	9.2	U
SW-36	8 - 9	8/13/2002	9	U
SW-38	3.6 - 4.2	9/6/2002	7.1	U
SW-38	6.7 - 7.6	9/6/2002	8.8	U
SW-38	9.8 - 10.6	9/6/2002	22	J
SW-39	3 - 3.2	9/6/2002	9.5	
SW-39	9.1 - 10.1	9/6/2002	26	UJ
SW-39	9.1 - 10.1	9/6/2002	8.5	UJ
SW-40	4.5 - 5.3	9/4/2002	7.5	U
SW-40	9.5 - 10.5	9/4/2002	8.6	U
SW-42	4 - 5	8/15/2002	8.6	U
SW-42	11 - 12	8/15/2002	8.5	U
SW-43	5 - 6	8/14/2002	8.6	U
SW-43	8 - 9	8/14/2002	8.9	U
SW-43	10 - 12	8/14/2002	8.7	U
SW-44	3 - 4	8/14/2002	9.4	U
SW-44	8 - 9	8/14/2002	9.4	U
SW-45	3 - 4	8/14/2002	12	

2-60 Area COC Results

Benzo(b)fluoranthene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzo(b)fluoranthene (µg/kg) - 2004 Soil Screening Level = 144 µg/kg; PMCL[3] = 2.9 µg/kg				
SW-45	10 - 11	8/14/2002	9.1	U
SW-53	3 - 4	8/14/2002	8.5	U
SW-53	8 - 9	8/14/2002	9.2	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
bis(2-Ethylhexyl)phthalate Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
bis(2-Ethylhexyl)phthalate (µg/kg) - 2004 Soil Screening Level = 1,570 µg/kg; PMCL[3] = NE				
DP-4408	5 - 6	8/15/2002	83	U
DP-4408	10 - 11	8/15/2002	88	U
DP-4410	5 - 6	8/15/2002	93	U
DP-4410	11 - 12	8/15/2002	80	U
DP-4908	5 - 6	8/26/2002	76	U
DP-4908	8 - 9	8/26/2002	76	U
DP-4909	3 - 4	8/26/2002	73	U
DP-4909	10 - 11	8/26/2002	83	U
DP-6201	4.5 - 5	9/3/2002	89	UJ
DP-6201	9.5 - 10.5	9/3/2002	88	UJ
DP-6202	4 - 5	9/3/2002	90	UJ
DP-6202	9 - 10.5	9/3/2002	78	UJ
DP-6203	4 - 5	8/28/2002	92	U
DP-6203	9 - 10	8/28/2002	86	U
DP-6208	5 - 5.4	9/24/2002	290	
DP-6208	10.5 - 11	9/24/2002	360	
DP-6209	4 - 6	8/14/2002	83	U
DP-6209	9 - 11	8/14/2002	90	U
DP-6301	4.5 - 5.5	8/28/2002	93	U
DP-6301	10.5 - 11.5	8/28/2002	82	U
DP-6302	4.8 - 5.2	9/3/2002	81	UJ
DP-6302	9 - 10.4	9/3/2002	73	UJ
DP-6302	9 - 10.4	9/3/2002	71	UJ
DP-6401	6 - 6.4	9/6/2002	90	U
DP-6401	9.5 - 10.2	9/6/2002	78	U
DP-6501	4.5 - 5.5	9/3/2002	150	J
DP-6501	9.4 - 10.3	9/3/2002	86	UJ
DP-6607	7 - 8	8/15/2002	82	BU
DP-6607	10 - 11	8/15/2002	86	U
PL2-311A	5 - 5	12/15/1993	1300	U
PL2-311A	7.5 - 7.5	12/15/1993	580	U
PL2-311A	10 - 10	12/15/1993	350	U
PL2-314A	7.5 - 7.5	12/7/1993	64	U
PL2-314A	10 - 10	12/7/1993	73	U
PL2-315A	2 - 2	12/8/1993	60	U
PL2-317A	7.5 - 7.5	11/24/1993	68	U
SB-04405	1 - 1	12/9/1993	63	U
SB-04904	1 - 1	11/19/1993	72	U
SB-04904	5 - 5	11/19/1993	63	U
SB-06202	1 - 1	12/6/1993	63	U
SB-06202	7.5 - 7.5	12/6/1993	81	U
SB-06203	2 - 2	11/30/1993	71	U
SB-06204	2 - 2	11/30/1993	64	U
SB-06205	2 - 2	12/8/1993	61	U
SB-06206	5 - 5	12/6/1993	68	U
SB-06206	10 - 10	12/6/1993	81	U
SB-06208	5 - 5	12/6/1993	66	U
SB-06211	4 - 4	11/13/2003	83	U

2-60 Area COC Results
bis(2-Ethylhexyl)phthalate Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
bis(2-Ethylhexyl)phthalate (µg/kg) - 2004 Soil Screening Level = 1,570 µg/kg; PMCL[3] = NE				
SB-06212	3.2 - 3.2	11/13/2003	85	U
SB-06213	3 - 3	11/13/2003	73	U
SB-06214	4 - 4	11/13/2003	81	U
SB-06215	5.5 - 5.5	11/13/2003	85	U
SB-06216	3 - 3	12/30/2003	1600	
SB-06217	7 - 7	12/30/2003	86	U
SB-06218	4 - 4	12/30/2003	120	
SB-06301	1 - 1	12/14/1993	63	
SB-06302	1 - 1	12/14/1993	60	U
SB-06304	2 - 2	12/3/1993	66	U
SB-06401	5 - 5	12/3/1993	68	U
SB-06401	7.5 - 7.5	12/3/1993	78	U
SB-06402	5 - 5	12/2/1993	62	U
SB-06402	10 - 10	12/2/1993	81	U
SB-06403	5 - 5	12/3/1993	66	U
SB-06403	10 - 10	12/3/1993	71	U
SB-06501	1 - 1	12/8/1993	96	
SB-06502	2 - 2	12/20/1993	56	U
SB-06503	2 - 2	12/16/1993	59	U
SB-06503	8 - 8	12/16/1993	76	U
SB-06503	11 - 11	12/16/1993	68	U
SB-06504	5 - 5	12/8/1993	69	U
SB-06504	10 - 10	12/8/1993	57	U
SB-06604	1 - 1	11/19/1993	64	U
SB-06605	10 - 10	11/18/1993	67	U
SB-07002	1.5 - 1.5	8/18/1994	73	U
SB-07002	7 - 7	8/18/1994	71	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	92	UJ
SW-36	8 - 9	8/13/2002	90	UJ
SW-38	3.6 - 4.2	9/6/2002	71	U
SW-38	6.7 - 7.6	9/6/2002	88	U
SW-38	9.8 - 10.6	9/6/2002	99	U
SW-39	3 - 3.2	9/6/2002	86	U
SW-39	9.1 - 10.1	9/6/2002	85	U
SW-39	9.1 - 10.1	9/6/2002	85	U
SW-40	4.5 - 5.3	9/4/2002	75	U
SW-40	9.5 - 10.5	9/4/2002	86	U
SW-42	4 - 5	8/15/2002	86	U
SW-42	11 - 12	8/15/2002	85	U
SW-43	5 - 6	8/14/2002	86	U
SW-43	8 - 9	8/14/2002	89	U
SW-43	10 - 12	8/14/2002	120	BU
SW-44	3 - 4	8/14/2002	110	BU
SW-44	8 - 9	8/14/2002	96	BU
SW-45	3 - 4	8/14/2002	80	UJ
SW-45	10 - 11	8/14/2002	91	UJ
SW-53	3 - 4	8/14/2002	85	UJ

2-60 Area COC Results

bis(2-Ethylhexyl)phthalate Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
bis(2-Ethylhexyl)phthalate (µg/kg) - 2004 Soil Screening Level = 1,570 µg/kg; PMCL[3] = NE				
SW-53	8 - 9	8/14/2002	92	UJ

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).
NE - Not Established

2-60 Area COC Results
Chrysene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Chrysene (µg/kg) - 2004 Soil Screening Level = 46.6 µg/kg; PMCL[3] = 2.9 µg/kg				
DP-4408	5 - 6	8/15/2002	16	J
DP-4408	10 - 11	8/15/2002	8.8	U
DP-4410	5 - 6	8/15/2002	9.3	U
DP-4410	11 - 12	8/15/2002	8	U
DP-4908	5 - 6	8/26/2002	7.6	U
DP-4908	8 - 9	8/26/2002	7.6	U
DP-4909	3 - 4	8/26/2002	7.3	U
DP-4909	10 - 11	8/26/2002	8.3	U
DP-6201	4.5 - 5	9/3/2002	8.9	U
DP-6201	9.5 - 10.5	9/3/2002	8.8	U
DP-6202	4 - 5	9/3/2002	9	U
DP-6202	9 - 10.5	9/3/2002	7.8	U
DP-6203	4 - 5	8/28/2002	9.2	U
DP-6203	9 - 10	8/28/2002	8.6	U
DP-6208	5 - 5.4	9/24/2002	8.2	U
DP-6208	10.5 - 11	9/24/2002	8.6	U
DP-6209	4 - 6	8/14/2002	8.3	U
DP-6209	9 - 11	8/14/2002	9	U
DP-6301	4.5 - 5.5	8/28/2002	9.3	U
DP-6301	10.5 - 11.5	8/28/2002	8.2	U
DP-6302	4.8 - 5.2	9/3/2002	8.1	U
DP-6302	9 - 10.4	9/3/2002	7.3	UJ
DP-6302	9 - 10.4	9/3/2002	7.1	U
DP-6401	6 - 6.4	9/6/2002	9	U
DP-6401	9.5 - 10.2	9/6/2002	7.8	U
DP-6501	4.5 - 5.5	9/3/2002	78	UJ
DP-6501	4.5 - 5.5	9/3/2002	67	J
DP-6501	9.4 - 10.3	9/3/2002	86	UJ
DP-6501	9.4 - 10.3	9/3/2002	8.6	U
DP-6607	7 - 8	8/15/2002	81	U
DP-6607	7 - 8	8/15/2002	8.1	U
DP-6607	10 - 11	8/15/2002	86	U
DP-6607	10 - 11	8/15/2002	8.6	U
PL2-311A	5 - 5	12/15/1993	1300	U
PL2-311A	7.5 - 7.5	12/15/1993	580	U
PL2-311A	10 - 10	12/15/1993	350	U
PL2-314A	7.5 - 7.5	12/7/1993	64	U
PL2-314A	10 - 10	12/7/1993	73	U
PL2-315A	2 - 2	12/8/1993	60	U
PL2-317A	7.5 - 7.5	11/24/1993	68	U
SB-04405	1 - 1	12/9/1993	63	U
SB-04904	1 - 1	11/19/1993	72	U
SB-04904	5 - 5	11/19/1993	63	U
SB-06202	1 - 1	12/6/1993	63	U
SB-06202	7.5 - 7.5	12/6/1993	81	U
SB-06203	2 - 2	11/30/1993	71	U
SB-06204	2 - 2	11/30/1993	64	U
SB-06205	2 - 2	12/8/1993	160	
SB-06206	5 - 5	12/6/1993	68	U

2-60 Area COC Results
Chrysene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Chrysene (µg/kg) - 2004 Soil Screening Level = 46.6 µg/kg; PMCL[3] = 2.9 µg/kg				
SB-06206	10 - 10	12/6/1993	81	U
SB-06208	5 - 5	12/6/1993	66	U
SB-06211	4 - 4	11/13/2003	30	
SB-06212	3.2 - 3.2	11/13/2003	31	
SB-06213	3 - 3	11/13/2003	7.3	U
SB-06214	4 - 4	11/13/2003	8.1	U
SB-06215	5.5 - 5.5	11/13/2003	8.5	U
SB-06216	3 - 3	12/30/2003	100	
SB-06217	7 - 7	12/30/2003	8.6	
SB-06218	4 - 4	12/30/2003	73	
SB-06301	1 - 1	12/14/1993	61	U
SB-06302	1 - 1	12/14/1993	60	U
SB-06304	2 - 2	12/3/1993	66	U
SB-06401	5 - 5	12/3/1993	68	U
SB-06401	7.5 - 7.5	12/3/1993	78	U
SB-06402	5 - 5	12/2/1993	62	U
SB-06402	10 - 10	12/2/1993	81	U
SB-06403	5 - 5	12/3/1993	66	
SB-06403	10 - 10	12/3/1993	71	U
SB-06501	1 - 1	12/8/1993	50	U
SB-06502	2 - 2	12/20/1993	56	U
SB-06503	2 - 2	12/16/1993	59	U
SB-06503	8 - 8	12/16/1993	76	U
SB-06503	11 - 11	12/16/1993	68	U
SB-06504	5 - 5	12/8/1993	69	U
SB-06504	10 - 10	12/8/1993	57	U
SB-06604	1 - 1	11/19/1993	64	U
SB-06605	10 - 10	11/18/1993	67	U
SB-07002	1.5 - 1.5	8/18/1994	73	U
SB-07002	7 - 7	8/18/1994	71	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	9.2	U
SW-36	8 - 9	8/13/2002	9	U
SW-38	3.6 - 4.2	9/6/2002	7.1	U
SW-38	6.7 - 7.6	9/6/2002	14	
SW-38	9.8 - 10.6	9/6/2002	9.9	U
SW-39	3 - 3.2	9/6/2002	13	
SW-39	9.1 - 10.1	9/6/2002	26	UJ
SW-39	9.1 - 10.1	9/6/2002	8.5	UJ
SW-40	4.5 - 5.3	9/4/2002	7.5	U
SW-40	9.5 - 10.5	9/4/2002	8.6	U
SW-42	4 - 5	8/15/2002	8.6	U
SW-42	11 - 12	8/15/2002	8.5	U
SW-43	5 - 6	8/14/2002	18	
SW-43	8 - 9	8/14/2002	8.9	U
SW-43	10 - 12	8/14/2002	8.7	U
SW-44	3 - 4	8/14/2002	9.4	U
SW-44	8 - 9	8/14/2002	9.4	U
SW-45	3 - 4	8/14/2002	14	

2-60 Area COC Results
Chrysene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Chrysene (µg/kg) - 2004 Soil Screening Level = 46.6 µg/kg; PMCL[3] = 2.9 µg/kg				
SW-45	10 - 11	8/14/2002	9.1	U
SW-53	3 - 4	8/14/2002	8.5	U
SW-53	8 - 9	8/14/2002	9.2	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Aroclor 1254 Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Aroclor 1254 (µg/kg) - 2004 Screening Level = 33 µg/kg; PMCL[3] = 33 µg/kg				
DP-4408	5 - 6	8/15/2002	190	
DP-4408	10 - 11	8/15/2002	44	U
DP-6209	4 - 6	8/14/2002	42	U
DP-6209	9 - 11	8/14/2002	45	U
DP-6401	6 - 6.4	9/6/2002	45	U
DP-6401	9.5 - 10.2	9/6/2002	39	U
DP-6501	4.5 - 5.5	9/3/2002	510	
DP-6501	9.4 - 10.3	9/3/2002	43	U
DP-6607	7 - 8	8/15/2002	41	U
DP-6607	10 - 11	8/15/2002	43	U
PL2-311A	5 - 5	12/15/1993	63.1	U
PL2-311A	7.5 - 7.5	12/15/1993	57.6	U
PL2-311A	10 - 10	12/15/1993	69.4	U
PL2-312A	1 - 1	12/16/1993	70.9	U
PL2-312A	7.5 - 7.5	12/16/1993	76.3	U
PL2-315A	2 - 2	12/8/1993	80	U
PL2-317A	7.5 - 7.5	11/24/1993	80	U
SB-04405	1 - 1	12/9/1993	62.9	U
SB-06203	2 - 2	11/30/1993	80	U
SB-06204	2 - 2	11/30/1993	80	U
SB-06205	2 - 2	12/8/1993	80	UJ
SB-06208	5 - 5	12/6/1993	65.8	U
SB-06208	10 - 10	12/6/1993	64.5	U
SB-06211	4 - 4	11/13/2003	42	U
SB-06212	3.2 - 3.2	11/13/2003	43	U
SB-06213	3 - 3	11/13/2003	37	U
SB-06214	4 - 4	11/13/2003	41	U
SB-06215	5.5 - 5.5	11/13/2003	42	U
SB-06216	3 - 3	12/30/2003	110	
SB-06217	7 - 7	12/30/2003	43	U
SB-06218	4 - 4	12/30/2003	47	
SB-06301	1 - 1	12/14/1993	61.3	U
SB-06302	1 - 1	12/14/1993	60.1	U
SB-06304	2 - 2	12/3/1993	65.4	U
SB-06401	5 - 5	12/3/1993	69.2	U
SB-06401	7.5 - 7.5	12/3/1993	72.2	U
SB-06402	5 - 5	12/2/1993	58.1	U
SB-06402	10 - 10	12/2/1993	85.1	U
SB-06403	5 - 5	12/3/1993	67.3	U
SB-06403	10 - 10	12/3/1993	69.4	U
SB-06405	1.5 - 1.5	8/19/1994	80	U
SB-06405	7 - 7	8/19/1994	72	U
SB-06405	9 - 9	8/19/1994	87	U
SB-06406	1.5 - 1.5	8/19/1994	82	U
SB-06406	6.5 - 6.5	8/19/1994	84	U
SB-06406	8.5 - 8.5	8/19/1994	87	U
SB-06407	1.5 - 1.5	9/22/1994	73	U
SB-06407	8 - 8	9/22/1994	98	U
SB-06407	11 - 11	9/22/1994	86	U

2-60 Area COC Results
Aroclor 1254 Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Aroclor 1254 (µg/kg) - 2004 Screening Level = 33 µg/kg; PMCL[3] = 33 µg/kg				
SB-06408	1.5 - 1.5	9/19/1994	53	J
SB-06408	7 - 7	9/19/1994	82	U
SB-06408	11 - 11	9/19/1994	85	U
SB-06501	1 - 1	12/8/1993	80	UJ
SB-06502	2 - 2	12/20/1993	56.5	U
SB-06504	5 - 5	12/8/1993	80	UJ
SB-06504	10 - 10	12/8/1993	80	UJ
SB-06505	7.5 - 7.5	12/10/1993	29.8	U
SB-06505	10 - 10	12/10/1993	33	U
SB-06510	1.5 - 1.5	8/19/1994	52	J
SB-06510	8.5 - 8.5	8/19/1994	73	U
SB-06604	1 - 1	11/19/1993	80	U
SB-06605	10 - 10	11/18/1993	80	U
SB-07002	1.5 - 1.5	8/18/1994	74	U
SB-07002	7 - 7	8/18/1994	72	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	46	U
SW-36	8 - 9	8/13/2002	45	U
SW-38	3.6 - 4.2	9/6/2002	36	U
SW-38	6.7 - 7.6	9/6/2002	44	U
SW-38	9.8 - 10.6	9/6/2002	49	U
SW-39	3 - 3.2	9/6/2002	43	U
SW-39	9.1 - 10.1	9/6/2002	43	U
SW-39	9.1 - 10.1	9/6/2002	43	U
SW-40	4.5 - 5.3	9/4/2002	38	U
SW-40	9.5 - 10.5	9/4/2002	43	U
SW-42	4 - 5	8/15/2002	43	U
SW-42	11 - 12	8/15/2002	43	U
SW-43	5 - 6	8/14/2002	43	U
SW-43	8 - 9	8/14/2002	45	U
SW-43	10 - 12	8/14/2002	44	U
SW-44	3 - 4	8/14/2002	47	U
SW-44	8 - 9	8/14/2002	47	U
SW-45	3 - 4	8/14/2002	40	U
SW-45	10 - 11	8/14/2002	46	U
SW-53	3 - 4	8/14/2002	42	U
SW-53	8 - 9	8/14/2002	46	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Aroclor 1260 Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Aroclor 1260 (µg/kg) - 2004 Screening Level = 33 µg/kg; PMCL[3] = 33 µg/kg				
DP-4408	5 - 6	8/15/2002	78	U
DP-4408	10 - 11	8/15/2002	44	U
DP-6209	4 - 6	8/14/2002	42	U
DP-6209	9 - 11	8/14/2002	45	U
DP-6401	6 - 6.4	9/6/2002	45	U
DP-6401	9.5 - 10.2	9/6/2002	39	U
DP-6501	4.5 - 5.5	9/3/2002	260	U
DP-6501	9.4 - 10.3	9/3/2002	43	U
DP-6607	7 - 8	8/15/2002	41	U
DP-6607	10 - 11	8/15/2002	43	U
PL2-311A	5 - 5	12/15/1993	63.1	U
PL2-311A	7.5 - 7.5	12/15/1993	57.6	U
PL2-311A	10 - 10	12/15/1993	69.4	U
PL2-312A	1 - 1	12/16/1993	70.9	U
PL2-312A	7.5 - 7.5	12/16/1993	76.3	U
PL2-315A	2 - 2	12/8/1993	80	U
PL2-317A	7.5 - 7.5	11/24/1993	80	U
SB-04405	1 - 1	12/9/1993	62.9	U
SB-06203	2 - 2	11/30/1993	80	U
SB-06204	2 - 2	11/30/1993	80	U
SB-06205	2 - 2	12/8/1993	80	UJ
SB-06208	5 - 5	12/6/1993	46.2	J
SB-06208	10 - 10	12/6/1993	64.5	U
SB-06211	4 - 4	11/13/2003	42	U
SB-06212	3.2 - 3.2	11/13/2003	43	U
SB-06213	3 - 3	11/13/2003	37	U
SB-06214	4 - 4	11/13/2003	41	U
SB-06215	5.5 - 5.5	11/13/2003	42	U
SB-06216	3 - 3	12/30/2003	94	
SB-06217	7 - 7	12/30/2003	43	U
SB-06218	4 - 4	12/30/2003	43	
SB-06301	1 - 1	12/14/1993	61.3	U
SB-06302	1 - 1	12/14/1993	60.1	U
SB-06304	2 - 2	12/3/1993	65.4	U
SB-06401	5 - 5	12/3/1993	69.2	U
SB-06401	7.5 - 7.5	12/3/1993	72.2	U
SB-06402	5 - 5	12/2/1993	58.1	U
SB-06402	10 - 10	12/2/1993	85.1	U
SB-06403	5 - 5	12/3/1993	67.3	U
SB-06403	10 - 10	12/3/1993	69.4	U
SB-06405	1.5 - 1.5	8/19/1994	80	U
SB-06405	7 - 7	8/19/1994	72	U
SB-06405	9 - 9	8/19/1994	87	U
SB-06406	1.5 - 1.5	8/19/1994	82	U
SB-06406	6.5 - 6.5	8/19/1994	84	U
SB-06406	8.5 - 8.5	8/19/1994	87	U
SB-06407	1.5 - 1.5	9/22/1994	73	U
SB-06407	8 - 8	9/22/1994	98	U
SB-06407	11 - 11	9/22/1994	86	U

2-60 Area COC Results
Aroclor 1260 Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Aroclor 1260 (µg/kg) - 2004 Screening Level = 33 µg/kg; PMCL[3] = 33 µg/kg				
SB-06408	1.5 - 1.5	9/19/1994	77	U
SB-06408	7 - 7	9/19/1994	82	U
SB-06408	11 - 11	9/19/1994	85	U
SB-06501	1 - 1	12/8/1993	80	UJ
SB-06502	2 - 2	12/20/1993	56.5	U
SB-06504	5 - 5	12/8/1993	80	UJ
SB-06504	10 - 10	12/8/1993	80	UJ
SB-06505	7.5 - 7.5	12/10/1993	29.8	U
SB-06505	10 - 10	12/10/1993	33	U
SB-06510	1.5 - 1.5	8/19/1994	70	U
SB-06510	8.5 - 8.5	8/19/1994	73	U
SB-06604	1 - 1	11/19/1993	80	U
SB-06605	10 - 10	18-Nov-93	80	U
SB-07002	1.5 - 1.5	8/18/1994	76	
SB-07002	7 - 7	8/18/1994	72	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	46	U
SW-36	8 - 9	8/13/2002	45	U
SW-38	3.6 - 4.2	9/6/2002	36	U
SW-38	6.7 - 7.6	9/6/2002	44	U
SW-38	9.8 - 10.6	9/6/2002	49	U
SW-39	3 - 3.2	9/6/2002	43	U
SW-39	9.1 - 10.1	9/6/2002	43	U
SW-39	9.1 - 10.1	9/6/2002	43	U
SW-40	4.5 - 5.3	9/4/2002	38	U
SW-40	9.5 - 10.5	9/4/2002	43	U
SW-42	4 - 5	8/15/2002	43	U
SW-42	11 - 12	8/15/2002	43	U
SW-43	5 - 6	8/14/2002	43	U
SW-43	8 - 9	8/14/2002	45	U
SW-43	10 - 12	8/14/2002	44	U
SW-44	3 - 4	8/14/2002	47	U
SW-44	8 - 9	8/14/2002	47	U
SW-45	3 - 4	8/14/2002	40	U
SW-45	10 - 11	8/14/2002	46	U
SW-53	3 - 4	8/14/2002	42	U
SW-53	8 - 9	8/14/2002	46	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Benzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzene (µg/kg) - 2004 Soil Screening Level = 25.3 µg/kg; PMCL[3] = 4,300 µg/kg				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6401	6 - 6.4	9/6/2002	69	U
DP-6401	9.5 - 10.2	9/6/2002	62	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
PL2-311A	5 - 5	12/15/1993	2000	
PL2-311A	7.5 - 7.5	12/15/1993	130	U
PL2-311A	10 - 10	12/15/1993	16000	U
PL2-314A	7.5 - 7.5	12/7/1993	1.1	U
PL2-314A	10 - 10	12/7/1993	1.3	U
PL2-315A	2 - 2	12/8/1993	1.1	U
PL2-315A	7.5 - 7.5	12/8/1993	1.3	U
PL2-316A	7.5 - 7.5	12/7/1993	1.4	U
PL2-316A	10 - 10	12/7/1993	1.3	U
PL2-317A	7.5 - 7.5	11/24/1993	1.1	U
SB-04405	1 - 1	12/9/1993	1.1	U
SB-04405	7.5 - 7.5	12/9/1993	1.1	U
SB-04417	7.5 - 7.5	10/28/1994	15	
SB-04417	10 - 10	10/28/1994	84	
SB-04418	5 - 5	10/27/1994	60	

2-60 Area COC Results
Benzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzene (µg/kg) - 2004 Soil Screening Level = 25.3 µg/kg; PMCL[3] = 4,300 µg/kg				
SB-04418	7.5 - 7.5	10/27/1994	4.7	
SB-04420	7.5 - 7.5	10/28/1994	1.4	U
SB-04420	10 - 10	10/28/1994	1.2	U
SB-04904	1 - 1	11/19/1993	1.2	U
SB-04904	5 - 5	11/19/1993	1.1	U
SB-06202	1 - 1	12/6/1993	1.1	U
SB-06202	7.5 - 7.5	12/6/1993	1.3	U
SB-06203	2 - 2	11/30/1993	1.2	U
SB-06203	7.5 - 7.5	11/30/1993	1	U
SB-06204	2 - 2	11/30/1993	1.1	U
SB-06204	7.5 - 7.5	11/30/1993	1.2	U
SB-06205	2 - 2	12/8/1993	1.1	U
SB-06205	7.5 - 7.5	12/8/1993	1.3	U
SB-06206	5 - 5	12/6/1993	1.3	U
SB-06206	10 - 10	12/6/1993	1.4	U
SB-06208	5 - 5	12/6/1993	1.1	U
SB-06208	10 - 10	12/6/1993	1.2	U
SB-06210	5 - 5	2/24/1995	1.3	U
SB-06210	7.5 - 7.5	2/24/1995	1.4	U
SB-06210	9 - 9	2/24/1995	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SB-06301	1 - 1	12/14/1993	1.1	U
SB-06301	7.5 - 7.5	12/14/1993	1.3	U
SB-06301	11 - 11	12/14/1993	1.4	U
SB-06302	3 - 3	12/14/1993	1.3	U
SB-06302	7.5 - 7.5	12/14/1993	1.4	U
SB-06302	11 - 11	12/14/1993	1.3	U
SB-06304	2 - 2	12/3/1993	1.1	U
SB-06304	7.5 - 7.5	12/3/1993	1.3	U
SB-06304	10 - 10	12/3/1993	1.3	U
SB-06401	5 - 5	12/3/1993	1.4	U
SB-06401	7.5 - 7.5	12/3/1993	1.3	U
SB-06402	5 - 5	12/2/1993	1.3	U
SB-06402	10 - 10	12/2/1993	1.3	U
SB-06403	5 - 5	12/3/1993	1.2	U
SB-06403	10 - 10	12/3/1993	1.2	U
SB-06405	1.5 - 1.5	8/19/1994	1.2	U
SB-06405	7 - 7	8/19/1994	1.1	U
SB-06405	9 - 9	8/19/1994	1.3	U
SB-06406	1.5 - 1.5	8/19/1994	1.2	U
SB-06406	6.5 - 6.5	8/19/1994	1.2	U
SB-06406	8.5 - 8.5	8/19/1994	1.3	U

2-60 Area COC Results
Benzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Benzene (µg/kg) - 2004 Soil Screening Level = 25.3 µg/kg; PMCL[3] = 4,300 µg/kg				
SB-06408	1.5 - 1.5	9/19/1994	1.2	U
SB-06408	7 - 7	9/19/1994	1.2	U
SB-06408	11 - 11	9/19/1994	1.4	U
SB-06501	1 - 1	12/8/1993	1	U
SB-06501	7.5 - 7.5	12/8/1993	1.1	U
SB-06502	1 - 1	12/20/1993	1.3	U
SB-06502	2 - 2	12/20/1993	1	U
SB-06502	9 - 9	12/20/1993	1.1	U
SB-06503	2 - 2	12/16/1993	1	U
SB-06503	8 - 8	12/16/1993	1.4	U
SB-06503	11 - 11	12/16/1993	1.3	U
SB-06504	5 - 5	12/8/1993	1.4	U
SB-06504	10 - 10	12/8/1993	1.1	U
SB-06604	0.5 - 0.5	11/19/1993	1.1	U
SB-06604	1 - 1	11/19/1993	1.3	U
SB-06605	0.5 - 0.5	11/18/1993	1.1	U
SB-06605	10 - 10	11/18/1993	1.1	U
SB-07002	1.5 - 1.5	8/18/1994	1.1	U
SB-07002	7 - 7	8/18/1994	1.1	U
SB-07002	12 - 12	8/18/1994	1.3	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	6.7	
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	330	U
SW-39	9.1 - 10.1	9/6/2002	330	U
SW-39	9.1 - 10.1	9/6/2002	310	U
SW-40	4.5 - 5.3	9/4/2002	1.1	U
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
n-Butylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
n-Butylbenzene (µg/kg) - 2004 Soil Screening Level = 4,640 µg/kg; PMCL[3] = Not Established				
DP-4408	5 - 6	8/15/2002	2.3	U
DP-4408	10 - 11	8/15/2002	970	M
DP-4908	5 - 6	8/26/2002	2.5	U
DP-4908	8 - 9	8/26/2002	2.5	U
DP-4909	3 - 4	8/26/2002	2.3	U
DP-4909	10 - 11	8/26/2002	2.5	U
DP-6201	4.5 - 5	9/3/2002	2.7	U
DP-6201	9.5 - 10.5	9/3/2002	2.6	U
DP-6202	4 - 5	9/3/2002	2.8	U
DP-6202	9 - 10.5	9/3/2002	2.5	U
DP-6203	4 - 5	8/28/2002	2.7	U
DP-6203	9 - 10	8/28/2002	2.5	U
DP-6204	5 - 5.3	9/24/2002	2.1	U
DP-6204	9.6 - 9.8	9/24/2002	2.5	U
DP-6205	4.8 - 5	9/24/2002	2.2	U
DP-6205	10 - 10.4	9/24/2002	2.6	U
DP-6206	5.2 - 5.6	9/24/2002	2.8	U
DP-6206	10.3 - 10.7	9/24/2002	2.6	U
DP-6207	4.5 - 5.5	9/3/2002	2.7	U
DP-6207	9.5 - 10.5	9/3/2002	2.5	U
DP-6208	5 - 5.4	9/24/2002	2.2	U
DP-6208	10.5 - 11	9/24/2002	2.6	U
DP-6209	4 - 6	8/14/2002	2.6	U
DP-6209	9 - 11	8/14/2002	2.6	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
DP-6501	4.5 - 5.5	9/3/2002	2.3	U
DP-6501	9.4 - 10.3	9/3/2002	2.7	U
DP-6606	4.5 - 5	8/30/2002	2.1	UJ
DP-6606	9.5 - 10	8/30/2002	2.5	UJ
DP-6607	7 - 8	8/15/2002	2.3	U
DP-6607	10 - 11	8/15/2002	2.5	U
DP-6608	5 - 6	8/26/2002	2.2	U
DP-6608	11 - 12	8/26/2002	2.6	U
SW-36	6 - 7	8/13/2002	2.6	U
SW-36	8 - 9	8/13/2002	2.8	U
SW-38	3.6 - 4.2	9/6/2002	2.2	U
SW-38	6.7 - 7.6	9/6/2002	2.7	U
SW-38	9.8 - 10.6	9/6/2002	2.7	U
SW-39	3 - 3.2	9/6/2002	3800	U
SW-39	9.1 - 10.1	9/6/2002	37000	T
SW-39	9.1 - 10.1	9/6/2002	31000	U
SW-40	4.5 - 5.3	9/4/2002	2.2	U

2-60 Area COC Results
n-Butylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
n-Butylbenzene (µg/kg) - 2004 Soil Screening Level = 4,640 µg/kg; PMCL[3] = Not Established				
SW-40	9.5 - 10.5	9/4/2002	2.3	U
SW-42	4 - 5	8/15/2002	2.5	U
SW-42	11 - 12	8/15/2002	2.8	U
SW-43	5 - 6	8/14/2002	2.7	U
SW-43	8 - 9	8/14/2002	2.7	U
SW-43	10 - 12	8/14/2002	2.7	U
SW-44	3 - 4	8/14/2002	2.8	U
SW-44	8 - 9	8/14/2002	2.8	U
SW-45	3 - 4	8/14/2002	2.4	U
SW-45	10 - 11	8/14/2002	2.7	U
SW-53	3 - 4	8/14/2002	2.5	U
SW-53	8 - 9	8/14/2002	2.7	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
sec-Butylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
sec-Butylbenzene (µg/kg) - 2004 Soil Screening Level = 7,860 µg/kg; PMCL[3] = Not Established				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	2400	M
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	1500	
SW-39	9.1 - 10.1	9/6/2002	10000	
SW-39	9.1 - 10.1	9/6/2002	7400	
SW-40	4.5 - 5.3	9/4/2002	1.1	U

2-60 Area COC Results
sec-Butylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
sec-Butylbenzene (µg/kg) - 2004 Soil Screening Level = 7,860 µg/kg; PMCL[3] = Not Established				
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Ethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Ethylbenzene (µg/kg) - 2004 Soil Screening Level = 2,520 µg/kg; PMCL[3] = 43,000 µg/kg				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.6	
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6401	6 - 6.4	9/6/2002	69	U
DP-6401	9.5 - 10.2	9/6/2002	62	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
PL2-311A	5 - 5	12/15/1993	28000	N
PL2-311A	7.5 - 7.5	12/15/1993	1300	N
PL2-311A	10 - 10	12/15/1993	16000	U
PL2-314A	7.5 - 7.5	12/7/1993	1.1	U
PL2-314A	10 - 10	12/7/1993	1.3	U
PL2-315A	2 - 2	12/8/1993	1.1	U
PL2-315A	7.5 - 7.5	12/8/1993	1.3	U
PL2-316A	7.5 - 7.5	12/7/1993	1.4	U
PL2-316A	10 - 10	12/7/1993	1.3	U
PL2-317A	7.5 - 7.5	11/24/1993	1.1	U
SB-04405	1 - 1	12/9/1993	1.1	U
SB-04405	7.5 - 7.5	12/9/1993	1.1	U
SB-04417	7.5 - 7.5	10/28/1994	31	
SB-04417	10 - 10	10/28/1994	68	
SB-04418	5 - 5	10/27/1994	200	

2-60 Area COC Results
Ethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Ethylbenzene (µg/kg) - 2004 Soil Screening Level = 2,520 µg/kg; PMCL[3] = 43,000 µg/kg				
SB-04418	7.5 - 7.5	10/27/1994	6.5	
SB-04420	7.5 - 7.5	10/28/1994	1.4	U
SB-04420	10 - 10	10/28/1994	1.2	U
SB-04904	1 - 1	11/19/1993	1.2	U
SB-04904	5 - 5	11/19/1993	1.1	U
SB-06202	1 - 1	12/6/1993	1.1	U
SB-06202	7.5 - 7.5	12/6/1993	1.3	U
SB-06203	2 - 2	11/30/1993	1.2	U
SB-06203	7.5 - 7.5	11/30/1993	1	U
SB-06204	2 - 2	11/30/1993	1.1	U
SB-06204	7.5 - 7.5	11/30/1993	1.2	U
SB-06205	2 - 2	12/8/1993	1.1	U
SB-06205	7.5 - 7.5	12/8/1993	1.3	U
SB-06206	5 - 5	12/6/1993	1.3	U
SB-06206	10 - 10	12/6/1993	1.4	U
SB-06208	5 - 5	12/6/1993	1.1	U
SB-06208	10 - 10	12/6/1993	1.2	U
SB-06210	5 - 5	2/24/1995	1.3	U
SB-06210	7.5 - 7.5	2/24/1995	1.4	U
SB-06210	9 - 9	2/24/1995	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SB-06301	1 - 1	12/14/1993	1.1	U
SB-06301	7.5 - 7.5	12/14/1993	1.3	U
SB-06301	11 - 11	12/14/1993	1.4	U
SB-06302	3 - 3	12/14/1993	1.3	U
SB-06302	7.5 - 7.5	12/14/1993	1.4	U
SB-06302	11 - 11	12/14/1993	1.3	U
SB-06304	2 - 2	12/3/1993	1.1	U
SB-06304	7.5 - 7.5	12/3/1993	1.3	U
SB-06304	10 - 10	12/3/1993	1.3	U
SB-06401	5 - 5	12/3/1993	1.4	U
SB-06401	7.5 - 7.5	12/3/1993	1.3	U
SB-06402	5 - 5	12/2/1993	1.3	U
SB-06402	10 - 10	12/2/1993	1.3	U
SB-06403	5 - 5	12/3/1993	1.2	U
SB-06403	10 - 10	12/3/1993	1.2	U
SB-06405	1.5 - 1.5	8/19/1994	1.2	U
SB-06405	7 - 7	8/19/1994	1.1	U
SB-06405	9 - 9	8/19/1994	1.3	U
SB-06406	1.5 - 1.5	8/19/1994	1.2	U
SB-06406	6.5 - 6.5	8/19/1994	1.2	U
SB-06406	8.5 - 8.5	8/19/1994	1.3	U

2-60 Area COC Results
Ethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Ethylbenzene (µg/kg) - 2004 Soil Screening Level = 2,520 µg/kg; PMCL[3] = 43,000 µg/kg				
SB-06408	1.5 - 1.5	9/19/1994	1.2	U
SB-06408	7 - 7	9/19/1994	1.2	U
SB-06408	11 - 11	9/19/1994	1.4	U
SB-06501	1 - 1	12/8/1993	1	U
SB-06501	7.5 - 7.5	12/8/1993	1.1	U
SB-06502	1 - 1	12/20/1993	1.3	U
SB-06502	2 - 2	12/20/1993	1	U
SB-06502	9 - 9	12/20/1993	1.1	U
SB-06503	2 - 2	12/16/1993	1	U
SB-06503	8 - 8	12/16/1993	1.4	U
SB-06503	11 - 11	12/16/1993	1.3	U
SB-06504	5 - 5	12/8/1993	1.4	U
SB-06504	10 - 10	12/8/1993	1.1	U
SB-06604	0.5 - 0.5	11/19/1993	1.1	U
SB-06604	1 - 1	11/19/1993	1.3	U
SB-06605	0.5 - 0.5	11/18/1993	1.1	U
SB-06605	10 - 10	11/18/1993	1.1	U
SB-07002	1.5 - 1.5	8/18/1994	1.1	U
SB-07002	7 - 7	8/18/1994	1.1	U
SB-07002	12 - 12	8/18/1994	1.3	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	4.6	
SW-38	6.7 - 7.6	9/6/2002	9	
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	9100	
SW-39	9.1 - 10.1	9/6/2002	100000	
SW-39	9.1 - 10.1	9/6/2002	59000	
SW-40	4.5 - 5.3	9/4/2002	1.1	U
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results

Isopropylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Isopropylbenzene (µg/kg) - 2004 Soil Screening Level = 1,270 µg/kg; PMCL[3] = Not Established				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	2800	
SW-39	9.1 - 10.1	9/6/2002	18000	
SW-39	9.1 - 10.1	9/6/2002	14000	
SW-40	4.5 - 5.3	9/4/2002	1.1	U

2-60 Area COC Results
Isopropylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Isopropylbenzene (µg/kg) - 2004 Soil Screening Level = 1,270 µg/kg; PMCL[3] = Not Established				
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Naphthalene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Napthalene (µg/kg) - 2004 Soil Screening Level = 24,800 µg/kg; PMCL[3] = 235,000 µg/kg				
DP-4408	5 - 6	8/15/2002	83	U
DP-4408	5 - 6	8/15/2002	8.3	U
DP-4408	5 - 6	8/15/2002	5.7	U
DP-4408	10 - 11	8/15/2002	88	U
DP-4408	10 - 11	8/15/2002	8.8	U
DP-4408	10 - 11	8/15/2002	1.9	U
DP-4410	5 - 6	8/15/2002	93	U
DP-4410	5 - 6	8/15/2002	9.3	U
DP-4410	11 - 12	8/15/2002	80	U
DP-4410	11 - 12	8/15/2002	8	U
DP-4908	5 - 6	8/26/2002	76	U
DP-4908	5 - 6	8/26/2002	17	
DP-4908	5 - 6	8/26/2002	6.1	U
DP-4908	8 - 9	8/26/2002	76	U
DP-4908	8 - 9	8/26/2002	7.6	U
DP-4908	8 - 9	8/26/2002	6.1	U
DP-4909	3 - 4	8/26/2002	73	U
DP-4909	3 - 4	8/26/2002	7.3	U
DP-4909	3 - 4	8/26/2002	5.7	U
DP-4909	10 - 11	8/26/2002	83	U
DP-4909	10 - 11	8/26/2002	8.3	U
DP-4909	10 - 11	8/26/2002	6.4	U
DP-6201	4.5 - 5	9/3/2002	89	UJ
DP-6201	4.5 - 5	9/3/2002	8.9	U
DP-6201	4.5 - 5	9/3/2002	6.8	U
DP-6201	9.5 - 10.5	9/3/2002	88	UJ
DP-6201	9.5 - 10.5	9/3/2002	8.8	U
DP-6201	9.5 - 10.5	9/3/2002	6.5	U
DP-6202	4 - 5	9/3/2002	90	UJ
DP-6202	4 - 5	9/3/2002	9	U
DP-6202	4 - 5	9/3/2002	7	U
DP-6202	9 - 10.5	9/3/2002	78	UJ
DP-6202	9 - 10.5	9/3/2002	7.8	U
DP-6202	9 - 10.5	9/3/2002	6.2	U
DP-6203	4 - 5	8/28/2002	92	U
DP-6203	4 - 5	8/28/2002	9.2	U
DP-6203	4 - 5	8/28/2002	6.6	U
DP-6203	9 - 10	8/28/2002	86	U
DP-6203	9 - 10	8/28/2002	8.6	U
DP-6203	9 - 10	8/28/2002	6.2	U
DP-6204	5 - 5.3	9/24/2002	5.4	U
DP-6204	9.6 - 9.8	9/24/2002	6.3	U
DP-6205	4.8 - 5	9/24/2002	5.4	U
DP-6205	10 - 10.4	9/24/2002	6.4	U
DP-6206	5.2 - 5.6	9/24/2002	7	U
DP-6206	10.3 - 10.7	9/24/2002	6.6	U
DP-6207	4.5 - 5.5	9/3/2002	6.9	U
DP-6207	9.5 - 10.5	9/3/2002	6.2	U
DP-6208	5 - 5.4	9/24/2002	82	U

2-60 Area COC Results
Naphthalene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Napthalene (µg/kg) - 2004 Soil Screening Level = 24,800 µg/kg; PMCL[3] = 235,000 µg/kg				
DP-6208	5 - 5.4	9/24/2002	8.2	U
DP-6208	5 - 5.4	9/24/2002	5.5	U
DP-6208	10.5 - 11	9/24/2002	86	U
DP-6208	10.5 - 11	9/24/2002	8.6	U
DP-6208	10.5 - 11	9/24/2002	6.5	U
DP-6209	4 - 6	8/14/2002	83	U
DP-6209	4 - 6	8/14/2002	8.3	U
DP-6209	4 - 6	8/14/2002	6.4	U
DP-6209	9 - 11	8/14/2002	90	U
DP-6209	9 - 11	8/14/2002	9	U
DP-6209	9 - 11	8/14/2002	6.5	U
DP-6301	4.5 - 5.5	8/28/2002	93	U
DP-6301	4.5 - 5.5	8/28/2002	9.3	U
DP-6301	10.5 - 11.5	8/28/2002	82	U
DP-6301	10.5 - 11.5	8/28/2002	8.2	U
DP-6302	4.8 - 5.2	9/3/2002	81	UJ
DP-6302	4.8 - 5.2	9/3/2002	8.1	U
DP-6302	9 - 10.4	9/3/2002	73	UJ
DP-6302	9 - 10.4	9/3/2002	71	UJ
DP-6302	9 - 10.4	9/3/2002	7.3	UJ
DP-6302	9 - 10.4	9/3/2002	7.1	U
DP-6401	6 - 6.4	9/6/2002	90	U
DP-6401	6 - 6.4	9/6/2002	12	
DP-6401	9.5 - 10.2	9/6/2002	78	U
DP-6401	9.5 - 10.2	9/6/2002	7.8	U
DP-6501	4.5 - 5.5	9/3/2002	78	UJ
DP-6501	4.5 - 5.5	9/3/2002	7.8	U
DP-6501	4.5 - 5.5	9/3/2002	5.8	U
DP-6501	9.4 - 10.3	9/3/2002	86	UJ
DP-6501	9.4 - 10.3	9/3/2002	8.6	U
DP-6501	9.4 - 10.3	9/3/2002	6.6	U
DP-6606	4.5 - 5	8/30/2002	5.2	UJ
DP-6606	9.5 - 10	8/30/2002	6.1	UJ
DP-6607	7 - 8	8/15/2002	81	U
DP-6607	7 - 8	8/15/2002	8.1	U
DP-6607	7 - 8	8/15/2002	5.7	U
DP-6607	10 - 11	8/15/2002	86	U
DP-6607	10 - 11	8/15/2002	8.6	U
DP-6607	10 - 11	8/15/2002	6.1	U
DP-6608	5 - 6	8/26/2002	5.4	U
DP-6608	11 - 12	8/26/2002	6.6	U
PL2-311A	5 - 5	12/15/1993	20000	
PL2-311A	7.5 - 7.5	12/15/1993	8300	
PL2-311A	10 - 10	12/15/1993	31000	D
PL2-314A	7.5 - 7.5	12/7/1993	64	U
PL2-314A	10 - 10	12/7/1993	73	U
PL2-315A	2 - 2	12/8/1993	60	U
PL2-317A	7.5 - 7.5	11/24/1993	68	U
SB-04405	1 - 1	12/9/1993	63	U

2-60 Area COC Results
Naphthalene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Napthalene (µg/kg) - 2004 Soil Screening Level = 24,800 µg/kg; PMCL[3] = 235,000 µg/kg				
SB-04904	1 - 1	11/19/1993	72	U
SB-04904	5 - 5	11/19/1993	63	U
SB-06202	1 - 1	12/6/1993	63	U
SB-06202	7.5 - 7.5	12/6/1993	81	U
SB-06203	2 - 2	11/30/1993	71	U
SB-06204	2 - 2	11/30/1993	64	U
SB-06205	2 - 2	12/8/1993	210	
SB-06206	5 - 5	12/6/1993	68	U
SB-06206	10 - 10	12/6/1993	81	U
SB-06208	5 - 5	12/6/1993	66	U
SB-06211	4 - 4	11/13/2003	6.3	U
SB-06212	3.2 - 3.2	11/13/2003	6.4	U
SB-06213	3 - 3	11/13/2003	5.2	U
SB-06214	4 - 4	11/13/2003	6.2	U
SB-06215	5.5 - 5.5	11/13/2003	6.3	U
SB-06216	3 - 3	12/30/2003	6	U
SB-06217	7 - 7	12/30/2003	5.8	U
SB-06218	4 - 4	12/30/2003	7.5	J
SB-06301	1 - 1	12/14/1993	61	U
SB-06302	1 - 1	12/14/1993	60	U
SB-06304	2 - 2	12/3/1993	66	U
SB-06401	5 - 5	12/3/1993	68	U
SB-06401	7.5 - 7.5	12/3/1993	78	U
SB-06402	5 - 5	12/2/1993	62	U
SB-06402	10 - 10	12/2/1993	81	U
SB-06403	5 - 5	12/3/1993	66	U
SB-06403	10 - 10	12/3/1993	71	U
SB-06501	1 - 1	12/8/1993	50	U
SB-06502	2 - 2	12/20/1993	56	U
SB-06503	2 - 2	12/16/1993	59	U
SB-06503	8 - 8	12/16/1993	76	U
SB-06503	11 - 11	12/16/1993	68	U
SB-06504	5 - 5	12/8/1993	69	U
SB-06504	10 - 10	12/8/1993	57	U
SB-06604	1 - 1	11/19/1993	64	U
SB-06605	10 - 10	11/18/1993	67	U
SB-07002	1.5 - 1.5	8/18/1994	73	U
SB-07002	7 - 7	8/18/1994	71	U
SB-07002	12 - 12	8/18/1994	88	U
SW-36	6 - 7	8/13/2002	92	UJ
SW-36	6 - 7	8/13/2002	9.2	U
SW-36	6 - 7	8/13/2002	6.6	U
SW-36	8 - 9	8/13/2002	90	UJ
SW-36	8 - 9	8/13/2002	9	U
SW-36	8 - 9	8/13/2002	7	U
SW-38	3.6 - 4.2	9/6/2002	71	U
SW-38	3.6 - 4.2	9/6/2002	7.1	U
SW-38	3.6 - 4.2	9/6/2002	5.5	U
SW-38	6.7 - 7.6	9/6/2002	88	U

2-60 Area COC Results
Naphthalene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Napthalene (µg/kg) - 2004 Soil Screening Level = 24,800 µg/kg; PMCL[3] = 235,000 µg/kg				
SW-38	6.7 - 7.6	9/6/2002	15	
SW-38	6.7 - 7.6	9/6/2002	6.7	U
SW-38	9.8 - 10.6	9/6/2002	99	U
SW-38	9.8 - 10.6	9/6/2002	24	
SW-38	9.8 - 10.6	9/6/2002	6.8	U
SW-39	3 - 3.2	9/6/2002	8300	
SW-39	3 - 3.2	9/6/2002	2300	
SW-39	3 - 3.2	9/6/2002	2200	
SW-39	9.1 - 10.1	9/6/2002	120000	
SW-39	9.1 - 10.1	9/6/2002	80000	
SW-39	9.1 - 10.1	9/6/2002	56000	J
SW-39	9.1 - 10.1	9/6/2002	29000	
SW-39	9.1 - 10.1	9/6/2002	21000	J
SW-39	9.1 - 10.1	9/6/2002	20000	J
SW-40	4.5 - 5.3	9/4/2002	75	U
SW-40	4.5 - 5.3	9/4/2002	7.5	U
SW-40	4.5 - 5.3	9/4/2002	5.4	U
SW-40	9.5 - 10.5	9/4/2002	86	U
SW-40	9.5 - 10.5	9/4/2002	8.6	U
SW-40	9.5 - 10.5	9/4/2002	5.8	U
SW-42	4 - 5	8/15/2002	86	U
SW-42	4 - 5	8/15/2002	8.6	U
SW-42	4 - 5	8/15/2002	6.3	U
SW-42	11 - 12	8/15/2002	85	U
SW-42	11 - 12	8/15/2002	8.5	U
SW-42	11 - 12	8/15/2002	6.9	U
SW-43	5 - 6	8/14/2002	86	U
SW-43	5 - 6	8/14/2002	8.6	U
SW-43	5 - 6	8/14/2002	6.8	U
SW-43	8 - 9	8/14/2002	89	U
SW-43	8 - 9	8/14/2002	8.9	U
SW-43	8 - 9	8/14/2002	6.7	U
SW-43	10 - 12	8/14/2002	87	U
SW-43	10 - 12	8/14/2002	8.7	U
SW-43	10 - 12	8/14/2002	6.7	U
SW-44	3 - 4	8/14/2002	94	U
SW-44	3 - 4	8/14/2002	9.4	U
SW-44	3 - 4	8/14/2002	7	U
SW-44	8 - 9	8/14/2002	94	U
SW-44	8 - 9	8/14/2002	9.4	U
SW-44	8 - 9	8/14/2002	7	U
SW-45	3 - 4	8/14/2002	80	UJ
SW-45	3 - 4	8/14/2002	8	U
SW-45	3 - 4	8/14/2002	5.9	U
SW-45	10 - 11	8/14/2002	91	UJ
SW-45	10 - 11	8/14/2002	9.1	U
SW-45	10 - 11	8/14/2002	6.8	U
SW-53	3 - 4	8/14/2002	85	UJ
SW-53	3 - 4	8/14/2002	8.5	U

2-60 Area COC Results
Naphthalene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Napthalene (µg/kg) - 2004 Soil Screening Level = 24,800 µg/kg; PMCL[3] = 235,000 µg/kg				
SW-53	3 - 4	8/14/2002	6.2	U
SW-53	8 - 9	8/14/2002	92	UJ
SW-53	8 - 9	8/14/2002	9.2	U
SW-53	8 - 9	8/14/2002	6.7	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
n-Propylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
n-Propylbenzene (µg/kg) - 2004 Soil Screening Level = 13,600 µg/kg; PMCL[3] = Not Established				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	4900	
SW-39	9.1 - 10.1	9/6/2002	42000	
SW-39	9.1 - 10.1	9/6/2002	40000	
SW-40	4.5 - 5.3	9/4/2002	1.1	U

2-60 Area COC Results
n-Propylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
n-Propylbenzene (µg/kg) - 2004 Soil Screening Level = 13,600 µg/kg; PMCL[3] = Not Established				
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Tetrachloroethene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Tetrachloroethene (µg/kg) - 2004 Soil Screening Level = 8.72 µg/kg; PMCL[3] = 890 µg/kg				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	2.8	
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	5.8	
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	2.2	
DP-6206	10.3 - 10.7	9/24/2002	1.7	
DP-6207	4.5 - 5.5	9/3/2002	5.4	
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
PL2-311A	5 - 5	12/15/1993	1500	U
PL2-311A	7.5 - 7.5	12/15/1993	130	U
PL2-311A	10 - 10	12/15/1993	16000	U
PL2-314A	7.5 - 7.5	12/7/1993	1.1	U
PL2-314A	10 - 10	12/7/1993	1.3	U
PL2-315A	2 - 2	12/8/1993	3.7	
PL2-315A	7.5 - 7.5	12/8/1993	1.3	U
PL2-316A	7.5 - 7.5	12/7/1993	1.4	U
PL2-316A	10 - 10	12/7/1993	4.5	
PL2-317A	7.5 - 7.5	11/24/1993	1.1	U
SB-04405	1 - 1	12/9/1993	1.1	U
SB-04405	7.5 - 7.5	12/9/1993	1.1	U
SB-04417	7.5 - 7.5	10/28/1994	1.3	U
SB-04417	10 - 10	10/28/1994	1.4	U
SB-04418	5 - 5	10/27/1994	9.5	U
SB-04418	7.5 - 7.5	10/27/1994	1.2	U
SB-04420	7.5 - 7.5	10/28/1994	1.4	U

2-60 Area COC Results
Tetrachloroethene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Tetrachloroethene (µg/kg) - 2004 Soil Screening Level = 8.72 µg/kg; PMCL[3] = 890 µg/kg				
SB-04420	10 - 10	10/28/1994	1.2	U
SB-04904	1 - 1	11/19/1993	1.2	U
SB-04904	5 - 5	11/19/1993	1.1	U
SB-06202	1 - 1	12/6/1993	1.1	U
SB-06202	7.5 - 7.5	12/6/1993	1.3	U
SB-06203	2 - 2	11/30/1993	1.2	U
SB-06203	7.5 - 7.5	11/30/1993	1	U
SB-06204	2 - 2	11/30/1993	1.1	U
SB-06204	7.5 - 7.5	11/30/1993	1.2	U
SB-06205	2 - 2	12/8/1993	1.1	U
SB-06205	7.5 - 7.5	12/8/1993	1.3	U
SB-06206	5 - 5	12/6/1993	1.3	U
SB-06206	10 - 10	12/6/1993	1.4	U
SB-06208	5 - 5	12/6/1993	1.1	U
SB-06208	10 - 10	12/6/1993	1.2	U
SB-06210	5 - 5	2/24/1995	4	
SB-06210	7.5 - 7.5	2/24/1995	1.6	
SB-06210	9 - 9	2/24/1995	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SB-06301	1 - 1	12/14/1993	1.1	U
SB-06301	7.5 - 7.5	12/14/1993	1.3	U
SB-06301	11 - 11	12/14/1993	1.4	U
SB-06302	3 - 3	12/14/1993	1.3	U
SB-06302	7.5 - 7.5	12/14/1993	1.4	U
SB-06302	11 - 11	12/14/1993	1.6	
SB-06304	2 - 2	12/3/1993	1.1	U
SB-06304	7.5 - 7.5	12/3/1993	1.3	U
SB-06304	10 - 10	12/3/1993	1.3	U
SB-06401	5 - 5	12/3/1993	1.4	U
SB-06401	7.5 - 7.5	12/3/1993	1.3	U
SB-06402	5 - 5	12/2/1993	4.6	
SB-06402	10 - 10	12/2/1993	1.3	U
SB-06403	5 - 5	12/3/1993	1.2	U
SB-06403	10 - 10	12/3/1993	1.2	U
SB-06405	1.5 - 1.5	8/19/1994	1.2	U
SB-06405	7 - 7	8/19/1994	1.1	U
SB-06405	9 - 9	8/19/1994	1.3	U
SB-06406	1.5 - 1.5	8/19/1994	2.3	
SB-06406	6.5 - 6.5	8/19/1994	1.2	U
SB-06406	8.5 - 8.5	8/19/1994	1.3	U
SB-06408	1.5 - 1.5	9/19/1994	1.2	U
SB-06408	7 - 7	9/19/1994	1.2	U

2-60 Area COC Results
Tetrachloroethene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Tetrachloroethene (µg/kg) - 2004 Soil Screening Level = 8.72 µg/kg; PMCL[3] = 890 µg/kg				
SB-06408	11 - 11	9/19/1994	1.4	U
SB-06501	1 - 1	12/8/1993	1	U
SB-06501	7.5 - 7.5	12/8/1993	1.1	U
SB-06502	1 - 1	12/20/1993	1.3	U
SB-06502	2 - 2	12/20/1993	1	U
SB-06502	9 - 9	12/20/1993	1.1	U
SB-06503	2 - 2	12/16/1993	1	U
SB-06503	8 - 8	12/16/1993	2.8	
SB-06503	11 - 11	12/16/1993	8.8	
SB-06504	5 - 5	12/8/1993	1.4	U
SB-06504	10 - 10	12/8/1993	1.1	U
SB-06604	0.5 - 0.5	11/19/1993	1.1	U
SB-06604	1 - 1	11/19/1993	1.3	U
SB-06605	0.5 - 0.5	11/18/1993	1.1	U
SB-06605	10 - 10	11/18/1993	1.1	U
SB-07002	1.5 - 1.5	8/18/1994	1.1	U
SB-07002	7 - 7	8/18/1994	1.1	U
SB-07002	12 - 12	8/18/1994	1.3	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	330	U
SW-39	9.1 - 10.1	9/6/2002	330	U
SW-39	9.1 - 10.1	9/6/2002	310	U
SW-40	4.5 - 5.3	9/4/2002	1.1	U
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	3.6	
SW-45	10 - 11	8/14/2002	3.5	
SW-53	3 - 4	8/14/2002	7.7	
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results
Trichloroethene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Trichloroethene (µg/kg) - 2004 Soil Screening Level = 2.0 µg/kg; PMCL[3] = 5,500 µg/kg				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	300	
DP-4908	5 - 6	8/26/2002	5.7	
DP-4908	8 - 9	8/26/2002	1.6	
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	2.3	
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	4.6	
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	6.4	
DP-6206	10.3 - 10.7	9/24/2002	4.6	
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1.6	J
DP-6606	9.5 - 10	8/30/2002	2.3	J
DP-6607	7 - 8	8/15/2002	5.5	
DP-6607	10 - 11	8/15/2002	5.1	
DP-6608	5 - 6	8/26/2002	2.7	
DP-6608	11 - 12	8/26/2002	7.2	
PL2-311A	5 - 5	12/15/1993	1500	U
PL2-311A	7.5 - 7.5	12/15/1993	130	U
PL2-311A	10 - 10	12/15/1993	16000	U
PL2-314A	7.5 - 7.5	12/7/1993	1.1	U
PL2-314A	10 - 10	12/7/1993	1.3	U
PL2-315A	2 - 2	12/8/1993	1.1	U
PL2-315A	7.5 - 7.5	12/8/1993	1.3	U
PL2-316A	7.5 - 7.5	12/7/1993	1.4	U
PL2-316A	10 - 10	12/7/1993	1.3	U
PL2-317A	7.5 - 7.5	11/24/1993	1.1	U
SB-04405	1 - 1	12/9/1993	1.1	U
SB-04405	7.5 - 7.5	12/9/1993	1.1	U
SB-04417	7.5 - 7.5	10/28/1994	1.3	U
SB-04417	10 - 10	10/28/1994	1.4	U
SB-04418	5 - 5	10/27/1994	9.5	U
SB-04418	7.5 - 7.5	10/27/1994	1.2	U
SB-04420	7.5 - 7.5	10/28/1994	1.4	U

2-60 Area COC Results
Trichloroethene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Trichloroethene (µg/kg) - 2004 Soil Screening Level = 2.0 µg/kg; PMCL[3] = 5,500 µg/kg				
SB-04420	10 - 10	10/28/1994	1.2	U
SB-04904	1 - 1	11/19/1993	1.2	U
SB-04904	5 - 5	11/19/1993	1.1	U
SB-06202	1 - 1	12/6/1993	1.1	U
SB-06202	7.5 - 7.5	12/6/1993	1.3	U
SB-06203	2 - 2	11/30/1993	1.2	U
SB-06203	7.5 - 7.5	11/30/1993	1	U
SB-06204	2 - 2	11/30/1993	1.1	U
SB-06204	7.5 - 7.5	11/30/1993	1.2	U
SB-06205	2 - 2	12/8/1993	1.1	U
SB-06205	7.5 - 7.5	12/8/1993	1.3	U
SB-06206	5 - 5	12/6/1993	1.3	U
SB-06206	10 - 10	12/6/1993	1.4	U
SB-06208	5 - 5	12/6/1993	1.1	U
SB-06208	10 - 10	12/6/1993	1.2	U
SB-06210	5 - 5	2/24/1995	14	
SB-06210	7.5 - 7.5	2/24/1995	3.4	
SB-06210	9 - 9	2/24/1995	2	
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SB-06301	1 - 1	12/14/1993	1.1	U
SB-06301	7.5 - 7.5	12/14/1993	1.3	U
SB-06301	11 - 11	12/14/1993	1.4	U
SB-06302	3 - 3	12/14/1993	9.9	
SB-06302	7.5 - 7.5	12/14/1993	1.4	U
SB-06302	11 - 11	12/14/1993	1.7	
SB-06304	2 - 2	12/3/1993	1.1	U
SB-06304	7.5 - 7.5	12/3/1993	1.5	
SB-06304	10 - 10	12/3/1993	1.3	U
SB-06401	5 - 5	12/3/1993	1.4	U
SB-06401	7.5 - 7.5	12/3/1993	1.3	U
SB-06402	5 - 5	12/2/1993	1.3	U
SB-06402	10 - 10	12/2/1993	1.3	U
SB-06403	5 - 5	12/3/1993	1.2	U
SB-06403	10 - 10	12/3/1993	1.2	U
SB-06405	1.5 - 1.5	8/19/1994	1.2	U
SB-06405	7 - 7	8/19/1994	1.1	U
SB-06405	9 - 9	8/19/1994	1.3	U
SB-06406	1.5 - 1.5	8/19/1994	1.2	U
SB-06406	6.5 - 6.5	8/19/1994	1.2	U
SB-06406	8.5 - 8.5	8/19/1994	1.3	U
SB-06408	1.5 - 1.5	9/19/1994	1.2	U
SB-06408	7 - 7	9/19/1994	1.2	U

2-60 Area COC Results
Trichloroethene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
Trichloroethene (µg/kg) - 2004 Soil Screening Level = 2.0 µg/kg; PMCL[3] = 5,500 µg/kg				
SB-06408	11 - 11	9/19/1994	1.4	U
SB-06501	1 - 1	12/8/1993	1	U
SB-06501	7.5 - 7.5	12/8/1993	1.1	U
SB-06502	1 - 1	12/20/1993	1.3	U
SB-06502	2 - 2	12/20/1993	1	U
SB-06502	9 - 9	12/20/1993	1.1	U
SB-06503	2 - 2	12/16/1993	1	U
SB-06503	8 - 8	12/16/1993	1.4	U
SB-06503	11 - 11	12/16/1993	1.3	U
SB-06504	5 - 5	12/8/1993	1.4	U
SB-06504	10 - 10	12/8/1993	1.1	U
SB-06604	0.5 - 0.5	11/19/1993	4.2	
SB-06604	1 - 1	11/19/1993	20	
SB-06605	0.5 - 0.5	11/18/1993	1.1	U
SB-06605	10 - 10	11/18/1993	1.1	U
SB-07002	1.5 - 1.5	8/18/1994	2.7	
SB-07002	7 - 7	8/18/1994	5.1	
SB-07002	12 - 12	8/18/1994	7.9	
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	330	U
SW-39	9.1 - 10.1	9/6/2002	330	U
SW-39	9.1 - 10.1	9/6/2002	310	U
SW-40	4.5 - 5.3	9/4/2002	1.1	U
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	14	
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results

1,2,4-Trimethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
1,2,4-Trimethylbenzene (µg/kg) - 2004 Screening Level = 2,360 µg/kg; PMCL[3] = Not Established				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.2	
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	29000	
SW-39	9.1 - 10.1	9/6/2002	320000	
SW-39	9.1 - 10.1	9/6/2002	110000	J
SW-40	4.5 - 5.3	9/4/2002	1.1	U

2-60 Area COC Results

1,2,4-Trimethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
1,2,4-Trimethylbenzene (µg/kg) - 2004 Screening Level = 2,360 µg/kg; PMCL[3] = Not Established				
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

2-60 Area COC Results

1,3,5-Trimethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
1,3,5-Trimethylbenzene (µg/kg) - 2004 Screening Level = 2,470 µg/kg; PMCL[3] = Not Established				
DP-4408	5 - 6	8/15/2002	1.1	U
DP-4408	10 - 11	8/15/2002	0.4	U
DP-4908	5 - 6	8/26/2002	1.2	U
DP-4908	8 - 9	8/26/2002	1.2	U
DP-4909	3 - 4	8/26/2002	1.1	U
DP-4909	10 - 11	8/26/2002	1.3	U
DP-6201	4.5 - 5	9/3/2002	1.4	U
DP-6201	9.5 - 10.5	9/3/2002	1.3	U
DP-6202	4 - 5	9/3/2002	1.4	U
DP-6202	9 - 10.5	9/3/2002	1.2	U
DP-6203	4 - 5	8/28/2002	1.3	U
DP-6203	9 - 10	8/28/2002	1.2	U
DP-6204	5 - 5.3	9/24/2002	1.1	U
DP-6204	9.6 - 9.8	9/24/2002	1.3	U
DP-6205	4.8 - 5	9/24/2002	1.1	U
DP-6205	10 - 10.4	9/24/2002	1.3	U
DP-6206	5.2 - 5.6	9/24/2002	1.4	U
DP-6206	10.3 - 10.7	9/24/2002	1.3	U
DP-6207	4.5 - 5.5	9/3/2002	1.4	U
DP-6207	9.5 - 10.5	9/3/2002	1.2	U
DP-6208	5 - 5.4	9/24/2002	1.1	U
DP-6208	10.5 - 11	9/24/2002	1.3	U
DP-6209	4 - 6	8/14/2002	1.3	U
DP-6209	9 - 11	8/14/2002	1.3	U
DP-6501	4.5 - 5.5	9/3/2002	1.2	U
DP-6501	9.4 - 10.3	9/3/2002	1.3	U
DP-6606	4.5 - 5	8/30/2002	1	UJ
DP-6606	9.5 - 10	8/30/2002	1.2	UJ
DP-6607	7 - 8	8/15/2002	1.1	U
DP-6607	10 - 11	8/15/2002	1.2	U
DP-6608	5 - 6	8/26/2002	1.1	U
DP-6608	11 - 12	8/26/2002	1.3	U
SB-06211	4 - 4	11/13/2003	1.3	U
SB-06212	3.2 - 3.2	11/13/2003	1.3	U
SB-06213	3 - 3	11/13/2003	1	U
SB-06214	4 - 4	11/13/2003	1.2	U
SB-06215	5.5 - 5.5	11/13/2003	1.3	U
SB-06216	3 - 3	12/30/2003	1.2	U
SB-06217	7 - 7	12/30/2003	1.2	U
SB-06218	4 - 4	12/30/2003	1.2	U
SW-36	6 - 7	8/13/2002	1.3	U
SW-36	8 - 9	8/13/2002	1.4	U
SW-38	3.6 - 4.2	9/6/2002	1.1	U
SW-38	6.7 - 7.6	9/6/2002	1.3	U
SW-38	9.8 - 10.6	9/6/2002	1.4	U
SW-39	3 - 3.2	9/6/2002	9600	
SW-39	9.1 - 10.1	9/6/2002	120000	
SW-39	9.1 - 10.1	9/6/2002	96000	
SW-40	4.5 - 5.3	9/4/2002	1.1	U

2-60 Area COC Results

1,3,5-Trimethylbenzene Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (µg/kg)	Data Qualifier[2]
1,3,5-Trimethylbenzene (µg/kg) - 2004 Screening Level = 2,470 µg/kg; PMCL[3] = Not Established				
SW-40	9.5 - 10.5	9/4/2002	1.2	U
SW-42	4 - 5	8/15/2002	1.3	U
SW-42	11 - 12	8/15/2002	1.4	U
SW-43	5 - 6	8/14/2002	1.4	U
SW-43	8 - 9	8/14/2002	1.3	U
SW-43	10 - 12	8/14/2002	1.3	U
SW-44	3 - 4	8/14/2002	1.4	U
SW-44	8 - 9	8/14/2002	1.4	U
SW-45	3 - 4	8/14/2002	1.2	U
SW-45	10 - 11	8/14/2002	1.4	U
SW-53	3 - 4	8/14/2002	1.2	U
SW-53	8 - 9	8/14/2002	1.3	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Gasoline-Range Hydrocarbons (mg/kg) - 2004 Soil Screening Level = 30 mg/kg; PMCL[3] = 100 mg/kg				
PL2-310A	7.5 - 7.5	11/19/1993	37	
PL2-310A	10 - 10	11/19/1993	110	
PL2-311A	5 - 5	12/15/1993	2500	
PL2-311A	5 - 5	12/15/1993	9100	
PL2-311A	7.5 - 7.5	12/15/1993	840	
PL2-311A	7.5 - 7.5	12/15/1993	4600	
PL2-311A	10 - 10	12/15/1993	3600	
PL2-311A	10 - 10	12/15/1993	15000	
PL2-312A	1 - 1	12/16/1993	20	U
PL2-312A	7.5 - 7.5	12/16/1993	20	U
PL2-316A	7.5 - 7.5	12/7/1993	20	U
PL2-316A	10 - 10	12/7/1993	20	U
PL2-317A	7.5 - 7.5	11/24/1993	20	U
SB-04409	1.5 - 1.5	9/12/1994	5	U
SB-04409	7 - 7	9/12/1994	5	U
SB-04409	10.5 - 10.5	9/12/1994	5	U
SB-04410	5 - 5	3/3/1995	5	U
SB-04410	8 - 8	3/3/1995	5	U
SB-04410	11 - 11	3/3/1995	5	U
SB-04411	5 - 5	8/15/1994	5	U
SB-04411	5 - 5	8/15/1994	20	U
SB-04411	7.5 - 7.5	8/15/1994	5	U
SB-04411	7.5 - 7.5	8/15/1994	20	U
SB-04411	10 - 10	8/15/1994	5	U
SB-04411	10 - 10	8/15/1994	20	U
SB-04412	5 - 5	8/11/1994	140	
SB-04412	7.5 - 7.5	8/11/1994	48	
SB-04417	7.5 - 7.5	10/28/1994	5	U
SB-04417	10 - 10	10/28/1994	5	U
SB-04418	5 - 5	10/27/1994	10	
SB-04418	5 - 5	10/27/1994	9	
SB-04418	7.5 - 7.5	10/27/1994	5	U
SB-04420	7.5 - 7.5	10/28/1994	5	U
SB-04420	10 - 10	10/28/1994	5	U
SB-06208	5 - 5	12/6/1993	20	U
SB-06208	10 - 10	12/6/1993	20	U
SB-06403	5 - 5	12/3/1993	20	U
SB-06403	10 - 10	12/3/1993	20	U
SB-06405	1.5 - 1.5	8/19/1994	20	U
SB-06405	7 - 7	8/19/1994	20	U
SB-06405	9 - 9	8/19/1994	20	U
SB-06406	1.5 - 1.5	8/19/1994	20	U
SB-06406	6.5 - 6.5	8/19/1994	20	U
SB-06406	8.5 - 8.5	8/19/1994	20	U
SB-06407	1.5 - 1.5	9/22/1994	20	U
SB-06407	8 - 8	9/22/1994	20	UJ
SB-06407	11 - 11	9/22/1994	20	U
SB-06408	1.5 - 1.5	9/19/1994	20	U
SB-06408	7 - 7	9/19/1994	20	U

2-60 Area COC Results

TPH Gasoline Range Concentrations in Soil

Sample Location	Sample Interval[1] (ft. bgs)	Sample Date	Concentration (mg/kg)	Data Qualifier[2]
Gasoline-Range Hydrocarbons (mg/kg) - 2004 Soil Screening Level = 30 mg/kg; PMCL[3] = 100 mg/kg				
SB-06408	11 - 11	9/19/1994	20	U
SB-06408	11 - 11	9/19/1994	20	U
SB-06504	5 - 5	12/8/1993	20	U
SB-06504	10 - 10	12/8/1993	20	U
SB-06510	1.5 - 1.5	8/19/1994	20	U
SB-06510	8.5 - 8.5	8/19/1994	20	U
SB-06902	7.5 - 7.5	11/30/1993	20	U
SB-07002	1.5 - 1.5	8/18/1994	20	U
SB-07002	7 - 7	8/18/1994	20	U
SB-07002	12 - 12	8/18/1994	20	U

Note: (1) - Data restricted from surface to 12ft bgs.
(2) - Definitions for data qualifiers are provided on Table B-3.
(3) - PMCL - Preliminary Media Cleanup Level (Weston, 1999).

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment C
Health & Safety Plan

ENVIRONMENTAL PARTNERS INC

Attachment C: Health and Safety Plan for 2-60s Area Data Gap Investigation

Boeing Plant 2
Seattle/Tukwila, Washington

Prepared For:

The Boeing Company
P.O. Box 3707
M/C 1W-12
Seattle/Tukwila, WA 98124

September 16, 2004

Prepared By:

Environmental Partners, Inc.
295 NE Gilman Blvd. Suite 201
Issaquah, WA 98027
(425) 395-0010

John S. Brasino, PE, Ph.D.
Principal

Douglas C. Kunkel L.H.G.
Senior Hydrogeologist

Project Number: 17504.0

QR____ TR____

BOEING CONTACTS

Jennifer Parsons: ..... **(206) 715-7981 (cell)**
Will Ernst: ..... **(425) 891-7724**
Mike Gleason: ..... **(206) 290-6576**

EPI CONTACTS

Josh Bernthal: ..... **(425) 241-5400 (cell) (425) 395-0024 (office)**
Doug Kunkel: ..... **(425) 241-8170 (cell) (425) 395-0016 (office)**

EMERGENCY CONTACTS AND EMERGENCY INFORMATION

****Boeing Emergency Number:..... 206-655-2222 Call First****
POLICE: **911**
FIRE: **911**
FIRST AID: **911**

In the event of an emergency, be prepared to give the following information:

- Location of Emergency

  Site Location: ..... **The Boeing Company**
  7755 East Marginal Way South
  Seattle, Washington 98108

  Landmarks: ..... **West of Boeing Field and East of the Duwamish Waterway**
  Nearest Cross Street: ..... **South of 16th Ave South**

- Phone Number That You Are Calling From: ..... **LOOK ON PHONE**

- What Happened?
  * Type of Accident
  * Type(s) of Injuries
- How Many People Need Help?

Additional Emergency Information:

- **Boeing Emergency Number:..... 206-655-2222**

- Hospital Name: ..... **Harborview Medical Center**
  Address: ..... **325 9th Avenue**
  City, State, Zip Code: ..... **Seattle, Washington 98104**
  Phone Number: ..... **(206) 731-3000**

- Note: Contact a Principal at Environmental Partners, Inc. after Emergency Services have been called.
  Environmental Partners, Inc..... **(425) 395-0010 (office)**
  John Brasino (Principal)..... **(206) 954-6935 (cell)**
  Thom Morin (Principal)..... **(206) 342-6957 (cell)**

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Destination - Interactive Map

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2. Turn Right on **CARLETON AVE S**	0.5	↱
3. Take the **I-5 NORTH** ramp	0.6	↰
4. Merge on **I-5 NORTH**	2.5	↰

5.	Take the **JAMES ST** exit	1.3	↑
6.	Turn Right on **JAMES ST**	0.1	↱
7.	Turn Right on **9TH AVE**	0.2	↱
Distance: 5.9 miles **Approximate Travel Time:** 11 mins			

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1.0 PLAN OBJECTIVES AND APPLICABILITY

This Health and Safety Plan has been written to comply with the standards prescribed by the Occupational Safety and Health Act (OSHA) and the Washington Industrial Safety and Health Act (WISHA).

The purpose of this health and safety plan is to establish protection standards and mandatory safe practices and procedures for all personnel involved with field activities at the site. This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may occur during field activities. The plan consists of site and facility descriptions, a summary of work activities, an identification and evaluation of chemical and physical hazards, monitoring procedures, personnel responsibilities, a description of site zones, decontamination and disposal practices, emergency procedures, and administrative requirements.

Mr. Josh Bernthal, of Environmental Partners, Inc. (EPI) is the designated Site Health and Safety Officer. As Site Health and Safety Officer, Mr. Bernthal has total responsibility for ensuring that the provisions outlined herein adequately protect worker health and safety and that the procedures outlined by this Health and Safety Plan are properly implemented. In this capacity, Mr. Bernthal will conduct ongoing oversight and site inspections to ensure that this Health and Safety Plan remains current with potentially changing site conditions. Mr. Bernthal has the authority to make health and safety decisions that may not be specifically outlined in this plan, should site conditions warrant such actions. In the event that Mr. Bernthal leaves the site while work is in progress, an alternate Site Health and Safety Officer will be designated.

The provisions and procedures outlined by this Health and Safety Plan apply to all contractors, subcontractors, owner's representatives, oversight personnel, and any other persons involved with the field activities described herein. All such persons are required to read this Health and Safety Plan and indicate that they understand its contents by signing the Site Health and Safety Officer's copy of the Plan. In addition, all such persons are required to provide documentation of their current certification under Occupational Safety and Health Administration's (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation, 29 CFR 1910.120. Copies of this Health and Safety Plan have been distributed to a designated representative of the following companies and /or organizations:

- The Boeing Company

It should be noted that this Health and Safety Plan is based on information that was available as of the date indicated on the Title Page. It is possible that additional hazards that are not specifically addressed by this Health and Safety Plan may exist at the work-site, or may be created as a result of on-site activities. It is EPI's firm belief that active participation in health and safety procedures and acute awareness of on-site conditions by all site workers is crucial to the health and safety of everyone involved. If you identify a site condition that is not addressed by this Health and Safety Plan, or if you have any questions or concerns about site conditions or this Plan, immediately notify the Site Health and Safety Officer.

This Health and Safety Plan was prepared for use by EPI personnel by Mr. Josh Bernthal.

Josh Bernthal Project Engineer	Douglas Kunkel LG, LHG. Senior Hydrogeologist

2.0 BACKGROUND INFORMATION

The work site is located at: The Boeing Company, Plant 2
7755 East Marginal Way South
Seattle, Washington 98108

2.1 Site History

This Health and Safety Plan relates specifically to data gap investigation work that will be performed at in the 2-60s Area of the Facility. Figure 1-3 shows the boundaries of the 2-60s Area and locations and outlines of various RCRA units present within the 2-60s Area. The area contains numerous RCRA units such as paint booth sumps, PCB retention tanks, oil/water separators and also several non-RCRA underground and above-ground storage tanks. All of the larger buildings in the 2-60s area have been demolished to their floor slabs. The only buildings remaining in the 2-60s area are Building 2-64, Building 2-48, Building 2-57, Building 2-47, and parts of Buildings 2-45 and 2-49. The 2-60s Area is almost entirely paved or covered by building slabs limiting the potential for incidental exposure to contaminated soil and groundwater.

2.2 Scope of Work

Following is a brief summary of the on-site work activities that are covered by this Health and Safety Plan:

Task 1 – Monitoring well installation and soil sampling
Task 2 – Direct-push probe groundwater and soil sampling
Task 3 – Groundwater sampling in existing and new monitoring wells

3.0 HAZARD EVALUATION AND RISK ANALYSIS

In general, there are three broad hazard categories that may be encountered during site work; Chemical Exposure Hazards, Fire/Explosion Hazards, and Physical Hazards. Subsections 3.1 through 3.3 deal with specific hazards falling within each of these broad categories.

3.1 Chemical Exposure Hazards

Table 1 presents chemical-specific data regarding permissible exposure levels (PELs), likely pathways of exposure, target organs that will likely be affected by exposure, and likely symptoms of exposure for hazardous substances that are potentially present at the site. Table 1 data were compiled from the NIOSH Pocket Guide to Chemical Hazards, June 1997 edition. It should be noted that the PELs are the regulated limits; Recommended Exposure Limits (RELs) by NIOSH are guidance but are listed as a reference.

Table 1: Chemical-Specific Exposure Data

Chemical Name	REL*	PEL*	IDLH*	Exposure Route	Target Organs	Symptoms
Acetone	250 ppm	1000 ppm	2,500 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system	Irritation of eyes, nose, throat; headache; dizziness; dermatitis
Acetic Acid	10 ppm	10 ppm	50 ppm	Inhalation; skin/eye contact	Eyes; skin; respiratory system; teeth	Irritation of eyes, nose, throat; skin burns; hyperkeratosis; chronic bronchitis
Arsenic (elemental)	0.002 mg/m^3	0.010 mg/m^3	5 mg/m^3	Inhalation; ingestion; skin/eye contact	Skin; respiratory system; kidneys; central nervous system; liver; GI tract; respiratory system	Irritation of skin; dermatitis; respiratory distress; diarrhea; kidney damage; muscle tremor; convulsions; GI tract; reproductive effects; lover damage
Benzene	0.1 ppm	10 ppm (Table Z-2 1910.1000)	500 ppm	Inhalation; ingestion; skin/eye contact	Blood, central nervous system; skin; bone marrow; eyes; respiratory system	Irritation of eyes, nose, respiratory; giddiness; headache; nausea; staggered gait; fatigue; anorexia; lassitude; dermatitis; bone marrow; depression
Cis-1,2-Dichloroethene	200 ppm	200 ppm	1000 ppm	Inhalation; ingestion; skin/eye contact	Eyes, respiratory system, central nervous system	Irritation of eyes and respiratory system, central nervous system depression.
Cyanide	5 mg/m^3	5 mg/m^3	25 mg/m^3	Inhalation, ingestion, skin absorprtion, skin/eye contact	Eyes, skin, respiratory system, central nervous system, thyroid, blood, cardiovascular system	Irritation of eyes, skin; upper respiratory system; asphyxia; weakness; headache; confusion; nausea; vomiting; increased respiration rate; slow gasping respiration; thyroid, blood changes
Ethyl benzene	100 ppm	100 ppm	800 ppm	Inhalation; ingestion; skin/eye contact	Eyes; upper respiratory system; skin; central nervous system	Irritation of eyes, mucous membrane; headache; dermatitis; narcosis; coma
Ethylene Dichloride (1, 2-dichloroethane)	1 ppm	50 ppm	50 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; kidneys, liver, central nervous system; cardiovascular	Irritation of eyes, corneal opacity; central nervous system depression;

					system	nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage
Heptane	85 ppm	500 ppm	750 ppm	Inhalation; ingestion; skin/eye contact	Skin; respiratory system; central nervous system	Lightheadedness, vertigo; loss of appetite, nausea; unconsciousness

Table 1: Chemical-Specific Exposure Data (continued)

Chemical Name	REL*	PEL*	IDLH*	Exposure Route	Target Organs	Symptoms
Hexane	50 ppm	500 ppm	1,100 ppm	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system; central nervous system; peripheral nervous system	Irritation of eyes, nose; lightheadedness; nausea
Lead (elemental)	0.100 mg/m^3	0.050 $mg/m^{3(}$	100 mg/m^3	Inhalation; ingestion, direct contact	Eyes; GI tract; central nervous system; kidneys; blood; gingival tissue	Weakness; lassitude; insomnia; facial pallor; pale eyes; anorexia; low weight; malnutrition; constipation; abdominal pain; colic; anemia; gingival lead line; tremor; paralysis of wrist, ankles; encephalopathy; kidney disease; irritated eyes; hypotension
Methylene Chloride	Lowest possible exposure	25 ppm (29 CFR 1910.1052)	2,000 ppm	Inhalation; ingestion; skin absorption, skin and/or eye contact	Eyes; skin; central nervous system; cardiovascular system	Irritation of eyes, skin; lightheadedness; somnolence
Methyl Ethyl Ketone Peroxide	0.2 ppm	---	Not determined	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system; liver; kidneys	Irritation of eyes, skin, nose, throat; cough; blisters; vomiting; blurred vision
Phosphoric Acid	1 mg/m^3	1 mg/m^3	1,000 mg/m^3	Inhalation; ingestion; skin/eye contact	Eyes; skin; respiratory system	Irritation of eyes, skin, upper respiratory system; eye and skin burns
Tetrachloroethene		100 ppm	150 ppm	Inhalation; ingestion; absorption; skin/eye contact	Eyes, skin, respiratory system, liver, kidneys, central nervous system	Irritation of eyes, nose, throat, nausea, flush face and neck, vertigo, dizziness, incoordination, somnoluence, skin erythema (redness), liver damage (carcinogen)
Toluene	100 ppm	200 ppm	500 ppm	Inhalation, absorption, ingestion, skin/eye contact	Central nervous system; liver; kidneys; skin	Fatigue; confusion, euphoria, dizziness, headache; dilated pupils; lacrimation; nervousness; insomnia; Paresthesia; dermatitis
Trichloroethene	25 ppm	100 ppm	1000 ppm	Inhalation; ingestion; absorption; skin/eye contact	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system	Irritation eyes, skin; headache, visual disturbance, lassitude, dizziness, tremor, drowsiness, nausea, vomiting; dermatitis, cardiac arrhythmias, paresthesia, liver injury
Vinyl Chloride	Lowest possible exposure	0.5 ppm (29 CFR 1910.1017)	Not determined	Inhalation; skin/eye contact	Liver, central nervous system, blood, respiratory system, lymphatic system	Lassitude; abdominal pain; GI bleeding; enlarged liver; pallor or cyanosis of extremities; liquid; frostbite
Xylene	100 ppm	100 ppm	900 ppm	Inhalation; ingestion; absorption;	Central nervous system; GI tract; blood; liver; kidneys; skin	Dizziness, excitement, drowsiness, uncoordination,

				skin/eye contact		staggered gait; irritation of eyes, nose, throat; corneal vacuolization; anorexia; nausea; vomiting, abdominal pain; dermatitis

REL – Recommended Exposure Limit (NIOSH) Pocked Guide to Chemical Hazards, June 1997

PEL – Permissible Exposure Limit (OSHA) Table Z-1 in 29 CFR 1910.1000

IDLH – Immediately Dangerous to Life or Health

3.2 Fire and Explosion Hazards

It is highly unlikely that vapors from the contaminated soils will be present at levels sufficient to create an explosion and/or fire hazard. It should be noted, however, that the 1996 Emergency Response Guidebook, published by the United States Department of Transportation, identifies the following explosion and/or fire hazards associated with gasoline vapors.

- Flammable/combustible material
- May be ignited by heat, sparks or flames
- Vapors may travel to a source of ignition and flash back
- Containers may explode in heat or fire
- Vapor explosion hazards indoors, outdoors or in sewers
- Run-off to sewers may cause a fire or explosion hazard

3.3 Physical Hazards

Following is a summary of a variety of physical hazards that may be encountered on the job-site. For convenience, these hazards have been categorized into several general groupings and suggested preventative measures are also included.

Category	Cause	Prevention
Head Hazards	Falling and/or sharp objects, bumping hazards.	Hard hats will be worn by all personnel at all times when overhead hazards are present.
Foot/Ankle Hazards	Sharp objects, dropped objects, uneven and/or slippery surfaces, chemical exposure	Chemical resistant, steel-toed boots must be worn at all times on-site.
Eye Hazards	Sharp objects, poor lighting, bright lights (welding equipment), exposure due to splashes	Safety glasses/face shields will be worn when appropriate. Shaded welding protection will be worn when appropriate.
Electrical Hazards	Underground utilities, overhead utilities	Locator service mark-outs, visual inspection of work area prior to starting work.
Mechanical Hazards	Heavy equipment such as drill rigs, service trucks, excavation equipment, saws, drills, etc.	Competent operators, backup alarms, regular maintenance, daily mechanical checks, proper guards.
Noise Hazards	Machinery creating >85 decibels TWA, >115 decibels continuous noise, or peak at >140 decibels	Wear earplugs or protective ear muffs when appropriate.
Fall Hazards	Elevated and/or slippery or uneven surfaces. Trips caused by poor "house keeping" practices	Care should be used to avoid such accidents and to maintain good “house keeping". Fall protection devices must be used when work proceeds on elevated surfaces.

Lifting Hazards	Injury due to improper lifting techniques, overreaching/overextending, heavy objects	Use proper lifting techniques, mechanical devices where appropriate.
Lighting Accidents	due to improper illumination	Work will proceed during daylight hours only, or under sufficient artificial illumination.

4.0 AIR/SITE MONITORING

The following section describes monitoring techniques and equipment that are to be used during site work. The Site Health and Safety Officer, or a designated alternate, is responsible for performing all monitoring activities. Air and site monitoring will be used to determine the level of protection that is required for work to proceed safely.

4.1 Air Monitoring

Air monitoring will be performed to ensure that personnel are not exposed to harmful vapor concentrations in excess of PELs. This monitoring will also be used to identify any increases in airborne contaminant concentrations during work activities.

4.1.1 Air Monitoring Equipment

All monitoring equipment used during this project will be inspected and calibrated at least daily to ensure that it is in proper working condition. If any piece of required monitoring equipment does not work properly, work in the monitored area will stop and will not continue until the monitoring equipment is repaired.

PID: Because exposure to airborne contaminants is expected to be limited to volatile organic compounds (VOCs), air monitoring will be performed with a Photoionization Detector (PID). The range of contaminants expected to be present require that the PID be equipped with a *10.2 eV* detector lamp. The most likely airborne constituents include TCE and vinyl chloride. Because site action level for VOCs is set and 5 ppm and the PEL for vinyl chloride is 1.0 ppm it will be important to determine if the total VOCs detected in the air contain greater than 1.0 ppm vinyl chloride. This determination will be made using colorimetric tubes specifically designed to detect and quantify vinyl chloride concentrations in the air. If total VOC concentrations are greater than 1.0 ppm over background (sustained for >15 minutes) EPI will use colorimetric tubes to evaluate the vinyl chloride concentration. If vinyl chloride is detected at concentrations greater than 1.0 ppm in the breathing zone engineering controls will be implemented and the breathing zone will be re-tested.

The PID must be "zeroed" and calibrated according to manufacturer instructions at least daily. Initial monitoring will be performed every 5 minutes, unless odors, tastes, or a PID response indicate the presence of airborne contaminants above background levels. If airborne contaminants are detected, air monitoring will be performed continuously.

4.1.2 Action Levels

Photoionization Detector (PID)

Response	Length of Time	Protective Measure
< 5 ppm	15 minute average	Level D PPE
>1 ppm over background	15 minute average	Evaluate vinyl chloride concentrations relative to total VOCs using colorimetric tubes
5-25 ppm	15 minute average	Allow work area to vent. If persistent: Level C
25-50 ppm	Sustained over 15 minutes	Level C PPE, High-efficiency organic vapor cartridges in respirator
> 50 ppm	One (1) minute average	Vacate work area, notify Site Health and Safety Officer immediately

It should be noted that these action levels are based on the presence of benzene and vinyl chloride which have the lowest PELs and STELs of the compounds listed in Table 1.

4.2 Site Monitoring

The Site Health and Safety Officer will visually inspect the work-site at least daily to identify whether any new potential hazards have arisen. If and whenever possible, immediate measures will be taken to eliminate, or reduce the risks associated with these hazards.

4.3 Personal Protective Equipment (PPE)

It is anticipated that all field tasks will be performed in Level D PPE unless additional PPE is required because of task or site-specific upgrades. Level D PPE includes the following items:

- Nitrile inner and outer gloves
- Steel toe, steel shank work boots. Neoprene steel-toe, steel shank boots for ground water sampling and for drilling below the water table
- Hearing protection during drilling activities
- Hard hat during drilling activities and excavation work
- Safety glasses
- Cotton or Tyvek coveralls recommended

Level C PPE includes all Level D items plus the following:

- Full-face respirator equipped with organic vapor/HEPA combination cartridges (full face respirator replaces safety glasses for eye protection),
- Tyvek or Saranex coveralls
- Neoprene steel-toe, steel shank boots

5.0 HAZARD ANALYSIS BY TASK

The following section identifies potential hazards associated with each task listed in section 2.2 of this Health and Safety Plan. Unless otherwise noted, work will begin and proceed in Level D personal protective equipment. The level of protection will be upgraded accordingly by the Site Health and Safety Officer whenever warranted by conditions present in the work area.

Task 1 – Monitoring Well Installation and Soil Sampling: Exposure to volatile organic compounds; head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, lifting, and overhead hazards.

Task 2 – Direct-Push Probe Groundwater and Soil Sampling: Exposure to volatile organic compounds through air effluent; head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, lifting, and overhead hazards.

Task 3 – Groundwater Sampling: Exposure to volatile organic compounds; head, foot/ankle, and eye hazards; electrical and mechanical hazards; noise, fall, and lifting hazards.

Personnel: EPI – Josh Bernthal, Doug Kunkel, John Brasino, Sharon Gelinas, Jason Cook, Tatsu Komada, Alex Jones, Jeremy Walliman, Janine, Burkhardt, Daniel Krause

Contractor Names: Cascade Drilling or other drilling company, APS or other utility locating company, and possibly concrete coring companies.

6.0 SITE CONTROL

The following section identifies several activity zones located on the work-site. It should be noted that access to some of these activity zones (i.e. the exclusion zone) will be restricted to designated personnel.

The work site is secured. Pedestrians and other unauthorized personnel will not be allowed within the exclusion zone.

6.1 Contamination Reduction Zone

A specified area will be established for the decontamination of sampling equipment. Because the location of this zone will change during the course of the investigation the site safety office will discuss the contaminant reduction zone location during each daily safety briefing.

6.1.1 Decontamination Procedures - Equipment

Split spoon samplers and other down-hole equipment will be decontaminated with Liquinox™ or equivalent soap and water and rinsed with distilled water prior to collecting soil samples for analysis. An alternative method of decontamination is to steam clean all down-hole sampling and drilling equipment. All decontamination wastes will be containerized and left in a designated on-site location.

6.1.2 Decontamination Procedures - Personnel

All personal protective clothing (i.e. nitrile gloves) and other miscellaneous waste will be bagged in opaque garbage bags and will be discarded in the trash. All on site personnel must, at a minimum, wash their face and hands before eating, before break periods, and prior to leaving the site.

7.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

The purpose of this section is to define procedures and specific responsibilities that are to be followed in the event that a chemical spill or release, a fire or explosion, or an accident involving injuries occurs. The Site Health and Safety Officer, or a designated alternate, will determine when emergency and/or regulatory agencies should be contacted and which agencies are appropriate to contact. It should be noted that if injuries have occurred, all site workers have the responsibility to secure medical help for the affected worker(s). Medical emergency help can be contacted at the appropriate phone numbers listed on the pink pages of this Plan.

In all emergency situations, the rule is SAFETY FIRST! Do not, under any circumstances, endanger yourself or others to rescue a fallen co-worker. It is far better to rescue one person after proper safety measures for the rescue have been carefully considered, than to have to rescue additional people whose haste to help out got them in trouble.

In case of injury: call 206-655-2222 first, then 911 if necessary.

8.0 ADMINISTRATIVE

8.1 Medical Surveillance

Personnel involved with field activities must be covered under their employer's medical surveillance program that includes annual physical examinations and certification to wear respiratory protective equipment. These medical monitoring programs must be in compliance with all applicable worker health and safety regulations.

8.2 Record Keeping

The Site Health and Safety Officer, or a designated alternate, will be responsible for keeping daily logs of workers and visitors present at the work site, attendance lists of personnel present at site health and safety meetings, accident reports, air monitoring results, and signatures of all personnel who have read this Health and Safety Plan.

SIGNATURE PAGE

I have read this Health and Safety Plan and understand its contents. I agree to abide by its provisions and will immediately notify the Site Health and Safety Officer (Josh Bernthal, (425) 241-5400) if site conditions or hazards not specifically designated herein are encountered.

Name (Print)	Signature	Date	Company/Affiliation

Boeing Plant 2
Seattle/Tukwila, Washington

Uplands Corrective Measures
Volume IV: 2-60s Area

Data Gap Investigation Work Plan

Attachment D
Technical Procedures

TECHNICAL PROCEDURE TP-1.0

Standard Procedures for Field Parameter Measurement

Revision 1
September 2003

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Introduction

One or more of the following field instruments might be used to monitor ground water field parameters during purging or sampling. The equipment and methodologies presented below are applicable for field measurements during standard high-flow (3 casing volumes) purging, low-flow purging, process water measurements and also for surface water measurements.

Multi-parameter meters such as the Horiba are easier to calibrate and operate compared to using several single-parameter instruments, especially when used to monitor well purging. However, it should be noted that the Horiba U-10 does not measure Oxidation-Reduction Potential (ORP), which is an important field parameter for evaluation of site geochemistry. In addition, if turbidity is an important parameter it may be prudent to use a turbidity-only instrument for this parameter as the turbidity probe in the multi-parameter Horiba is not as robust as those used in single-parameter models.

The following sections describe the procedures for calibration and field measurements using a variety of commonly-available instruments. However, it should be note that this Technical Procedure includes only a few of the many water sampling field instruments that are available. For additional details regarding calibration, operation, or troubleshooting or for instruments not included in this Technical Procedure, it is recommended that field staff consult the appropriate manufacturer's operation manual or call their technical service line. Another potential source of technical help for rental instruments is the technical assistance number of the rental company.

Horiba U-10 or U-20 Water Checker Calibration and Use

These instructions cover the calibration and operation of the Horiba™ model U-10 and U-20 multi-parameter water quality meters which are used to measure the following six field parameters:

- pH (standard units)
- Conductivity (mS/cm)
- Temperature (Celsius)
- Turbidity (NTU)
- Salinity (%)
- Dissolved oxygen (mg/L)

.A copy of the instruction manual for the Horiba meter should accompany the instrument as a reference, particularly for nonstandard calibration procedures, measurements, and troubleshooting. If a multi-parameter instrument other than the Horiba U-10 or U-20 is used, field staff should follow the manufacturer's instructions for specific calibration and use and should refer to these procedures only for general guidance. Field staff should record the meter manufacturer and all identification numbers in the Instrument Calibration Log.

Preparing the Meter and Electrodes for Calibration

The meter and the probes may not function properly if they have reached temperatures below 45 degrees Fahrenheit (°F). Keep this equipment in a warm environment prior to calibration and use.

Turn on the meter. Remove the rubber protector from the glass bulb on the pH probe.

The meter will show a **LOW BATT** message if the 9-volt battery has insufficient voltage to properly power the meter. Replace the battery whenever the **LOW BATT** message appears and perform a new calibration.

Inspect the supplied Autocal solution to be sure that the expiration date has not been passed. Document the manufacturer, lot number, expiration date, and standard readings of the Autocal solution in the Instrument Calibration Log.

Fill the supplied calibration cup with Autocal solution. Be sure to the fill the cup to the line noted on the side the container. Lower the probe over the calibration cup and allow the probes to come into equilibrium with the solution for one minute

Press the **MODE** button until the indicator on the screen is under **AUTO** then press **ENTER** and the Horiba will automatically perform a 1-point calibration to the Autocal solution. A two-point calibration may be performed if more precise data are required. Consult the manufacturer's instruction manual to perform two-point calibration. It should be noted that additional standards or buffer solutions are needed to perform two-point calibration.

Taking Field Measurements

Field measurements should be performed on the sample without delay to minimize changes in temperature and chemistry. The sample should not be aerated by the sampling process. The probes need to be thoroughly rinsed in distilled water between sampling locations.

The Cup Method

Obtain a sample volume in a cup large enough to completely submerge the Horiba probe. Field measurements should be performed on the sample without delay to minimize changes in sample temperature and chemistry. Immerse the probe completely in the sample for at least 60 seconds to allow the probe temperature to equalize with the sample temperature. Jiggle the probe to displace any air bubbles that may have attached to the probe. Then gently move the probe up and down. Press the blue **Display** button to cycle through the six field parameters measured by this instrument. Record the sample field parameters in the field logbook. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

The Flow-Through-Cell Method

Direct the continuous sample flow from the sampling pump so that it discharges at the bottom of the flow-through cell. The cell will then fill from the bottom up and overflow out the top of the cell, which prevents aeration of the sample except at the air-surface interface. The flow rates should be low enough that the sample is not aerated below the air-water interface as it passes through the cell. Place the Horiba probe into the cell so that

it is fully submerged. Jiggle the probe to displace any air bubbles that may have attached to the probe.

Allow 60 seconds for the probe temperature to equalize with the sample temperature and then record the sample field parameters. Press the blue **Display** button to cycle through the six field parameters measured by this instrument. Record the sample field parameters in the field logbook. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

pH Meter and Electrode Calibration and Use

pH Meters

These instructions cover the calibration and operation of the Orion® 250A and 290A pH meters, which may be used for taking field pH measurements of groundwater and surface water. A copy of the instruction manual for the Orion pH meters should accompany the instruments as a reference, particularly for nonstandard calibration procedures, measurements, and troubleshooting (see Information Sources, below). If a pH meter other than the Orion 250A or 290A is used, field staff should follow the manufacturer's instructions for specific calibration and use and should refer to these procedures only for general guidance. Field staff should record the meter manufacturer and all identification numbers in the Instrument Calibration Log.

pH Electrodes

Two types of pH electrodes are generally used with the Orion pH meters. Instruction manuals for these electrodes are also available and should be kept with the equipment for reference and troubleshooting.

- The Orion Model 9107BN Low Maintenance Triode is a gel-filled, non-refillable electrode with an integral temperature probe. The 9107BN Low Maintenance Triode is designed to be stored dry, with or without the protective cap in place.
- The Orion Model 9157BN Triode is a liquid-filled, refillable electrode with an integral temperature probe. Use Orion 900011 fill solution to refill the electrode. The 9157BN Triode must be stored in a pH electrode storage solution for silver/silver chloride (Ag/AgCl) electrodes or in a pH 4 buffer solution.

During calibration and field measurement, the internal solution level of either electrode must remain a minimum of 1 inch above the surface of the liquid being measured. In addition, the vent hole on the 9157BN Triode must be uncovered while measurements are taken with this electrode. Both of these electrodes provide automatic temperature compensation (ATC) for pH measurements when the temperature probe is connected properly to the pH meter. The meter will read a constant 25 degrees Celsius (°C) if the temperature probe is not connected or not functioning.

Preparing the Meter and Electrodes for Calibration

The meters and the probes may not function properly if they have reached temperatures below 45 degrees Fahrenheit (°F). Keep this equipment in a warm environment prior to calibration and use.

Connect the BNC-type pH electrode connector and the DIN-type ATC connector to the top of the pH meter. Turn on the meter. Check to make sure the meter is in the pH mode.

The meter will show a **LOW BATT** message if the 9-volt battery has insufficient voltage to properly power the meter. Replace the battery whenever the **LOW BATT** message appears and perform a new calibration.

Use the **SETUP MENU** to set the meter's internal operating parameters (refer to the Orion manual for instructions). The decimal point resolution should be set to two decimal places rather than at the default setting of three. Three is too high for field measurements, and more time is needed to obtain stable meter readings using three decimal places.

Auto calibrating with Two Buffers (Orion 250A and 290A pH Meters)

Choose two buffers, 7.00 and 4.00 or 7.00 and 10.00, that will bracket the expected sample range. Use only new, unused pH buffers for calibration. Never return used buffer to a bottle containing unused buffer solution.

Rinse the electrode in clean distilled water and gently shake excess water from the electrode. (All rinses specified in these instructions should be performed using clean distilled water.) Do not wipe the electrode because the static electrical charge generated can affect the electrode's measurements.

Insert the electrode into the 7.00 buffer until the **READY** message appears. If the **READY** message does not appear, check the meter setup menu to make sure the **READY** function has been enabled (refer to Orion manual for instructions). Record the buffer temperature in the calibration log.

Press the **2nd** and then the **CAL** buttons to place the meter in calibration mode. The **P-1** message will appear at the bottom of the screen, indicating that the meter is ready for the first buffer. The meter will automatically recognize the buffer. The **READY** message will be displayed, and the pH buffer value will flash as soon as the electrode has achieved a stable, temperature-corrected reading. Record the flashing pH value in the calibration log. Press the **YES** button to enter the first calibration point into the meter. The meter will now show the **P-2** message at the bottom of the screen, indicating that the meter is ready for the second buffer.

Rinse the electrode and place it in either the 4.00 or 10.00 buffer. Once the **READY** message appears, record the flashing pH value in the calibration log. Press the **YES** button to enter the second calibration point into the meter. The meter will automatically display the slope value. Record this value and then return the electrode to the **MEASURE** mode. The slope value should be in the 92 percent to 102 percent range for an acceptable calibration, according to the electrode manual. In general, any slope of less than 97 percent or greater than 101 percent is suspicious and indicates that the calibration process should be repeated. If recalibration fails, consider using a new set of standards and/or refilling the electrode (if it's the refillable type). The manufacturer's instructions cover procedures for additional remedies, such as cleaning the electrode bulb, checking out the meter function, and calibrating the meter manually.

Rinse the electrode. It is ready for use.

A one-point calibration check should be performed every 4 hours or anytime a sample pH value is suspected to be in error. To perform a one-point calibration check, place the rinsed

electrode in the buffer closest to the sample pH and see if the value obtained is within ± 0.5 pH units of the table value for that buffer at that temperature (see Table C-1 at end of this appendix). If it is not, perform another calibration for the instrument and record the new values. Thoroughly document all sample measurements and calibration values before and after recalibration.

Auto calibrating with Three Buffers (Orion 290A Meter Only)

The three-point calibration uses the 4.00, 7.00, and 10.00 buffers. Use only new, unused pH buffers for calibration. Never return used buffer solution to a bottle containing unused solution.

Rinse the electrode in clean distilled water and gently shake excess water from electrode. Do not wipe the electrode because the static electrical charge generated can affect the electrode's measurements.

Insert the electrode into the 4.00 buffer until **READY** message appears. If the **READY** message does not appear, check the meter setup menu to make sure the **READY** function has been enabled (refer to Orion manual for instructions). Record the buffer temperature in the calibration log.

Press the **2nd** and then the **CAL** buttons to place the meter in calibration mode. The **P-1** message will appear at the bottom of the screen, indicating that the meter is ready for the first buffer. The meter will automatically recognize the buffer. The **READY** message will be displayed, and the pH buffer value will flash once the electrode has achieved a stable, temperature-corrected reading. Record the flashing pH value in the calibration log. Press the **YES** button to enter the first calibration point into the meter. The meter will now show the **P-2** message at the bottom of the screen, indicating that the meter is ready for the second buffer.

Rinse the electrode and place it in the 7.00 buffer. Once the **READY** message appears, record the flashing pH value in the calibration log. Press the **YES** button to enter the second calibration point into the meter. The meter will now show the **P-3** message at the bottom of the screen, indicating that the meter is ready for the third buffer.

Rinse the electrode and place it in the 10.00 buffer. Once the **READY** message appears, record the flashing pH value in the calibration log. Press the **YES** button to enter the third calibration point into the meter. The meter will now show the P-4 message at the bottom of the screen, indicating that the meter is ready for the fourth buffer***.*** Press the **MEASURE button** to bypass the fourth calibration point. The meter will automatically display the slope value; record this value and then return the meter to the **MEASURE** mode. The slope value should be in the 92 percent to 102 percent range for an acceptable calibration, according to the electrode manual. In general, any slope of less than 97 percent or greater than 101 percent is suspicious and indicates that the calibration process should be repeated.

Rinse the electrode. It is ready for use.

A one-point calibration check should be performed every 4 hours or anytime a sample pH value is suspected to be in error. To perform a one-point calibration check, place the rinsed electrode in the buffer closest to the sample pH and see if the value obtained is within ± 0.5 pH units of the table value for that buffer at that temperature (see Table C-1 at end of

this appendix). If it is not, perform another calibration for the instrument and record the new values. Thoroughly document all sample measurements and calibration values before and after recalibration.

Taking pH Measurements

Measurement of pH should be performed on the sample without delay to minimize changes in temperature and chemistry. The sample should not be aerated by the sampling process. The electrode needs to be thoroughly rinsed in distilled water between samples.

The Cup Method

Obtain a sample volume in a cup large enough to submerge the electrode bulb. Gently swirl the probe in the sample until the **READY** message appears. Record this pH value and the sample temperature and units.

The Flow-Through-Cell Method

Direct the continuous sample flow from the sampling pump so that it discharges at the bottom of the flow-through cell. The cell will then fill from the bottom up and overflow out the top of the cell, which prevents aeration of the sample except at the air-surface interface. The flow rates should be low enough that the sample is not aerated below the air-water interface as it passes through the cell. Place the pH electrode into the cell 2 to 4 inches below the surface of the sample.

Record the pH value and temperature when the **READY** message appears.

Information Sources

Orion Research Incorporated. Orion Laboratory Products Group Portable pH/ISE Meters Instruction Manual (Model 230A, 250A, and 290A). 1991.

Orion Research Incorporated. Orion Research Laboratory Products Group Model 9107 Low Maintenance Triode pH Electrode Instruction Manual. 1991.

Orion Research Incorporated. Orion Research Laboratory Products Group Model 9157 Triode pH Electrode Instruction Manual.

Orion Research Incorporated Telephone: (800) 225-1480.

Conductivity Meter and Probe Calibration and Use

Conductivity Meters

These instructions cover the calibration and operation of the YSI® conductivity meters used for taking field conductivity measurements. A copy of the YSI conductivity meter instruction manual should accompany the instrument as a reference, particularly for nonstandard calibration procedures, measurements, and troubleshooting (see Information Sources, below). If a conductivity meter other than the YSI 30 or YSI 33 is used, the user should follow the manufacturer's instructions for specific calibration and use and should refer to these procedures only for general guidance. Field staff should record the meter manufacturer and all identification numbers in the Instrument Calibration Log.

Two types of conductivity meters are in general use: the YSI 30, which measures electrical conductivity and specific conductance, and the YSI 33, which measures only electrical conductivity. Specific conductance is the sample's electrical conductivity at 25°C. Electrical conductivity values are relative to the sample temperature at the time of measurement and must be converted to specific conductance by use of a mathematical conversion formula. Specific conductance allows for the comparison of conductivities at a standard temperature.

Conductivity is measured in microsiemens/centimeter (µS/cm) or millisiemens/centimeter (mS/cm) on the YSI 30 and in micromhos/centimeter (µmhos/cm) on the YSI 33. One microsiemen/centimeter is equal to one micromho/centimeter.

Calibrating the YSI 30 Conductivity Meter

Turn the meter on by pushing the **ON/OFF** button. If the **LO BAT** message is displayed, put six new AA alkaline batteries in the meter. Always replace the batteries when the **LO BAT** message appears and check the meter calibration afterward.

Clean the conductivity probe on the inside and outside using a solution of Alconox or common foam-type bathroom toilet cleaner before each calibration. A small pipette brush is necessary to clean the inside of the probe. Thoroughly rinse the probe with clean distilled water until no residual cleaner is left on the probe that will interfere with the calibration standard's value. Gently shake excess water from the probe.

Press the **MODE** button until a flashing **°C** is displayed. This symbol indicates that the meter in the specific conductance mode. Temperature compensation is automatic when the meter is in the specific conductance mode.

> ***Warning***: The only difference on the meter readout between specific conductance mode and electrical conductivity is whether or not the **°C** is flashing. The operator needs to check the mode frequently when taking meter readings to ensure the meter is in the desired mode.

Immerse the probe completely in fresh conductivity standard for at least 60 seconds to allow the probe temperature to equalize with the standard's temperature. Generally, a conductivity standard of either 1,000 or 1,413 µS/cm is used. Gently move the probe up and down in the standard without touching the sides of the container or raising the probe above the surface.

Compare the readout on the meter to the conductivity standard's value. If the readings do not agree, simultaneously press the up arrow button and the down arrow button. The **CAL** message should appear in the lower left corner. Press the up arrow and down arrow buttons as appropriate to change the meter readout so that it agrees with the conductivity standard's value. Press **ENTER** to lock the new calibration in the meter's memory. The **CAL** message should disappear. Record the conductivity value of the standard in the calibration log.

If the YSI 30 meter is to be used to measure electrical conductivity, the meter should be switched to the electrical conductivity mode using the **MODE** button after calibration has been completed. Record the conductivity value and temperature of the standard used to calibrate the instrument in the calibration log.

Thoroughly rinse the probe with distilled water, making sure all the calibration standard is washed off. The conductivity meter and probe are ready for use.

Taking Conductivity Measurements Using the YSI 30 Meter

Select the desired mode of measurement by pressing the **MODE** button. The meter is in the specific conductance mode when the **°C** is flashing. The meter is in the electrical conductivity mode when the **°C** is NOT flashing.

> ***Warning***: When you record the readings in the log, make sure to indicate clearly whether specific conductance or electrical conductance was measured. The sample temperature is considered a part of the sample measurement and must also be recorded, with the proper units of measurement indicated.

The YSI 30 has four conductivity ranges: 0 to 499.9 µS/cm; 0 to 4,999 µS/cm; 0 to 49.99 mS/cm; 0 to 200.0 mS/cm. The meter has an auto-range function that automatically places the meter readout in the correct range for the sample being measured.

> ***Warning***: The meter must be checked each time a reading is taken to determine which range the meter is displaying—µS/cm or mS/cm (1 mS/cm equals 1,000 µ S/cm).

The Cup Method

Obtain a sample volume in a cup large enough to completely submerge the conductivity probe. Conductivity measurements should be performed on the sample without delay to minimize changes in temperature and chemistry. Immerse the probe completely in the sample for at least 60 seconds to allow the probe temperature to equalize with the sample temperature. Jiggle the probe to displace any air bubbles that may have attached to the probe. Then gently move the probe up and down, and record the sample conductivity reading and temperature. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

The Flow-Through-Cell Method

Direct the continuous sample flow from the sampling pump so that it discharges at the bottom of the flow-through cell. The cell will then fill from the bottom up and overflow out the top of the cell, which prevents aeration of the sample except at the air-surface interface. The flow rates should be low enough that the sample is not aerated below the air-water interface as it passes through the cell. Place the conductivity probe into the cell

so that it is fully submerged and not in contact with any surfaces. Jiggle the probe to displace any air bubbles that may have attached to the probe.

Allow 60 seconds for the probe temperature to equalize with the sample temperature and then record the conductivity value and temperature. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

In-Situ Method

Lower the conductivity probe into the water to the depth at which measurement is to be taken. Jiggle the probe to displace any air bubbles that may have attached to the probe. Gently move the probe up and down, allow 60 seconds for the probe temperature to equalize with the sample temperature, and then record the sample conductivity reading and temperature. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

Calibrating the YSI 33 Conductivity Meter

The YSI 33 conductivity meter calibration is factory set and cannot be adjusted in the field. Meter function is checked by measuring the conductivity of a known conductivity standard to ensure that the meter is reading correctly.

With the **MODE** knob in the **OFF** position and the meter in the normal 45 degree operating position, check whether the indicator needle is reading zero. If it is not, adjust the meter by turning the slot screw on the face of the meter (below the needle) with a small screwdriver.

Turn the **MODE** knob to the **RED LINE** position and, using the **RED LINE** knob, adjust the indicator needle so that it lines up with the red line on the meter readout (it is located at the 370 µmhos mark). If the meter will not line up with the red line**,** then replace the two D-cell alkaline batteries and try again.

> ***Note:*** The YSI 33 has three conductivity scales available: **X1**, **X10**, and **X100**. The **X1** scale ranges from 0 to 500 µmhos/cm; the conductivity is read directly from the meter scale. The **X10** scale ranges from 0 to 5,000 µmhos/cm; conductivity is obtained by reading the meter scale and then multiplying that reading by 10. The **X100** scale reads from 0 to 50,000 µmhos/cm and is obtained multiplying the meter scale reading by 100. To select the desired scale, turn the **MODE** knob to **X1**, **X10**, or **X100**.

Turn the **MODE** knob to the **X10** conductivity scale. (This is the recommended mode for 1,000 or 1,413 µmhos/cm standard.)

Rinse the conductivity probe in distilled water. Immerse the probe completely in fresh conductivity standard for at least 60 seconds to allow the probe temperature to equalize with the standard's temperature. Generally, a conductivity standard of either 1,000 or 1,413 µS/cm is used. Gently move the probe up and down within the standard without touching the sides of the container or raising the probe above the surface. Record the electrical conductivity reading in the calibration log.

Turn the **MODE** knob to the **TEMPERATURE** position and read the conductivity standard's temperature. The temperature scale reads backwards in increasing values from right to left. Record the conductivity standard's temperature in the calibration log.

Look up the temperature (see Table C-1 at end of this appendix) value for the conductivity standard at the temperature at which it was measured and compare that value to the measured value. The measured value should be within ± 10 percent of the table value. If the meter and table values vary by more than 10 percent, clean the conductivity probe on the inside and outside by soaking it for 5 minutes in a solution of Alconox or common foam-type bathroom cleaner. Do not use anything to clean inside the small holes at the end of the probe. Thoroughly rinse the probe with distilled water until no residual cleaner is left on the probe that will interfere with the calibration standard's value. Repeat all steps of the calibration check.

> ***Note***: The separate temperature knob at the top right of the meter is for salinity measurements only and is disabled when the meter is in the conductivity mode.

Thoroughly rinse the calibration standard from the probe with distilled water. The conductivity meter and probe are ready for use.

Taking Conductivity Measurements Using the YSI 33 Meter

Select the desired mode of measurement by turning the **MODE** knob to the **X1**, **X10**, or **X100** conductivity scale. After recording the electrical conductance reading for the sample measured, *always* immediately turn the **MODE** knob to the **TEMPERATURE** position and record the temperature of the sample.

> ***Warning***: When you record the readings in the log, make sure to indicate clearly that electrical conductance was measured. The sample temperature is considered a part of the sample measurement and must also be recorded, with the proper units of measurement indicated.

The Cup Method

Obtain a sample volume in a cup large enough to completely submerge the conductivity probe. Conductivity measurements should be performed on the sample without delay to minimize changes in sample temperature and chemistry. Immerse the probe completely in the sample for at least 60 seconds to allow the probe temperature to equalize with the sample temperature. Jiggle the probe to displace any air bubbles that may have attached to the probe. Then gently move the probe up and down, and record the sample conductivity reading and temperature. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

The Flow-Through-Cell Method

Direct the continuous sample flow from the sampling pump so that it discharges at the bottom of the flow-through cell. The cell will then fill from the bottom up and overflow out the top of the cell, which prevents aeration of the sample except at the air-surface interface. The flow rates should be low enough that the sample is not aerated below the air-water interface as it passes through the cell. Place the conductivity probe into the cell so that it is fully submerged and not in contact with any surfaces. Jiggle the probe to displace any air bubbles that may have attached to the probe.

Allow 60 seconds for the probe temperature to equalize with the sample temperature and then record the conductivity value and temperature. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

In-Situ Method

Lower the conductivity probe into the water to the depth where measurement is to be taken. Jiggle the probe to displace any air bubbles that may have attached to the probe. Gently move the probe up and down, allow 60 seconds for the probe temperature to equalize with the sample temperature, and then record the sample conductivity reading and temperature. Rinse the probe in distilled water. After use, the probe can be stored either wet or dry.

Information Sources

YSI Incorporated. Operations Manual: YSI Model 30 Handheld Salinity, Conductivity and Temperature System.

YSI Incorporated. Instructions for YSI Model 33 and 33M S-C-T Meters.

YSI Incorporated Telephone: (800) 765-4974. Internet address: http://www.ysi.com.

Dissolved Oxygen Meter and Probe Calibration and Use

These instructions cover the calibration and use of the YSI 54A meter, which is used for field measurements of dissolved oxygen (DO). A copy of the YSI DO meter instruction manual should accompany the instrument as a reference, particularly for nonstandard calibration procedures, measurements, and troubleshooting (see Information Sources, below). If a DO meter other than the YSI 54A is used, then the user should follow the manufacturer's instructions for specific calibration and use and should refer to these procedures only for general guidance. Field staff should record all manufacturer names and identification numbers in the Instrument Calibration Log.

The YSI 54A measures DO in the **0-10** and **0-20** milligrams per liter (mg/L) ranges. Resolution is 0.05 mg/L on the **0-10** scale and 0.1 mg/L on the **0-20** scale. DO measurements are affected by temperature, altitude, and salinity. Temperature changes are automatically compensated for by the YSI 54A. All waters to be measured are fresh water.

Preparing the YSI 54A DO Meter for Calibration

Connect the DO probe to the meter. Inspect the DO probe membrane for bubbles underneath the membrane or for wrinkles in the membrane. Use a blunt tool such as the eraser end of a pencil to apply pressure to the diaphragm located in the side of the DO probe while checking the membrane for pinhole leaks. If any problem is observed, replace the membrane and probe solution using parts from the YSI Model 5775 Oxygen Probe Service Kit and following instructions in the YSI instruction manual (pages 8 and 9).

The following functions (mechanical zero, red line, and instrument zero) are independent of the DO probe status and can be performed with the probe in or out of the water.

- **Mechanical Zero—**With the function knob in the **OFF** position and the meter in its operating position, check whether the indicator needle is reading zero. If it is not, adjust the meter by turning the slot screw on the face of the meter (below the needle) with a small screwdriver.
- **Red Line—**Turn the function knob to the **RED LINE** position and, using the **RED LINE** knob, adjust the indicator needle so that it lines up with the red line on the meter readout (it is located at the 31°C mark). If the meter will not line up, replace the four C-cell alkaline batteries and try again. A defective probe will also prevent the meter from red-lining properly.
- **Instrument Zero—**Turn the function knob to the **ZERO** position and, using the **ZERO** knob, adjust the indicator needle so that it reads zero. The zero function is an internal electronic function that is independent of the DO probe.

Calibrating the YSI 54A DO Meter

The YSI 54A DO meter calibration method specified in these instructions is the air calibration method. Other calibration methods are outlined in the YSI instruction manual, but the air calibration method is the easiest for field use.

Wet the sponge in the calibration bottle thoroughly with distilled water and shake any excess from the bottle. Insert the probe until it seals around the entire circumference of the probe. An alternative method is to saturate a paper towel with distilled water, wrap the membrane end of the DO probe completely in the wet paper towel (making sure the towel does not touch the probe membrane) and place the probe paper towel in a plastic bag to reduce evaporation. Either method places the probe in an atmosphere of air saturated with water and the DO value in this atmosphere is a known value at any given temperature.

Allow 15 minutes for the probe to stabilize before beginning calibration.

After the warm-up period, turn the function knob to the **TEMP** function and note the probe temperature. Record the temperature in the calibration log. If the temperature is 16°C or higher, turn the function knob to the **0-10** mg/L scale. If the temperature is less than 16°C, turn the function knob to the **0-20** mg/L scale.

Using Table 1, Solubility of Oxygen in Fresh Water, on page 14 of the YSI instruction manual (also printed on the back of the instrument case), find the mg/L of DO value for the probe temperature noted above. Use the **CAL** knob to adjust the indicator needle so that it reads the same as the table value. Rotate the probe 180 degrees vertically, and the meter reading should vary by no more than 0.05 mg/L.

If any problem is observed during calibration, replace the membrane and probe solution using parts from the YSI Model 5775 Oxygen Probe Service Kit and following instructions in the YSI instruction manual (pages 8 and 9). The meter will then need to be recalibrated.

Record the meter manufacturer name, identification number, calibration method (air saturation), calibration reading in mg/L, temperature in °C, and elevation above sea level (less than 100 feet for most Seattle-area sites).

Taking DO Measurements Using the YSI 54A Meter

The probe must be allowed a 15-minute warm-up period anytime it has been turned off, or false readings may be indicated. The probe is usually left in the on position (**0-10** or **0-20** position) after it has been calibrated. Battery drawdown is minimal.

DO measurements with the YSI 54A meter require a constant flow across the membrane. This flow can be maintained manually or by using a stirrer or flow-through cell. Typically, a stirrer is not used for field measurements.

The Flow-Through-Cell Method

Direct the continuous sample flow from the sampling pump so that it discharges at the bottom of the flow-through cell. The cell will then fill from the bottom up and overflow out the top of the cell, which prevents aeration of the sample except at the air-surface interface. The flow rates should be low enough that the sample is not aerated below the air-water interface as it passes through the cell. Place the DO probe into the cell so that it rests at the bottom of the cell.

Set the meter to the **0-10** or **0-20** mg/L scale as appropriate. Allow the probe temperature to equalize with the sample temperature and the DO measurement to stabilize. Record the DO value and temperature. Rinse the probe in distilled water and store it in the calibration bottle.

In-Situ Method

Lower the DO probe into the water to the depth where measurement is to be taken. Wait for the probe temperature to stabilize, then gently move the probe up and down at a rate of 1 foot per second until a stable DO reading is obtained. Record the DO value and temperature. Rinse the probe in distilled water and store it in the calibration bottle.

Information Sources

YSI Incorporated. Instruction Manual: YSI Models 54ARC and 54 ABP Dissolved Oxygen Meters.

YSI Incorporated Telephone: (800) 765-4974. Internet address: http://www.ysi.com

Field Turbidity Meter Calibration and Use

These instructions cover the calibration and operation of the HF Scientific® Model DRT-15CE portable turbidimeter, which is used to take field turbidity measurements of groundwater and surface water. A copy of the HF Scientific operating and maintenance manual should accompany the meter as a reference, particularly for nonstandard procedures, measurements, and troubleshooting (see Information Sources, below). If a turbidimeter other than the DRT-15CE is used, the user should follow the manufacturer's instructions for specific calibration and use and refer to these procedures only for general guidance. Field staff should record the meter manufacturer and all identification numbers in the Instrument Calibration Log.

The DRT-15CE has three ranges to measure sample turbidity: 0-10, 0-100, 0-1,000. The meter reads in nephelometric turbidity units (NTUs). The meter is powered by a rechargeable NiCad battery and may be turned off between sample measurements to conserve the battery power. The meter can be run off of the battery charger when plugged into a 110-volt power source.

Standardizing the DRT-15CE (Calibration)

The meter comes with a 0.02 NTU reference standard. The reference standard cuvette is indexed (marked) so that it can be oriented in the same direction each time it is placed into the optical well.

Clean and dry the outside of the reference standard cuvette with a lint-free wipe. The DRT-15CE measures turbidity by measuring the light refracted from the sample placed in the optical well. Any obstruction that will refract light from the cuvette—such as lint, smudges, or staining—will alter the turbidity reading.

Temperature variations and humidity can cause condensation on the reference standard cuvette and various lenses inside the meter. Try to keep the meter and reference standard cuvette at a constant temperature when performing standardization adjustments.

The meter can be sensitive to ambient light infiltrating the optical well. Keep the meter out of direct sunlight or bright light when standardizing or taking sample measurements.

Place the 0.02 NTU reference standard cuvette in the optical well of the turbidimeter. Align the cuvette to the indexing mark. Turn the **RANGE** knob to the **10** scale. Adjust the digital readout on the meter to **0.02** NTUs using the up or down arrows on the **REFERENCE ADJUST** buttons. Record the reference standard cuvette value in the calibration log.

Remove the reference standard cuvette and store it in the instrument case. Turn the **RANGE** knob to the **OFF** position to conserve battery power. The meter is ready for use.

Taking Turbidity Measurements

To check the cleanliness of the sample cuvette before use, fill the sample cuvette with distilled water and screw on the cap. Clean and dry the outside of the sample cuvette with a lint-free wipe. Insert the sample cuvette into the optical well so that it is aligned with the indexing mark. Turn the **RANGE** knob to the **10** scale. The turbidity reading should be approximately 0.3 NTUs if store-bought water is used.

Turbidity samples should be measured as soon as possible to avoid changes in sample chemistry. Samples with suspended solids that settle out rapidly must be measured while the solids are still in suspension.

Ambient high humidity combined with cold sample temperatures can cause condensation on the outside of the sample cuvette, which will yield false high turbidities. Drying the sample cuvette thoroughly and taking the measurement quickly before condensation occurs usually overcomes this problem. Chilling the sample cuvette in ice will also work to prevent condensation.

Fill the sample cuvette with the sample water and screw on the cap. Clean and dry the outside of the sample cuvette with a lint-free wipe. Insert the sample cuvette into the optical well so that it is aligned with the indexing mark.

Turn the **RANGE** knob to the **10** scale. If the turbidity value is greater than 10 NTUs, a small triangle will appear in the top left of the meter's digital readout screen.

Turn the **RANGE** knob to the **100** scale. The small triangle should disappear from the top left of the meter's digital readout screen and the meter reading value should be less than 100 NTUs.

If this does not occur, turn the **RANGE** knob to the **1,000** scale. The small triangle should disappear from the top left of the meter's digital readout screen and the meter reading value should be less than 1,000. If the small triangle does not disappear from the top left of the meter's digital readout screen and/or the meter reading value is greater than 1,000, the sample turbidity is beyond the range of this meter.

Once you have selected the correct range, read and record the turbidity value from the digital readout.

Information Resource

HF Scientific, Inc. DRT-15CE Portable Trubidimeter Operating and Maintenance Manual. March 1995.

HF Scientific, Inc., Telephone: (813) 337-2116.

Oxidation-Reduction Potential Electrode and Meter Calibration and Use

These instructions cover the oxidation-reduction potential (ORP) electrode and meter. Together, these instruments measure the redox (reduction/oxidation potential) of groundwater and surface water. The ORP electrode generally used is the Orion 9678BN Platinum Redox Electrode. This electrode is generally used with the Orion 250A or 290A pH meter. The 9678BN ORP electrode combines a platinum redox and Ag/AgCl reference electrode in a single unit and requires a liquid fill solution to operate. ORP field measurements are specific to the electrode and the fill solution used.

Copies of the Orion instruction manuals for the 9678BN electrode and the 250A or 290A pH meters should be kept with the equipment as a reference, particularly for nonstandard procedures, measurements, and troubleshooting (see Information Sources, below). If an electrode other than the 9678BN or a pH meter other than the 250A or 290A is used, the user should follow the manufacturer's instructions for specific calibration and use and refer to these procedures only for general guidance. Field staff should record both the meter and electrode manufacturer and all identification numbers in the Instrument Calibration Log.

Summary of Field Procedures

The steps required to calibrate and take readings with the ORP electrode are summarized briefly below. A detailed description of each step follows the summary.

1. Record ORP electrode type and identification number
2. Record type of fill solution used
   - 900001 (for weak ionic strength groundwater conditions)
   - 900011(for strong ionic strength groundwater conditions)
3. Prepare meter and electrode for calibration
4. Perform two-point calibration (operational check)
   - Zobell solution
   - Orion fill solution
5. Record measurement
   - Flow-through cell
   - In-situ measurement
   - Conversion of OPR readings to Eh values

ORP Electrode—General Operating Information

Fill Solution

The ORP electrode requires a liquid fill solution to operate. The field measurements are specific to the electrode and the fill solution used. Two different fill solutions are available from Orion for use with the electrode. One solution is used with the electrode when measuring the ORP of dilute solutions (low ionic strength) and the other solution is used for measurements in high ionic strength solutions, such as brine water or salt water.

- **Orion 900001** is used for measurement of dilute solutions, with a total ionic strength less than 0.2 molarity (M) (equivalent to moles/L). This fill solution matches the potential of the commonly used calomel electrode.
- **Orion 900011** is used for measurement of concentrated solutions, with total ionic strength greater than 0.2 M. This fill solution is 4 M potassium chloride (KCl) saturated with Ag/AgCl.

Converting ORP Field Measurements to Eh Values

ORP field measurements using the 9678BN electrode are specific to that electrode and the fill solution used. Field ORP measurements must be mathematically converted to yield values relative to the normal hydrogen electrode (Eh). The Orion 9678BN instruction manual (pages 4 and 5) outlines the steps necessary to convert the 9678BN ORP readings to Eh values.

Important Points for Electrode Use

- The vent hole on the 9678BN electrode must be uncovered while measurements are taken.
- During calibration and field measurement, the electrode internal fill solution level must remain a minimum of 1 inch above the surface of the liquid being measured.

Meters Used with the OPR Electrode

The Orion 250A and 290A pH meters are typically used for field ORP measurements of groundwater and surface water. General calibration and use procedures are provided below; refer to the Orion instruction manual if you encounter problems.

Preparing the Meter and Electrodes for Calibration

The meters and the electrodes may not function properly if they have reached temperatures below 45°F. Keep this equipment in a warm environment prior to calibration and use.

Push the **POWER** button to turn on the meter. The meter will show a **LOW BATT** message if the 9-volt battery has insufficient voltage to properly power the meter. Replace the battery whenever the **LOW BATT** message appears and perform a new calibration.

Connect the BNC-type electrode connector to the top of the pH meter. Push the **MODE** button until the arrow points to the **mV** (millivolt) mode. Do not use the **Rel mV** mode. The meter read out will now be in millivolts.

ORP measurement calculations require that sample temperature at the time of measurement be recorded. The temperature may be obtained from a hand thermometer or from another meter that measures temperature. The same Orion 250A or 290A meter used for ORP mV measurements can also be used for the temperature measurements by connecting the temperature electrode DIN connector to the top of the Orion meter. The Orion 250A and 290A meters do not have automatic temperature compensation (ATC) when in the mV mode even though the temperature readout shows **ATC °C** on the screen in that mode.

Use the **SETUP MENU** to set the meter's internal operating parameters (refer to Orion manual for instructions). The decimal point resolution should be set to two decimal places

rather than to the default setting of three. Three is too high for field measurements, and more time is needed to obtain stable meter readings using three decimal places.

Two-Point Electrode Operation Check (Calibration)

Zobell Solution Check

Use fresh YSI 3682 Zobell solution to check that the 9678BN ORP electrode is operating correctly. Use only new, unused standards for calibration. Never return used standards to a bottle containing unused standards. The YSI 3682 Zobell solution is good for 24 months on the shelf before hydration and for 6 months after hydration. Pour approximately 1 inch of Zobell solution into a 40 milliliter (mL) vial.

Rinse the electrode in clean distilled water and gently shake excess water from electrode. Do not wipe the electrode because the static electrical charge generated can affect the electrode's measurements. Insert the electrode into the Zobell solution and wait until the **READY** message appears. Record the ORP mV reading in the calibration log. If the **READY** message does not appear, check the meter setup menu to make sure the **READY** function has been enabled (refer to Orion manual for instructions).

Rinse the temperature electrode in clean distilled water and gently shake excess water from electrode. Insert the electrode into the Zobell solution and wait until the temperature reading is stable. Record the Zobell solution temperature (in °C) in the calibration log.

Look up the table value for the Zobell solution at the recorded temperature (see Table C-1 at the end of this appendix). The table value and actual value of the Zobell solution should be within ± 10 mV of each other. Record the measured value and temperature of the Zobell solution as well as the table value of the Zobell solution in the calibration log.

If calibration fails, consider using a new standard and/or refilling the electrode. The manufacturer's instruction manuals cover procedures for additional remedies, such as cleaning the electrode and checking out the meter function.

Orion 900001 Fill Solution Check

Use fresh Orion 900001 fill solution as a second check that the 9678BN ORP electrode is operating correctly. Use only new, unused standards for calibration. Never return used standards to a bottle containing unused solution. Pour approximately 1 inch of 900001 solution into a 40 mL vial.

Rinse the electrode in clean distilled water and gently shake excess water from electrode. Do not wipe the electrode because the static electrical charge generated can affect the electrode's measurements. Insert the electrode into the 900001 solution and wait until the **READY** message appears. Record the ORP mV reading in the calibration log.

Rinse the temperature electrode in clean distilled water and gently shake excess water from electrode. Insert the electrode into the 900001 solution and wait until the temperature reading is stable. Record the 900001 solution temperature (in °C) in the calibration log.

Look up the table value for the 900001 solution at the recorded temperature (see Table C-1 at the end of this appendix). The table value and actual value of the 900001 solution should be within ± 10 mV of each other. Record the measured value and temperature of the 900001 solution as well as the table value of the 900001 solution in the calibration log.

If calibration fails, consider using a new standard and/or refilling the electrode. The manufacturer's instruction manual covers procedures for additional remedies, such as cleaning the electrode and checking out the meter function.

Rinse the electrode in distilled water. It is ready for use.

Calibration Verification

A one-point calibration check should be performed every 4 hours and anytime a sample ORP value is suspected to be in error. To perform a one-point calibration check, place the rinsed electrode in either the Zobell or 900001 solution and see if the value obtained is within ± 10 mV of the table value for that buffer at that temperature. Thoroughly document all values before and after calibration.

Taking ORP Measurements

For ORP field measurements, *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, 1992) lists a one standard deviation value of ±22 mV for an individual electrode measuring groundwater. *Standard Methods* also indicates that there can be a ± 15 mV variation between ORP electrodes. The accuracy of ORP readings is subject to these variabilities.

ORP measurements can vary greatly because of changes in chemistry within the groundwater sample that result from exposing the water to atmospheric conditions. Therefore, the accuracy of the recorded measurement is highly dependent upon sampling methodology. To minimize chemical changes within the groundwater sample, use a flow-through cell or take the measurement in situ.

Flow-Through-Cell Method

Direct the continuous sample flow from the sampling pump so that it discharges at the bottom of the flow-through cell. The cell will then fill from the bottom up and overflow out the top of the cell, which prevents aeration of the sample except at the air-surface interface. The flow rates should be low enough that the sample is not aerated below the air-water interface as it passes through the cell. Place the ORP electrode into the cell so that it rests near the bottom of the cell.

Allow the electrode temperature to equalize with the sample temperature. The **READY** message will appear when the ORP mV reading has stabilized. Record the ORP mV value and temperature. Rinse and store the electrode in distilled water when reading(s) are complete.

In-Situ Method

Lower the ORP electrode into the water to a depth at which the sample level is 1 inch below the liquid level in the electrode. Allow the electrode temperature to equalize with the sample temperature. The **READY** message will appear when the ORP mV reading has stabilized. Record the ORP mV value and temperature. Rinse and store the electrode in distilled water when reading is complete.

Converting ORP Field Measurements to Eh Values

As noted above, ORP field measurements using the 9678BN electrode are specific to that electrode and the fill solution used. Field ORP measurements must be mathematically

converted to yield values relative to the normal hydrogen electrode (Eh). The Orion 9678BN instruction manual (pages 4 and 5) outlines the steps necessary to convert the 9678BN ORP readings to Eh values.

OPR Electrode Storage

Store the 9678BN electrode in distilled water when not in use.

Information Sources

Orion Research Incorporated. Instruction Manual: Platinum Redox Electrodes (Models 96-78-00 and 97-78-00). 1991. (This manual covers the 9678BN electrode.)

Orion Research Incorporated. Orion Laboratory Products Group Portable pH/ISE Meters Instruction Manual (Models 230A, 250A, and 290A). 1991.

Orion Research Incorporated Telephone: (800) 225-1480.

Golder Associates

Technical Procedure

Number: TP-1.4-6b, Revision -4-
Title: AUTOMATED GROUNDWATER LEVEL MEASUREMENT

Prepared by	Approved by	Approved by	Effective Date	Rev. Level
1/14/97	1/20/97	1-20-97	1-20-97	-4-

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Record of Revisions

TP-1.4-6b
Revision -4-

Section	Description of Change
All	Rewritten. TP-1.4.6 has been split into two procedures, TP-1.4-6a for manual methods and TP-1.4-6b for automated methods.

1. PURPOSE

1.1 This technical procedure is to be used to establish a uniform procedure for making automated or programmed measurements of groundwater levels in borings, drill holes, monitoring wells, and piezometers using a pressure transducer and datalogger system.

1.2 An alternative technical procedure (TP-1.4-6a – "Manual Groundwater Level Measurement") must be used for making manual measurements of groundwater levels with an electric water-level sounder, which is required in conjunction with this procedure.

2. APPLICABILITY

2.1 This technical procedure is applicable to all personnel using pressure transducers and datalogger systems to collect water-level data automatically.

3. DEFINITIONS

3.1 **Electric Water Level Sounder.** An instrument for manually measuring water levels in wells or boreholes. Electric water-level sounders are available in a variety of different types, but each works in essentially the same way: an open circuit involving an ammeter, bulb, and/or audible beeper and battery mounted within a reel of insulated two-wire electric cable. At the end of the two-wire cable is a weighted metal probe containing a partly shielded electrode. The cable is graduated or marked to indicate the length of cable above the tip of the electrode in the probe. The circuit is closed when the exposed electrode in the probe is immersed in water. Current flow is registered on the meter, illumination of the bulb, or sounding of the beeper on the reel. Some sounders also have a sensitivity adjustment.

3.2 **Well or Borehole.** For the purpose of this procedure, any hole in the ground (cased or open) that may contain groundwater, e.g., a boring, borehole, drill hole, test pit, water well, monitoring well, observation well, pumping well, or standpipe piezometer.

3.3 **Measuring Point (MP).** A reference or datum established to provide a consistent point from which the water level is measured, -- usually a mark on the casing at the top of a well or borehole. The elevation of the measuring point should be established by surveying (differential leveling) from a bench mark of known elevation above the local or national vertical datum. The elevation of the measuring point should be established to an accuracy of 0.01 ft.

3.4 **Diptube.** A small-diameter (1- to 2-inch) tube (usually PVC) with slots over the lower 1 or 2 ft that is placed in a pumping well to provide a stilling effect that counteracts turbulence.

3.5 **Pressure Transducer.** A piece of electronic equipment used for measuring pressure within a predefined range of pressure (e.g. 0 - 5 psi). The pressure transducer includes the steel housing and associated electronics, as well as the special cable used to suspend the pressure transducer in a well or borehole. Pressure transducers may be vented or unvented. Vented transducers include a small tube in the transducer cable that is vented to the atmosphere.

3.6 **Datalogger.** A purpose-built battery-powered electronic unit designed to collect data from a pressure transducer automatically by execution of internal computer code that triggers the transducer electronically and records the reading in memory. The datalogger must be periodically uploaded and reset, for example, via a personal computer, to obtain the data in electronic form.

4. REFERENCES

4.1 Instrumentation Northwest Inc., 1993. Submersible Pressure Transducer Installation, Maintenance and Operations Manual. 16 pp.

4.2 Instrumentation Northwest Inc., 1990. AquiStar DL-1/DL-1A [Datalogger] Operator's Manual. 76 pp.

4.3 Internet Primer on Pressure Transducers, published by Transtronics, Lawrence, KS: http://www.xtronics.com/xprimer.htm

4.4 Golder Technical Procedure TP-1.4-6a, "Manual Groundwater Level Measurement"

4.5 Golder Quality Procedure QP-16.1, "Quality Assurance Records Management"

5. DISCUSSION

5.1 **Types of Equipment.** This Technical Procedure has been prepared to reflect operational requirements of the PS9000-series pressure transducers obtained from Instrumentation Northwest Inc. of Redmond, WA, and the accompanying AquiStar dataloggers. Most pressure transducer and datalogger systems operate in similar or comparable manner, such that this procedure will be applicable to other equipment from other sources.

5.2 **Accuracy and Repeatability.** The prime objectives in the automatic measurement of groundwater levels are to obtain the depth to groundwater in a well or borehole below a point of known elevation, in a manner that is both accurate and repeatable, over a period of time, and at a set frequency of readings.

5.3 **Potential for data loss or corruption.** Be aware of the potential sources of error that can result in incorrect or lost data from pressure transducer and automatic datalogger:

- Entry of moisture into the body of the transducer, or into the datalogger, can cause short-circuiting and corrosion which may result in the corruption or loss of data.
- Slippage or other interference with the securing of the transducer cable can cause a sudden change in recorded water levels.
- Changes in air pressure can cause small fluctuations in the water level, and may be magnified if the vent tube of a vented pressure transducer is blocked.
- If the water level drops, it may fall below the pressure transducer, with the consequent loss of data.
- If the transducer becomes submerged beyond its maximum pressure rating, it will only record the full-scale reading; the water-level data collected will be incorrect.
- Incorrect setting of the control variables and instrument parameters in the datalogger can result in inaccurate or lost data.
- Transducer calibration may "drift" over time. This can usually be detected and corrected for in the data analysis (see 8.16).
- The datalogger battery may become exhausted during the period of data acquisition, especially if it is not properly charged. No data is collected following battery failure.
- Pressure transducer calibration is temperature-dependent. However, most groundwater applications typically exhibit very stable temperatures; adjustments for thermal effects may be required if groundwater temperatures vary (e.g., in geothermal applications).
- Failure to implement good housekeeping of electronic data (e.g., keeping back-up copies, and ensuring data is transferred before resetting the datalogger memory) can result in irrecoverable loss of data.
- Datalogger clocks do not usually take account of changes due to Daylight Savings or leap years; the timing of data collected in the spring or fall can therefore be in error by one hour.

5.4 **Care of the Equipment.** Pressure transducers and dataloggers are expensive and sensitive pieces of equipment that should be treated with care:

- Dropping or other mishandling causes mechanical shock that breaks transducers and reduces performance. Always handle transducers as if they were eggs. When lowering a pressure transducer into the water, do not throw it in; lower it gently all the way to the specified depth.

- Avoid situations where the pressure transducer may become caught or stuck down-hole, for example, near casing centralizers or pump riser columns.
- Care should be taken to ensure no damage occurs to the transducer cable, especially over the lip of steel casings. Cable damage represents one of the most frequent causes of transducer failure.
- Avoid abrasion of the transducer cable against the sharp lip of the casing, especially steel: this causes excessive wear and eventual failure of the electric wires inside the cable.
- Avoid over-stressing the pressure transducer by subjecting to pressures in excess of its maximum design range (e.g., by over-submergence).
- Ensure that the transducer cable is securely attached to a fixed object (i.e., casing) so that slippage of the transducer does not occur during data acquisition.
- For vented transducers with desiccant chambers, check the color of the desiccant frequently (i.e., monthly) and replace when exhausted.
- Rewind transducer cable onto a reel when removing a transducer from a well.
- Dataloggers should always be stored in a dry weather-resistant area, such as a box, inside a well casing or monument, or wrapped in a plastic bag.

6. RESPONSIBILITY

6.1 **Field Engineer/Geologist/Hydrogeologist/Technician:** Responsible for the installation, setup, periodic inspection, field maintenance, and data uploading in compliance with this technical procedure.

6.2 **Task Leader: Responsible for:** Direct supervision of personnel installing or using pressure transducers and dataloggers for making water-level measurements.

- Designation of measuring points on wells or boreholes.
- Determination of the appropriate transducer pressure range and cable length required for specific installations.
- Guidance on the purpose, number, timing, and/or frequency of automatic water-level measurements required.
- Assurance that equipment and materials are available to permit accomplishment of the task.

6.3 **Equipment Manager: Responsible for:**

- Periodic checks on the correct function of pressure transducers, dataloggers, connector cables and all associated fittings and couplings.

- Record-keeping, including calibration and maintenance record, for each pressure transducer and datalogger, by Golder equipment identification number.
- Checking returned dataloggers for data that has not been downloaded.

7. EQUIPMENT AND MATERIAL

7.1 Electric water-level sounder.

7.2 Portable computer with appropriate connector cable(s), compatible software (for use with the datalogger), and all related User Manuals, including phone number for user support services, if available.

7.3 Field notebook or Notepad program on portable computer.

7.4 Any tools required for securing access to wells or boreholes, such as well keys, wrenches, etc.

7.5 Data on well locations, identification number, depth, measuring point description, elevation, and known or anticipated depth to water.

7.6 Pressure transducer of adequate pressure rating, and with sufficient cable to reach the water level in the well and accommodate expected water-level changes.

7.7 Spare batteries for electric water-level sounder and datalogger.

7.8 Spare battery or alternate power source for portable computer.

7.9 Duct tape or similar for securing pressure transducer cable.

7.10 Indelible ink pens.

8. PROCEDURE

8.1 Each pressure transducer used for automated recording of water levels shall have been calibrated, and shall be marked with the operational pressure range and the length of attached cable prior to field use. Calibration data will be provided in the form of a calibration sheet.

8.2 Record project number, project name, location, and state in field notebook or electronically in a Notepad or similar computer program.

8.3 At each well, record date, time, well identification number, measuring point description (e.g., top of PVC casing), pressure transducer type/range and serial number, transducer cable length, datalogger type and serial number, and Golder equipment identification numbers.

8.4 Clean all downhole instruments and equipment before installing the pressure transducer in the well or borehole. Cleaning shall be with a non-phosphate detergent rinse followed by a rinse with approved tap water, then rinse with organic free distilled/deionized water.

8.5 Use the electric water-level sounder to measure and record the depth of groundwater in the well or borehole, per TP-1.6-4a, "Manual Groundwater Level Measurement."

8.6 Remove the electric water-level sounder form the well, and carefully lower in the pressure transducer until it is submerged below the water level.

8.7 Secure the pressure transducer cable firmly at the head of the well or borehole. This can be achieved using duct tape to bind the cable to the well casing or other firm object. Alternatively, the cable may be suspended from the datalogger using the appropriate equipment.

8.8 Connect the datalogger to the pressure transducer and (if the datalogger does not have a direct readout) connect the portable computer to the datalogger. Check and (if necessary) reset the datalogger clock (date and time) and set the calibration parameters to match the required settings appropriate for the pressure range of the transducer.

8.9 Make the necessary settings in accordance with the user manuals such that a reading of transducer submergence (in feet) is obtained via the datalogger. Adjust the depth setting of the transducer until the water level is approximately in the middle of the pressure range (unless otherwise instructed). Check that the transducer is functioning correctly by raising it up a known distance and monitoring the reduced amount of transducer submergence via the computer.

8.10 Reposition the transducer to the required depth setting and make a note of this depth below the measuring point. Make the necessary adjustments to the datalogger control settings (e.g., multiplier and offset) such that readings are recorded in the required manner (for example, as depth of submergence, or as depth of water below the measuring point). If the datalogger is set to record depth to water below the measuring point, check the transducer reading against the depth measured by electric water-level sounder, and record both readings.

8.11 Set the automatic data acquisition parameters for the datalogger. This will normally include reading interval and start time. Note these settings, together with the indicated date on which the datalogger memory will be full.

8.12 Initiate the automated data acquisition sequence, for example, by placing the datalogger in acquisition mode. This causes the datalogger to power down, and awake only to take the prescribed automated readings. Be aware that some dataloggers "time-out" automatically after a short period, and go directly into a "sleep" mode that preserves battery power, but does not perform data acquisition.

8.13 If the Datalogger is set for automated data acquisition, note down the indicated time and date at which the first reading will occur, and check that this conforms with the programmed settings. If necessary, awaken and re-program the datalogger with the correct settings, then re-initiate data acquisition. If the datalogger indicates that everything is set correctly, disconnect the computer and secure the datalogger from weather, vandalism, and other possible interference.

8.14 The datalogger and pressure transducer should operate automatically, collecting data at the prescribed frequency, until the memory is full or the battery power is exhausted. Schedule a return trip for uploading data before either of these events to ensure continuity of data acquisition. Note that if the datalogger is woken up during the data acquisition sequence, it will NOT resume the data acquisition sequence automatically. The acquisition mode must be reset as detailed in 8.12 above, otherwise no further data will be collected.

8.15 To upload data, connect the computer to the datalogger and interrogate the datalogger via the appropriate software. It should be possible to scan or review the collected data, monitor the current pressure transducer signal, and initiate data uploading from the datalogger to the computer. Data is typically stored as an electronic file on the computer hard-drive, or on a floppy disk in hexadecimal format. It is advisable to check the integrity of the data on this file by converting it into ASCII format that can be read visually on the computer. After making a back-up of the data and ensuring that both electronic copies are complete and correct, the datalogger memory may be reset. Be aware that resetting the datalogger memory typically erases all previously collected data.

8.16 At this time, the water level should be checked manually, as described in TP-1.6-4a, "Manual Groundwater Level Measurement." However, if the pressure transducer and datalogger are to remain installed for further data acquisition, this may not be feasible or desirable if there is insufficient access room for the electric water-level sounder as well as the transducer (e.g., in a small-diameter well or piezometer standpipe), or if there is any possibility that the sounder could become entangled with the pressure transducer cable. If the datalogger system is to be removed from the well or borehole, the manual water-level measurement should be made soon after removal is complete.

8.17 Transducer data should be processed, analyzed, and stored using a database or spreadsheet program, taking care not to alter any of the readings. Data may also be plotted or charted as water-level hydrographs. Manual data should be stored and shown together with the automated data to provide a check on the validity of the

automated data. Adjustment of the data may be necessary if there is significant transducer drift, thermal changes, or other spurious effects.

8.18 Electronic copies of the raw and processed data should be maintained in the project records in accordance with QP-16.1, "Quality Assurance Records Management."

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