## APPENDIX A Tables from Kennedy/Jenks 2015 Remedial Investigation

Area of Concern <sup>(a)</sup>	Description	Investigation History	Remediation History	Current Conditions	Potential Ongoing Source?	Associated COCs	Potentially Affected Media
Drainage Ditch	The drainage ditch located south of the property boundary. The ditch wraps around the eastern side of the adjacent Seattle Limousine (Chiyoda) property, and receives overland flow from the Chiyoda property as well as the Precision Engineering facility property, 14th Street South, and the US-99 northbound entrance ramp. There is no apparent connectivity to a storm sewer or other drainage features to convey water in the ditch. One catch basin located near the southern property line at Former Precision Engineering discharges directly to the drainage ditch.	In April 1986, four ditch soil samples were collected. Chromium was detected at a high concentration; however, Maul Foster & Alongi (MFA) questioned the units they were presented in. In 1989, a subsequent investigation was conducted and 15 shallow soil/sediment samples were analyzed for metals, again identifying chromium concentrations of concern. MFA collected additional samples in the drainage ditch in 2006. Hexavalent chromium was identified near the stormwater outfall, and lead and arsenic were detected above Model Toxics Control Act (MTCA) cleanup levels at several other locations within the ditch.	In October 2007, approximately 100 cubic yards (CY) of soil were excavated from the ditch and disposed offsite. Following confirmation sampling, additional excavation was conducted at two ditch locations in March 2008. Excavated areas were backfilled and reseeded. Not all impacted soil was removed.	One confirmation soil sample had concentrations of lead and arsenic above the cleanup level.	The ditch received impacted surface runoff and possible process wastes. It could be either and ongoing source or a sink.	Chromium, arsenic, lead.	Surface soil, surface water.
Former Plating Tank 1	Installed in an in-ground containment vault in 1968. Removed and reconstructed in early 1990s during remedial action, removed from the Site in 2005.	Sweet Edwards/EMCON in 1988 and 1989. Yellow-stained soil was observed in an opening in the concrete floor. Thirteen hand-augered borings and borings B-1 through B-5 were completed adjacent to former Plating Tanks 1 and 2. Additional investigation was conducted in 2005 & 2006 by MFA to characterize soils near Plating Tanks 1 and 2.	Tanks removed following 1989 investigation. Contaminated soil excavated in 1990. Approximately 114 CY of soil and concrete removed - soils excavated up to 13 feet below ground surface (bgs) (1993). Groundwater was encountered in base of excavation.	Hexavalent chromium detected in four of five confirmation samples up to 73 milligrams per kilogram (mg/kg).	Possible source area.	Trichloroethene (TCE), chromium and hexavalent chromium in soil.	Soil and groundwater.
Former Plating Tank 2	Installed in an in-ground containment vault in 1968. Removed and reconstructed in early 1990s during remedial action, removed from the Site in 2005.	Sweet Edwards/EMCON in 1988 and 1989. Yellow-stained soil was observed in an opening in the concrete floor. Thirteen hand-augered borings and borings B-1 through B-5 were completed adjacent to former Plating Tanks 1 and 2. Additional investigation was conducted in 2005 and 2006 by MFA to characterize soils near Plating Tanks 1 and 2.	Tanks removed following 1989 investigation. Contaminated soil excavated in 1990. Approximately 114 CY of soil and concrete removed - soils excavated up to 13 feet bgs (1993). Groundwater was encountered in base of excavation.	Hexavalent chromium detected in four of five confirmation samples up to 73 mg/kg.	Possible source area.	TCE, chromium and hexavalent chromium in soil.	Soil and groundwater.
Former Plating Tank 3	Aboveground tank with a concrete curb surround. Concrete-lined floor trenches located to the east and west. Located in the plating shop. Removed in the early 1990s during remedial action and replaced by Tanks 3 and 4.	In 1992, Plating Tanks 3, 4, 5 and 6 were removed, as was a 35-foot by 40-foot section of concrete below the tanks. Visibly contaminated soils were removed with the excavation extending up to 28 inches bgs. Chromium [Toxicity Characteristic Leaching Procedure (TCLP)] was detected in soils and concrete, and soil and concrete with low detections was used as excavation backfill. Additional geoprobe drilling was conducted in 2005 by MFA for soil and groundwater analysis. TCE and hexavalent chromium concentrations exceeded MTCA Method A cleanup levels.	Tanks removed in 1992, some soil excavated, concrete below the tanks was also removed. Excavation backfilled with excavated material.	2005 soil sampling suggests hexavalent chromium present in soils.	Yes.	TCE, chromium and hexavalent chromium in soil.	Soil and groundwater.
Former Plating Tank 4	Aboveground tank with a concrete curb surround. Concrete-lined floor trenches located to the east and west. Located in the plating shop. Removed in the early 1990s during remedial action and replaced by Tanks 3 & 4.	In 1992, Plating Tanks 3, 4, 5, and 6 were removed, as was a 35-foot by 40-foot section of concrete below the tanks. Visibly contaminated soils were removed with the excavation extending up to 28 inches bgs. Chromium (TCLP) was detected in soils and concrete, and soil and concrete with low detections was used as excavation backfill. Additional geoprobe drilling was conducted in 2005 by MFA for soil and groundwater analysis. TCE and hexavalent chromium concentrations exceeded MTCA Method A cleanup levels.	Tanks removed in 1992, some soil excavated, concrete below the tanks was also removed. Excavation backfilled with excavated material.	2005 soil sampling suggests hexavalent chromium present in soils.	Yes.	TCE, chromium, and hexavalent chromium in soil.	t Soil and groundwater.
Former Plating Tank 5	Aboveground tank with a concrete curb surround. Concrete-lined floor trenches located to the east and west. Located in the plating shop. Removed in the early 1990s during remedial action and replaced by Tanks 3 and 4.	In 1992, Plating Tanks 3, 4, 5, and 6 were removed, as was a 35-foot by 40-foot section of concrete below the tanks. Visibly contaminated soils were removed with the excavation extending up to 28 inches bgs. Chromium (TCLP) was detected in soils and concrete, and soil and concrete with low detections was used as excavation backfill. Additional geoprobe drilling was conducted in 2005 by MFA for soil and groundwater analysis. TCE and hexavalent chromium concentrations exceeded MTCA Method A cleanup levels.	Tanks removed in 1992, some soil excavated, concrete below the tanks was also removed. Excavation backfilled with excavated material	2005 soil sampling suggests hexavalent chromium present in soils.	Yes.	TCE, chromium, and hexavalent chromium in soil.	t Soil and groundwater.

Area of Concern <sup>(a)</sup>	Description	Investigation History	Remediation History	Current Conditions	Potential Ongoing Source?	Associated COCs	Potentially Affected Media
Former Plating Tank 6	Aboveground tank with a concrete curb surround. Concrete-lined floor trenches located to the east and west. Located in the plating shop. Removed in the early 1990s during remedial action and replaced by Tanks 3 and 4.	In 1992, Plating Tanks 3, 4, 5, and 6 were removed, as was a 35-foot by 40-foot section of concrete below the tanks. Visibly contaminated soils were removed with the excavation extending up to 28 inches bgs. Chromium (TCLP) was detected in soils and concrete, and soil and concrete with low detections was used as excavation backfill. Additional geoprobe drilling in 2005 by MFA for soil and groundwater analysis. TCE and hexavalent chromium concentrations exceeded MTCA Method A cleanup levels.	Tanks removed in 1992, some soil excavated, concrete below the tanks was also removed. Excavation backfilled with excavated material	2005 soil sampling suggests hexavalent chromium present in soils.	Yes.	TCE, chromium, and hexavalent chromium in soil.	Soil and groundwater.
Tank 7 vault	A large single containment vault 24 feet long, 8 feet wide, and 16 feet deep held three tanks. These tanks included Tank 7, a sodium hydroxide strip tank and a sodium bicarbonate strip tank. Tank 7 was 9 feet long, 7.5 feet wide, and 16 feet deep. All tanks in the large vault were removed in 2005.	One 20-foot soil boring was drilled northeast of Tank 7 in 1989. Groundwater was encountered at 9 feet bgs. Soil was sampled for pH and metals. Chromium was not detected in leachate above the Extraction Procedure Toxicity Test (EP Tox) Method reporting limit of 0.005 milligrams per liter (mg/L). Three additional soil borings, GP-7, GP-9, and GP-10 were drilled north of the Tank 7 vault during MFA's 2005 investigation. Soil samples were not collected from depths below that of the adjacent vault.	In 1989 groundwater was sampled from within the vault, concrete repaired, a liner installed at the base, and a new concrete slab was poured at the base of the vault. Current status/condition of the Tank 7 sump/vault not specified.	Unknown; vault no longer in use.	Possible source area. Apparently groundwater has previously infiltratated the vault surrounding Tank 7. Current conditions not specified.	Hexavalent chromium, 1,1- dichloroethene (1,1-DCE), methylene chloride (MC), and total petroleum hydrocarbons (TPHs) below MTCA Method A cleanup levels for soil. Hexavalent chromium in groundwater at GP-7 above MTCA Method B cleanup level.	Groundwater, possibly soil.
Trenches and drains	Prior to 1986, floor drains and trenches discharged to METRO's sanitary sewer system. Chrome-plating rinse water was permitted to discharge from a small rinse tank to the sanitary system. After July 1986, trenches and drains were re-routed to drain to containment vaults.	Several soil borings were advanced in 2005 and 2006 near trench and drain features. TCE, chromium, and hexavalent chromium were observed in one or more locations at concentrations exceeding MTCA Method A cleanup levels.	Upon facility closure, trenches were apparently filled with concrete. Other specifics of closure are not specified.	2005 soil samples suggest hexavalent chromium and TCE present in soils. Trenches and drains no longer in use.	Former drain lines may be a preferential pathway for vapor migration.	TCE, chromium and hexavalent chromium in soil.	Soil and groundwater.
Hydraulic cylinder test vault	Reportedly, a hydraulic cylinder test vault was located outside the building, approximately 10 feet from the western wall of the building. This vault measured 4 feet in diameter and was reportedly 25 feet deep.	Two soil samples were collected in 2005 at location GP-5, near the hydraulic cylinder test vault. Hexavalent chromium was detected in groundwater in excess of the MTCA Method B cleanup level.	None. Current status/condition of test vault not specified.	Unknown; vault no longer in use.	Unknown.	Hexavalent chromium in groundwater above MTCA Method B cleanup level.	Groundwater.
Temporary plating tanks	Temporary aboveground plating tanks were used in the area north of Tank 7.	Several soil borings were advanced in 2005 near the temporary plating area. Soil samples were analyzed for chromium and hexavalent chromium; however, concentrations were below the MTCA Method A cleanup level. The reconnaissance groundwater sample collected from location GP-7 contained hexavalent chromium at a concentration of 101 micrograms per liter (µg/L), which is above the MTCA Method B (non-carcinogen) cleanup level.	None.	No longer in use.	Unknown.	Hexavalent chromium.	Possibly soil and/or groundwater.
Scrubber room	A cooling-water tank, chromic-acid evaporator, chromic-acid purification unit, and large aboveground chromic-acid holding tank were located in the scrubber room. The evaporator was located in an in-ground containment vault and used to concentrate chromic- acid wastes.	Two soil borings were advanced in 2005 south of the scrubber room. Soil samples from both locations were analyzed for chromium and hexavalent chromium; however, reported concentrations were below MTCA Method A cleanup levels.	None.	No longer in use.	Unknown.	Hexavalent chromium.	Possibly soil and/or groundwater.
Parts washing	Parts washing and degreasing was conducted throughout the building. Solvents used included methyl ethyl ketone (MEK), stoddard solvent, and TCE. Prior to 1986, a closed-loop vapor degreaser system in the cylinder shop used TCE. A TCE tank was located in the chrome plating area.	Exact locations not specified. Parts washing areas may have been investigated in conjunction with sampling at other areas of concern.	None.	No longer in use.	Unknown.	TCE and degradation products.	Surface soil, surface water runoff.
Steam Cleaning Area	An outdoor steam-cleaning area was located southeast of the building prior to 1986. Liquids were discharged to an oil/water separator. In 1986, the oil/water separator was dismantled and steam cleaning operations were moved inside. A sodium hydroxide stripping tank was also located in this area.	Surface water and surface soil samples were collected in the southern ditch, which would have received surface water runoff. Lead was detected in shallow soil at location HA-17 at a concentration of 278 mg/kg, above the MTCA Method A cleanup level.	None.	Unknown; not believed to be in use.	Not expected to be an ongoing source.	Oil & grease, copper, nickel, zinc, chromium, caustics.	Surface soil, surface water runoff.
Solid Waste Dumpster	A solid waste dumpster was located near the southeastern corner of the Former Precision Engineering facility. Surface runoff from the dumpster area drains into the drainage ditch.	Surface water and surface soil samples were collected in the southern ditch, which would have received surface water runoff. Oil, arsenic, and lead were detected in shallow soil at one or more locations at concentrations exceeding MTCA Method A cleanup levels.	None.	Waste storage area still present at this location.	Unknown.	Oil & grease. Copper, nickel, zinc, and benzo(a)pyrene.	Surface soil, surface water runoff.

Notes:

(a) Refer to Figures 2 and 3 for locations of Areas of Concern.

#### Table 2: Summary of Previous Site Investigations

				Laboratory		
Date of Work	Associated Reference	Locations	Sampled	Conducted	Data Location	Summary of Activities
May 1988	Sweet-Edwards/EMCON, Inc. 1988. Status Report Soils/Ground Water Investigation, Seattle Facility. Dated 15 December 1988.	HA-1 through HA-6	Soil	Extraction Procedure Toxicity Test (EP Tox) Chromium	Appendix A Table A1	Hand-augered locations adjacent to Plating Tank 1.
June 1988	Sweet-Edwards/EMCON, Inc. 1988. Status Report Soils/Ground Water Investigation, Seattle Facility. Dated 15 December 1988.	MW1 through MW4	Groundwater	Total Chromium	Appendix A Table A2	Four groundwater monitoring wells constructed No soil samples were submitted for chemical analysis.
August 1988	Sweet-Edwards/EMCON, Inc. 1988. Status Report Soils/Ground Water Investigation, Seattle Facility. Dated 15 December 1988.	P-1	None	NA	NA	Piezometer installed in August 1988 for evaluation of groundwater elevations. A boring log for P-2, installed in April 1989, was appended to this report.
March 1989	Sweet-Edwards/EMCON, Inc. 1989a. Tank #7 Precision Engineering, Inc Seattle, Washington. June 1989.	B-1	Soil	EP Tox metals, pH	Appendix A Table A1	Characterization of deep soils near Chromic Acid Tank 7 pit. Temporary well installed (no aqueous samples); however, was abandoned in April 1989.
March 1989	Sweet-Edwards/EMCON, Inc. 1989b. Precision Engineering, Drainage Ditch Soil EP Tox Results. Dated 28 April 1989.	S1 through S6	Surface soil	EP Tox metals	Appendix A Table A1, A3	Surface soil samples from the drainage ditch south of the Former Precision Engineering property.
March 1989	Sweet-Edwards/EMCON, Inc. 1989c. Precision Engineering. Letter regarding results from soil and groundwater investigation. Dated 24 August 1989.	S1 through S6, PEI-B1 through PEI-B4	Surface and drainage ditch soil	EP Tox metals	Appendix A Table A1	Results only; interpretation in the February 1990 Sediment Sampling report.
September 1989	Sweet-Edwards/EMCON, Inc. 1989d. Surface Soil Sampling, Precision Engineering Seattle Facility. Dated 30 August 1989.	HA-7 through HA-13	Soil	EP Tox Chromium	Appendix A Table A1	Second phase of hand auger investigation locations near Plating Tanks 1 and 2.
November 1989	Sweet-Edwards/EMCON, Inc. 1990. Soil Sample Results; Tank No. 1 and Drainage Ditch, Precision Engineering, Inc., Seattle Facility. Dated 4 January 1990.	B-1 through B-5	Soil	EP Tox Chromium	Appendix A Table A1	Additional soil samples near Plating Tank 1.
November 1989	Sweet-Edwards/EMCON, Inc. 1990. Soil Sample Results; Tank No. 1 and Drainage Ditch, Precision Engineering, Inc., Seattle Facility. Dated 4 January 1990.	S-7 through S-13	Surface soil	EP Tox Chromium	Appendix A Table A3	Soil samples in the drainage ditch near the S-6 sampling location.
March 1989 and November 1989	Sweet-Edwards/EMCON, Inc. 1990. Sediment Sampling, Precision Engineering, Inc., Seattle, Washington. Dated 26 February 1990.	S1 through S13 and B1 through B4	Surface soil	EP Tox Chromium	Appendix A Table A1	Summarizes Phase I (locations S1 through S6),"background" samples B1 through B4, Phase II (S7 through S13)

#### Table 2: Summary of Previous Site Investigations

				Laboratory		
Date of Work	Associated Reference	Locations	Media Sampled	Analysis Conducted	Data Location	Summary of Activities
March and April 1993	Precision Engineering, Inc. 1993. Independent Remedial Action Report. 21 July 1993.	WP-1 through WP-14, NW-1, EW-1, WW-1, BW-1, PE-430B, PE-430E, PE-430S, PE-430W, PE-430N, BW-2	Soil and concrete	TCLP chromium and total chromium	Appendix A Tables A4, A5	Summarizes removal of Plating Tanks 3 through 6, and repairs to Tank 7. Also summarizes characterization activities conducted previously in 1988 through 1990, and remediation during excavation of Tanks 1 and 2.
June 2005	Maul Foster Alongi. 2005. Preliminary Soil and Groundwater Site Assessment Report. 5 August 2005	GP1 through GP11	Soil and groundwater	Metals, VOCs, petroleum hydrocarbons, hexavalent chromium, PCBs and PAHs	Appendix A Table A6	Summarizes soil and groundwater sampling conducted following closure of Precision Engineering operations.
December 2005	Maul Foster Alongi. 2006. Supplemental Remedial Investigation. 22 February 2006.	GP12 through GP31, MW5 through MW8, HA1 through HA5	Soil, surface soil, and groundwater	Metals, VOCs, petroleum hydrocarbons, hexavalent chromium, PCBs and PAHs	Appendix A Tables A2, A6, A7	Summarizes second phase of soil sampling by Geoprobe, groundwater reconnaissance sampling, and construction of three additional monitoring wells. Includes investigation in the drainage ditch.
April 2006 through January 2007	Maul Foster Alongi. 2008. Final Remedial Investigation and Risk Assessment Report. 21 July 2008.	HA6 through HA12, A1 through A7, and IA1 through IA9	Surface soil, groundwater, indoor air and sub-slab soil vapor	VOCs, hexavalent chromium, PAHs	Appendix A Tables A7, A8	Compilation of prior sampling activities, with additional indoor air and sub-slab vapor sampling, and further characterization in the drainage ditch.
October 2007 through July 2010	Maul Foster Alongi. 2011. Final Feasibility Study. 3 March 2011	B1 through B13, P1 through P9, SS1 through SS6, C1 through C3	Surface and near-surface soil, groundwater	Metals, VOCs, petroleum hydrocarbons, hexavalent chromium, and PAHs	Appendix A Tables A7, A8	Additional groundwater samples from existing monitoring well network. An interim action was conducted in the drainage ditch.

Notes:

NA = not applicable

VOCs = volatile organic compounds

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

## APPENDIX B MFA 2008 RI and Remedial Action

# FINAL REMEDIAL INVESTIGATION AND RISK ASSESSMENT REPORT

FORMER PRECISION ENGINEERING, INC. SITE 1231 South Director Street Seattle, Washington V... ID Number NW 1511 STOEL RIVES, LLP



Project No. 8006.08.04



July 21, 2008





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## FINAL REMEDIAL INVESTIGATION AND RISK ASSESSMENT REPORT

## FORMER PRECISION ENGINEERING, INC. SITE 1231 SOUTH DIRECTOR STREET SEATTLE, WASHINGTON VCP ID NUMBER NW 1511

Prepared for Stoel Rives, LLP July 21, 2008

Prepared by

Maul Foster & Alongi, Inc. 7223 NE Hazel Dell Avenue, Suite B Vancouver, Washington 98665

Project No. 8006.08.04



Final Remedial Investigation and Risk Assessment Report Former Precision Engineering, Inc. Site 1231 South Director Street, Seattle, Washington VCP ID Number NW 1511

The material and data in this report were prepared under the supervision and direction of the undersigned.

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## ACRONYMS AND ABBREVIATIONS

ATL	Air Toxics Ltd.
bgs	below ground surface
cPAH	carcinogenic polycyclic aromatic hydrocarbons
CSM	conceptual site model
CUL	cleanup level
DCA	dichloroethane
DCE	dichloroethene
DEO	Oregon Department of Environmental Quality
DRO	diesel-range organics
Ecology	Washington State Department of Ecology
GRO	gasoline-range organics
IHS	indicator hazardous substance
KCBOH	King County Board of Health
Metro	Municipality of Metropolitan Seattle
MFA	Maul Foster & Alongi, Inc.
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
ml/min	milliliters per minute
MTCA	Model Toxics Control Act
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
ORO	oil-range organics
PAH	polycyclic aromatic hydrocarbon
POTW	publicly owned treatment works
ppmy	parts per million by volume
Precision	Precision Engineering, Inc.
RA	risk assessment
RBC	risk-based concentration
RI	remedial investigation
TCE	trichloroethene
TPH	total petroleum hydrocarbons
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VCP	Voluntary Cleanup Program
VOC	volatile organic compound
WAC	Washington Administrative Code

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## ACRONYMS AND ABBREVIATIONS (Continued)

WBZ

water-bearing zone

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#### 1 SUMMARY

#### 1.1 Introduction

Maul Foster & Alongi, Inc. (MFA) has prepared this final remedial investigation (RI) and risk assessment (RA) report for the former Precision Engineering, Inc. (Precision) site at 1231 South Director Street in Seattle, Washington (see Figures 1 and 2). Precision formerly manufactured and repaired large hydraulic cylinders. Repair work included chrome-plating operations.

The RI and RA are being conducted under the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP). The site's VCP identification number is NW 1511. Precision entered the VCP in October 2005, after completing a preliminary soil and groundwater assessment in June 2005. A Supplemental Remedial Investigation (MFA, 2006a) was submitted to Ecology, summarizing investigations completed by MIFA between June and December 2005. Based on that report, Ecology issued an opinion letter on March 27, 2006, that concluded that the work completed was not sufficient to meet specific substantive requirements contained in the Washington State Model Toxics Control Act (MTCA) and its implementing regulations, Chapter 70.105D Revised Code of Washington and Chapter 173-340 Washington Administrative Code (WAC), for characterizing the site (Ecology, 2006c). Precision submitted an RI/RA report on July 17, 2006. Ecology has issued a number of comments on the RI/RA report by electronic mail. This final RI/RA report is meant to supersede all previous submittals and to incorporate Ecology's comments.

## 1.2 Findings

#### 1.2.1 Soil on Former Precision Property

#### **Indicator Hazardous Substances**

As discussed in Section 4.1, indicator hazardous substances (IHSs) identified in soil on the former Precision property are:

Hexavalent and trivalent chromium

- Petroleum hydrocarbons (diesel-range organics [DRO] and oil-range organics [ORO])
- Trichloroethene (TCE)

#### Nature and Extent

Hexavalent chromium was detected in soil samples collected under the building footprint, with the highest concentrations located beneath the former chrome-shop area. The highest concentrations of trivalent chromium were also found in this area. DRO and ORO were generally detected in and directly outside the southeast quadrant of the building. The highest concentrations of TCE were detected under the building, in the former chrome-shop and grinding-shop areas (see Figure 3). Section 4.1 contains additional information on the nature and extent of IHSs in on-site soil.

#### **Reasonable Maximum Exposure**

Exposure scenarios for soil are described in Section 6.4.1. The reasonable maximum exposure for soil is based on industrial workers who may contact IHSs in soil through incidental ingestion of impacted soil, inhalation of vapors or soil particulates, and dermal contact with chemicals in soil in an industrial setting. Also, indoor industrial workers may have indirect exposure to volatile chemicals (TCE) that migrate from vadose zone soil to indoor air.

#### CULs and Exceedances

Site-specific soil CULs based on direct-contact exposures were developed for each IHS, and a soil CUL based on vapor intrusion into buildings was developed for TCE (see Section 7.1.1).

CUL exceedances are described in detail in Section 7.2.1.1. Hexavalent chromium concentrations were above the direct-contact CUL in a limited area of shallow soil immediately beneath the building slab in the former chrome-plating area. The building prevents workers from having direct contact with hexavalent chromium in soil. No other IHSs were detected in soil on the property at a concentration exceeding a site-specific CUL for the direct-contact pathways.

TCE was detected in soil at a concentration greater than the vapor-intrusion CUL. Indoor-air sampling was performed to better evaluate this potential exposure scenario. Risks associated with potential exposure to IHSs in indoor air are summarized in Section 1.2.4 below.

#### 1.2.2 Soil in Off-Property Drainage Ditch

#### Indicator Hazardous Substances

For the purpose of the site investigation, Ecology requested that Precision's investigation include the drainage ditch located south of the former Precision property. As described in Section 4.2, IHSs in soil in the drainage ditch south of the former Precision property boundary are:

- Metals (arsenic, cadmium, copper, hexavalent chromium, trivalent chromium, lead)
- Chrysene
- Petroleum hydrocarbons (DRO and ORO)

#### Nature and Extent

The nature and extent of IHSs in ditch soil are described in detail in Section 4.2. Hexavalent chromium was detected in a soil sample near the stormwater outfall from the west side of the property. All other IHSs were detected in areas of the ditch that receive runoff from multiple sources besides the former Precision property, and Precision is not believed to be the source of these contaminants.

#### Reasonable Maximum Exposure

The reasonable maximum exposure for the ditch soil is by direct contact in an industrial setting (see Section 6.4).

#### **CULs and Exceedances**

Site-specific soil CULs based on direct-contact exposures were developed for each IHS, as described in Section 7.1.1. Exceedances of CULs are discussed in Section 7.2.2. The concentrations of lead and arsenic in some shallow-soil samples collected from the drainage ditch south of the former Precision property were above direct-contact CULs. These samples were in locations that receive runoff from multiple sources: from the former Precision property; from properties east and west of the former Precision property; from 14th Avenue; and from the Highway 99/W Marginal Way S on-ramp. MFA believes that the lead and arsenic in samples from the ditch originated primarily from sources other than the former Precision property. This conclusion is supported by site characterization data from the property. Neither lead nor arsenic was detected above CULs in the sample collected near the discharge pipe from the western part of the former Precision property, or in samples collected just south of the paved area directly in the path of sheet flow from the former Precision property. It should also be noted that lead and arsenic concentrations detected on the north side of the ditch, near the site, were similar in magnitude to concentrations from the south side of the ditch, receiving sheet

flow from a different source, the highway on-ramp. During the ditch investigation, the highest lead and arsenic concentrations were detected directly beneath the neighboring outfall and in the area around its discharge path.

#### **Cleanup** Action

Despite evidence of multiple sources of contamination, Ecology indicated that Precision may be at least partially responsible for the exceedances of CULs and did not accept Precision's previous proposal of taking no action in the off-property ditch. Therefore, to address the comments and concerns expressed by Ecology, Precision proposed to excavate all ditch soil containing IHSs at concentrations that exceed CULs. A separate work plan for removal of soil from the ditch (MFA, 2007) was approved by Ecology via electronic mail on August 2, 2007 (Ecology, 2007a).

Ditch excavation work and confirmation sampling were completed on October 24 and 25, 2007 (see Section 8). Approximately 100 cubic yards of soil was removed and properly disposed of off site. After excavation was complete, the entire area of soil disturbance was backfilled and stabilized with hydroseed. A total of 13 confirmation soil samples were collected at the bottom of the excavation and ten soil samples were collected around the perimeter of the excavation. Because two perimeter confirmation samples exceeded CULs, additional sampling was conducted on November 19, 2007, to delineate any potential contamination surrounding the samples. The results of this additional sampling indicated that there is no widespread contamination outside the area excavated.

As a precautionary measure, the two additional small areas mentioned above where chemical concentrations in confirmation samples were above the CULs were excavated on March 27, 2008. Approximately 4 cubic yards of soil was removed and properly disposed of off site. The excavated areas were backfilled with clean soil and stabilized with grass seed. Confirmation soil samples were collected from the bottom of the excavation. One confirmation sample had concentrations of arsenic and lead that exceeded CULs by 8 percent and 2 percent, respectively. Because these concentrations are only slightly above CULs, residual soil impacts are both isolated and small in extent, and over a foot of clean fill material covers the sample location, no additional removal activities were warranted.

#### 1.2.3 Groundwater

#### IHSs

As discussed in Section 4.3, IHSs identified in groundwater are:

- Metals (arsenic, copper, hexavalent chromium, trivalent chromium, and selenium)
- Petroleum hydrocarbons (DRO and ORO)

• Volatile organic compounds (VOCs) (TCE and vinyl chloride)

#### Nature and Extent

The nature and extent of IHSs in groundwater are described in detail in Section 4.3. Arsenic was ubiquitous in groundwater throughout the site at concentrations that appear to be consistent with naturally occurring background levels, and there is no indication that the former Precision property is a source of the arsenic in groundwater. Copper was present in six of eight monitoring wells throughout the property. Hexavalent chromium was detected in four of the eight monitoring wells. Trivalent chromium was detected in six of the eight monitoring wells. Elevated concentrations of both hexavalent chromium and trivalent chromium were found in groundwater samples collected beneath the building footprint, with highest concentrations in or near the former chrome-plating shop. Selenium was detected in four of the eight monitoring wells. However, because selenium was not detected in soil at the site, it does not appear that Precision is the source of the selenium detected in groundwater.

DRO were detected in five of the eight monitoring wells. ORO were detected in three of the eight monitoring wells. Generally, the highest concentrations of both DRO and ORO occurred in shallow groundwater in the southeast quadrant of the site.

TCE was detected only in samples from under the building footprint. The highest concentrations of TCE were in samples from below and downgradient of the former chrome shop. There was no indication of TCE free product at the site. The presence of TCE is interpreted to be the result of small releases over time that penetrated cracks or seams in the concrete floor, and not the result of a larger release of product that would result in free product in the subsurface. The use of TCE at the site ended in the mid-1980s. Vinyl chloride, a breakdown product of TCE, was detected in one reconnaissance groundwater sample (under the building footprint in the former cylinder shop, which is downgradient of the grinding shop). Vinyl chloride was also detected in one shallow monitoring well southeast of the building. The presence of vinyl chloride in groundwater and the lack of TCE in downgradient wells indicate that degradation of TCE is occurring and that nearly all TCE is degraded by the time groundwater reaches the downgradient property line.

#### **Reasonable Maximum Exposure**

Groundwater exposure scenarios are discussed in Section 6.4.2. The reasonable maximum exposure for groundwater at the site includes industrial workers who inhale volatile chemicals that migrate from groundwater. Other groundwater exposure pathways include excavation workers who directly contact groundwater, and potential discharge of groundwater to surface water. Shallow groundwater near the site is not used for potable water or domestic water supply and cannot be used as a potable or domestic water supply source in the foreseeable future.

#### **CUL** Development

The development of CULs for groundwater is discussed in Section 7.1.2. CULs protective of industrial workers who may inhale volatile IHSs that migrate from groundwater to indoor air were developed for TCE and vinyl chloride.

Neither CULs nor methods to calculate CULs for potential excavation workers who may directly contact chemicals in groundwater of an excavation are included in MTCA WAC 173-340-700 through WAC 173-340-760. However, Ecology approved the use of Oregon Department of Environmental Quality (DEQ) risk-based concentrations (RBCs) for comparison to site data to evaluate this direct-contact exposure scenario. It should be noted that Occupational Safety and Health Administration standards require dewatering of excavations before workers enter an excavation, and direct contact with groundwater is expected to be minimal.

Because groundwater fate and transport modeling shows that IHSs present at the site will not reach the Duwamish River (see Section 6.3 or Appendix A), groundwater CULs that exceed surface-water CULs can be established consistent with WAC 173-340-720(6)(c)(i)(E). Through fate-and-transport modeling, groundwater CULs with a point of compliance at the eastern property boundary were developed for the protection of surface water.

#### CUL Exceedances

Exceedances of groundwater CULs are discussed in detail in Section 7.2.3. The concentration of TCE in a reconnaissance groundwater sample from beneath the building exceeded both the groundwater CUL protective of indoor industrial workers who may have indirect exposure to chemicals that migrate from groundwater to indoor air and the RBC protective of excavation workers. Risks associated with potential exposure to IHSs in indoor air are summarized in Section 1.2.4. It appears that groundwater with concentrations of TCE above screening criteria is restricted to a relatively small area beneath the building.

In addition, concentrations of arsenic in groundwater samples from almost all monitoring wells on the site were above the excavation-worker RBC. Arsenic was ubiquitous in groundwater throughout the site at concentrations that appear to be consistent with naturally occurring background levels, and it appears that natural concentrations of arsenic in groundwater are above this RBC. There is no indication that the former Precision property is a source of the arsenic in groundwater.

Concentrations of all modeled IHSs at the eastern property boundary were below the calculated groundwater CULs for the protection of surface water. Hexavalent chromium concentrations that exceeded CULs for the protection of surface water were detected in groundwater samples collected from borings and MW5, located within the building footprint, and from one sample collected from MW1, located upgradient of the building.

Concentrations of hexavalent chromium in wells located near the eastern property line were not detected above their method reporting limits and did not exceed CULs.

#### 1.2.4 Air

Reasonable maximum exposure to potential air contamination at the site is by inhalation by an industrial worker. TCE was detected in soil and groundwater at concentrations above model-derived CULs protective of indoor industrial workers. To better evaluate risks that airborne IHSs may pose to potential industrial workers, samples of sub-slab soil vapor were collected in April 2006, and samples of indoor air were collected in June 2006. TCE was detected in sub-slab soil-gas samples collected beneath the building at concentrations above model-derived preliminary CULs protective of indoor industrial workers for sub-slab soil gas. However, concentrations of TCE measured in indoor air were below the applicable CUL (see Section 7.2.5). TCE was detected in ambient air (outdoor air) at the property, indicating that there may be other sources of TCE near the site that are unrelated to the former Precision facility. These results indicate that the transport models used to estimate soil, groundwater, and sub-slab soil-gas CULs overpredicted concentrations of TCE in indoor air.

The presence of TCE breakdown products (e.g., vinyl chloride) in groundwater downgradient of the source area indicates that TCE is degrading in situ. The TCE release must have occurred before the mid-1980s, when Precision stopped using TCE. TCE concentrations in soil and groundwater are expected to continue to decline over time, due to natural degradation processes. Absent any new TCE releases, current conditions represent the worst-case conditions for the foreseeable future. TCE concentrations in indoor air are currently below MTCA Method C CULs. Based on empirical indoor-air sample results, site-related volatile chemicals do not appear to pose unacceptable risks to future workers.

Ecology has requested that Precision complete additional investigation of the indoor-air pathway. However, Precision has decided that the most cost-effective way to address this pathway is to proceed with the installation of a sub-slab vapor mitigation system to remediate any potential risks associated with the presence of sub-slab TCE concentrations. On February 13, 2008, Precision submitted a separate cleanup action plan to Ecology that described the proposed sub-slab vapor mitigation system (Pioneer, 2008).

## 1.3 Conclusions and Recommendations

Investigations at the site have fully delineated the extent of IHSs in soil and groundwater on the property. Delineation has included extensive soil and reconnaissance groundwater sampling; at least two rounds of groundwater monitoring in eight monitoring wells; and modeling of the extent of TCE, vinyl chloride, metals, petroleum hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). No additional investigation of soil or groundwater at the site is recommended. Hexavalent chromium concentrations are above the direct-contact soil CUL for industrial workers in a limited area of shallow soil immediately beneath the building slab in the former chrome-plating area. The building prevents workers from having direct contact with hexavalent chromium in soil, and there is no current unacceptable risk to human health, based on hexavalent chromium in soil. No other IHSs were detected in soil on the former Precision property at a concentration exceeding a site-specific CUL for the direct-contact pathways.

To address the comments and concerns expressed by Ecology, Precision excavated ditch soil containing IHSs at concentrations that exceed CULs. Removal actions were completed on October 24 and 25, 2007, and March 27, 2008, and the area of disturbance was backfilled and stabilized with hydroseed. Based on confirmation sampling, a small area of less than 2 yards of soil remains with concentrations exceeding CULs. Residual soil impacts are both isolated and small in extent, and over a foot of clean fill material covers the sample location; therefore, no additional removal activities are warranted.

No IHSs were detected in downgradient monitoring wells near the eastern property boundary at concentrations that exceeded site-specific CULs, indicating that there is no off-site migration of contaminants at concentrations exceeding CULs. Additionally, fate and transport modeling predicts that no site-related IHSs will reach the Duwamish River at concentrations above method detection limits.

Concentrations of arsenic are ubiquitous in groundwater throughout the site at concentrations above the excavation-worker RBC, but these appear to be consistent with naturally occurring background levels. There is no indication that the former Precision property is a source of the arsenic in groundwater.

Inhalation of volatile chemicals that migrate from groundwater to indoor and outdoor air and direct contact, in the case of excavation workers, are the only potential pathways by which industrial workers at the site may be exposed to chemicals in groundwater. Concentrations of volatile chemicals, including TCE, in groundwater appear to be restricted to a relatively small area beneath the building, and TCE and vinyl chloride in indoor air of the building are below the applicable CULs, indicating that site-related volatile chemicals do not pose unacceptable risks to future workers. Ecology has requested that Precision complete additional investigation of the indoor-air pathway. However, Precision has decided that the most cost-effective way to address this pathway is to proceed with the installation of a sub-slab vapor mitigation system to remediate any potential risks associated with the presence of sub-slab TCE concentrations. On February 13, 2008, Precision submitted a separate cleanup action plan to Ecology that described the proposed sub-slab vapor mitigation system (Pioneer, 2008).

Other than those described above for the indoor air, no additional investigation or remedial measures for soil, groundwater, or indoor air are proposed.

## 2 BACKGROUND

## 2.1 Property Location and Description

The former Precision facility is located at 1231 South Director Street in Seattle, Washington (see Figure 1). The approximately 3.5-acre site is in King County, Washington, section 32, township 24 north, range 4 east, Willamette Meridian. The site is approximately 1,800 feet (less than 0.5 mile) west of the Duwamish River. The area surrounding the site is characterized by mixed industrial and residential use. The site is zoned I (Industrial). A single 62,000-square-foot building is located at the site. The east side of the building was constructed in 1968, and the west part was added in 1979. The building is surrounded by an asphalt parking lot (see Figure 2).

Precision operated continuously at the property between 1968 and 2005, ceasing operations on March 1, 2005. Precision specialized in the manufacture and repair of large hydraulic cylinders, large rolls used in the manufacture of paper and metal sheet products, and other equipment. Services included precision grinding and polishing, honing, hard-chrome plating, milling, welding, and a large number of flame- and arc-applied metal coatings. Much of Precision's work involved the use of chromic acid. Approximately 10,000 square feet of the west side of the building was leased to Baszile Metals Service, an aluminum distributorship, between approximately 1985 and 2003. Former operational areas and tanks inside the building are shown on Figure 3.

West of the former Precision property is a business that repairs and sells refrigerators. East of the former Precision property is a towing and limousine service business. According to former Precision personnel, the property to the east was used as a paint shop in the 1970s, and before that it was a fiberglass-boat-manufacturing operation.

#### 2.2 Features of Interest

The features of interest are described in detail below and are shown on Figure 3. The features of interest have been investigated as part of the RI.

## 2.2.1 Containment Vault Holding Former Plating Tanks 1 and 2

Former Plating Tanks 1 and 2 were installed in an in-ground containment vault in the southeast corner of the plating area in 1968, when the building was constructed (see

2 - 1

Figure 3). The tanks and vaults were removed and then reconstructed during an independent remedial action completed at the site in the early 1990s (MFA, 2005b). The tanks were removed from the site in 2005.

#### 2.2.2 Former Plating Tanks 3, 4, 5, and 6

Former Plating Tanks 3, 4, 5, and 6 included one aboveground tank with a concrete curb around it and three in-ground tanks located in containment vaults (Neely, 2002). Two concrete-lined trenches penetrated the floor on both sides of the former tanks (see Figure 3). The trenches had been filled with concrete by July 1986. The tanks and vaults were removed in the early 1990s during an independent remedial action. The tanks were replaced by a small aboveground tank (Tank 3) and a long, horizontal aboveground tank (Tank 4) (see Figure 3). Tanks 3 and 4 were removed from the site in 2005.

#### 2.2.3 Large Containment Vault Holding Former Plating Tank 7 and Caustic Tanks

The largest containment vault at the site was constructed in 1980 on the west side of the chrome-plating shop as part of the building expansion. The vault is approximately 24 feet long, 8 feet wide, and 16 feet deep. The vault held Plating Tank 7, a sodium hydroxide strip tank, and a sodium bicarbonate strip tank (see Figure 3). Tank 7 measured 9 feet long, 7.5 feet wide, and 16 feet deep. The tanks in the vault were removed from the site in 2005.

#### 2.2.4 Former Floor Trenches and Drains

Until 1985 or 1986, the floor drains and trenches in the chrome-plating shop discharged to the Municipality of Metropolitan Seattle (Metro) publicly owned treatment works (POTW) sanitary sewer system. Precision was permitted by Metro to discharge chromeplating rinse water from a small rinse tank to the POTW. By July 1986, Precision had sealed or otherwise disconnected the floor drains and trenches from the City sanitary sewer system and rerouted them to the containment vaults.

#### 2.2.5 Hydraulic Cylinder Test Vault

A covered, in-ground hydraulic cylinder test vault measuring approximately 4 feet in diameter and 25 feet deep is located outside the building, approximately 10 feet from the west wall of the building.

#### 2.2.6 Former Temporary Plating Tank Area

Temporary aboveground plating tanks were sometimes used to plate parts in the area north of Plating Tank 7.

#### 2.2.7 Former Scrubber Room and Chromic Acid Evaporator

The former scrubber room contained a chromic acid evaporator, a chromic-acid purification unit, and a large aboveground chromic-acid holding tank. These were removed by November 2006.

## 2.2.8 Former TCE Tank, Parts Washers, Degreasers, and Other Solvent Usage

Parts were cleaned in the chrome-plating shop both before and after plating, using TCE and other solvents. The use of TCE was discontinued at the site by the mid-1980s. Parts washers were also located in the grinding shop and cylinder shop.

#### 2.2.9 Former Steam-Cleaning Area

A covered outside steam-cleaning area including a sodium hydroxide stripping tank was located at the southeast corner of the building before 1986.

#### 2.2.10 Former Boiler UST

A former underground storage tank (UST) located beneath the floor of the boiler room in the south part of the building was used to fuel a boiler. The tank was abandoned in place and filled with "slurry" in 1992 (Environmental Associates, Inc., 1992). No testing of soil or groundwater was completed during the UST decommissioning.

#### 2.3 Site Definition

Ecology's MTCA regulations (WAC 173-340-200) define a site or facility as:

[A]ny building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located. The former Precision site includes areas where contamination is currently present at concentrations above screening level values, which could impact human health or the environment. Ecology (2006b) has defined the site as the extent of contamination caused by:

- DRO and ORO in soil and groundwater
- · Chromium and other metals in soil and groundwater
- TCE and its breakdown products in soil, groundwater and air

Ecology requested that Precision's RI include the drainage ditch located south of the former Precision property. Therefore, the site includes the off-property drainage ditch.

#### 2.4 Environmental Setting

The former Precision facility is located at the base of a hill along South Director Street. The site is generally flat except for the northern and western edges of the property, which consist of a steep excavated slope. The property is located in the lowland area of the Duwamish River Estuary. The Duwamish River is approximately 1,800 feet (less than 0.5 mile) east of the site and flows north to Elliot Bay.

#### 2.4.1 Surface Water and Stormwater System

Stormwater from the western portion of the property flows into a catch basin south of the building. The catch basin drains south to a manhole that in turn discharges to a drainage ditch south of the property boundary. Stormwater from the east side of the property flows east and southeast and mixes with stormwater from the property that lies east of the former Precision property. An asphalt curb approximately 2 inches high on the property east of the former Precision property causes localized ponding and sediment accumulation on the pavement southeast of the former Precision building. Stormwater from the property into the drainage ditch south of the property. A 1989 survey by John R. Ewing and Associates shows a catch basin at the property directly east of the former Precision property. The catch basin is shown with an outfall to the ditch (see Figure 2). Both the catch basin and the outfall were observed in the field.

The off-property drainage ditch empties into a 24-inch storm drain and then through a network of pipes until it discharges to the Duwamish River (Sweet-Edwards/EMCON, 1990). The pavement on the Highway 99/W Marginal Way S on-ramp south of the property slopes toward the drainage ditch such that stormwater from the on-ramp drains into the ditch via sheet flow. In addition to receiving runoff from the site and the Highway 99/W Marginal Way S on-ramp, the ditch receives surface-water runoff from properties to the west and east of the former Precision property, and water from a ditch that parallels 14th Avenue.

#### 2.4.2 Geology

The site is underlain by localized fill up to 10 feet thick (observed only in the eastern portion of the site); alluvium comprised of silt and sand (from the surface to a depth of approximately 20 feet, observed only on the eastern portion of the site); dense, gravelly, sandy silt glacial till (observed from surface to approximately 20 feet below ground surface [bgs] in the western part of the site and observed from 20 feet to 30 feet bgs in the eastern part of the site); and alluvium comprising sand and gravel (advanced outwash, observed from 30 feet bgs and below). The geology observed during the site investigations is generally consistent with a cross section prepared by Sweet-Edwards/EMCON, Inc. (Precision, 1993) and provided as Appendix B. The only change from this cross section is that the advanced outwash was observed in MW7 at approximately 29 feet bgs (at a shallower depth than depicted in the cross section). See Appendix C for boring and well logs.

#### 2.4.3 Hydrogeology

Two water-bearing zones (WBZs) are present beneath the site: (1) a confined alluvial WBZ beneath the eastern side of the site that flows easterly toward the Duwamish River (shallow WBZ), and (2) a confined sand and gravel WBZ beneath the low-permeability glacial till (deep WBZ, which is also referred to as the advanced outwash WBZ) (Precision, 1993). East of the facility, the glacial till appears to hydraulically separate the two WBZs (Precision, 1993).

Four monitoring wells (MW1 through MW4) and two piezometers (P1 and P2) were installed at the site in June 1988. The piezometers could not be located during the 2005 and 2006 sampling events, and it is assumed that these were decommissioned. In December 2005, four additional monitoring wells, MW5 through MW8, were installed (see Figure 2). Monitoring wells MW1 and MW7 are completed in the deep WBZ; monitoring wells MW2, MW3, MW5, MW6, and MW8 are installed in the shallow WBZ; and monitoring well MW4 is interpreted to be installed in the glacial till and is most likely representative of the shallow WBZ. Well logs and well-development forms for the monitoring wells are provided in Appendix C.

The first groundwater in the alluvium is encountered between 5 to 8 feet bgs. Saturated conditions are first encountered deeper in the till (between approximately 7 and 14 feet bgs). Depth-to-water measurements were collected at monitoring wells MW1 through MW8 just before the start of the December 2005 and April 2006 groundwater sampling. The depth to groundwater in wells installed in the shallow WBZ is between 3.49 and 6.39 feet bgs (see Table 1). The higher static groundwater elevations in the monitoring wells indicate confined conditions in the alluvium and the till. Figures 4 and 5 show the potentiometric surface for the shallow WBZ in December 2005 and April 2006, respectively. Estimated potentiometric contours show that the shallow WBZ generally flows from west to east. The hydraulic gradient of the shallow WBZ downgradient of the

property was calculated to be 0.003, using site groundwater-elevation data collected from MW6 (located at the property boundary) on April 17, 2006, and an average daily staff gauge elevation for the Duwamish on the same day (USGS, 2007).

In the deep WBZ (confined sand and gravel WBZ), MW1 exhibited flowing artesian conditions and MW7 showed a water level below that of MW1 and the shallow WBZ (see Figures 4 and 5). A deep potentiometric surface map was not created because of insufficient data (only two data points). Based on the available data from MW1 and MW7, it is assumed that MW1 is upgradient of the site and MW7 is downgradient of the site.

A staff gauge was installed in the ditch south of the property and adjacent to the 24-inchdiameter storm-drain line where the surface water in the ditch drains. The elevation of the ditch at the staff gauge is 11.61 feet National Geodetic Vertical Datum of 1929. The staff gauge was dry during both sampling events (December 2005 and April 2006), but in April 2006, there was approximately 0.5 feet of water ponded in the bottom of the ditch below the bottom of the staff gauge. Based on the lack of water in the ditch in December 2005, shallow groundwater does not discharge to the ditch year-round. Shallow groundwater may seasonally discharge to the ditch during periods of higher groundwater elevations (e.g., April 2005), but it is likely that the source of the water observed in the ditch is surface-water runoff. Note that the staff gauge was removed at the same time as the off-property ditch soil removal action.

The site-specific hydrogeology described above is generally consistent with that described for the central Duwamish Valley in the shallow groundwater use designation report prepared by the Duwamish Coalition (Duwamish Coalition, 1998b).

## **3 DESCRIPTION OF INVESTIGATIONS**

Investigations completed before 2005 are summarized in the RI work plan (MFA, 2005b). Investigations completed from June 2005 through January 2007 are described in detail in this section. Investigations completed in June and December 2005 involved collecting soil, reconnaissance groundwater, and groundwater samples from 32 Geoprobe<sup>TM</sup> borings; surface soil samples from five locations in the ditch just south of the property; and groundwater samples from eight monitoring wells (see Figure 6). On April 18 and 19, 2006, shallow-soil samples were collected from six additional locations in the ditch south of the property, groundwater samples were collected from seven probes inside the building (see Figures 6 and 7). On June 13, 2006, indoor air samples were collected from eight locations inside the building, and one air sample was collected outside the building (see Figure 7). On January 7, 2007, additional samples were collected from 13 locations in the ditch to further investigate the nature and extent of lead and arsenic in and around the ditch. Laboratory reports and data validation memorandums are included in Appendices D and E, respectively.

## 3.1 Investigation of Soil on Former Precision Property

In June 2005 and December 2005, soil sampling was completed to assess the nature and extent of contamination at the former Precision property. Thirty-two Geoprobe borings were advanced inside and outside the building on the former Precision property (see Figure 6).

Geoprobe borings were advanced to approximately 15 feet bgs or the top of the water table, whichever was encountered first. Soil samples were submitted for analysis of hexavalent chromium, Priority Pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc), VOCs, DRO, and ORO.

## 3.2 Investigation of Soil in Off-Property Ditch

In December 2005, soil samples were collected in the ditch south of the property boundary at the surface (0.5 feet bgs) and at approximately 1.5 feet bgs in five locations (HA1 through HA5) (see Figure 6). In April 2006, additional surface samples were collected from seven locations (HA6 through HA12) at 0.5 feet bgs and 1.0 or 1.5 feet

bgs. The primary purpose of the April 2006 ditch-soil sampling was to delineate the nature and extent of hexavalent chromium in soil that was detected in a sample collected from 0.5 feet bgs at HA2 in December 2005. In January 2007, additional samples were collected from 13 locations (HA13 through HA25) at 0.5 feet bgs and 1.5 feet bgs. The primary purpose of the January 2007 sampling event was to delineate the nature and extent of arsenic and lead that were detected in soil samples collected from 0.5 feet bgs at HA3, HA4, and HA5 in December 2005.

Sampling procedures were generally consistent with the RI work plan (MFA, 2005b). Samples from HA1 through HA5, collected in December 2005, were analyzed for metals, VOCs, PAHs, and petroleum hydrocarbons including gasoline-range organics (GRO), DRO, and ORO. Samples from HA6 through HA11, collected in April 2006, were analyzed for hexavalent chromium to delineate the extent of hexavalent chromium in soil near the location of HA2. One sample collected at HA12 was analyzed for arsenic, cadmium, copper, and lead to delineate the extent of these metals in soil near the location of HA3, HA4, and HA5. Samples from HA13 through HA27 were collected in January 2007. Samples from HA13 through HA16, HA26, and HA27 were placed on hold with the laboratory, pending results from the other locations. Samples from HA17 through HA25 were analyzed for lead and arsenic to delineate the extent of lead and arsenic in soil near locations HA3, HA4, and HA5.

## 3.3 Investigation of Reconnaissance Groundwater

In June 2005 and December 2005, reconnaissance groundwater samples were collected and analyzed for dissolved total chromium, hexavalent chromium, total petroleum hydrocarbons (TPH), VOCs, PAHs, and/or PCBs by the methods referenced in the Preliminary Assessment Report and the Supplemental RI Work Plan (MFA, 2005a,b). Reconnaissance groundwater samples were collected from borings GP-2, GP-4, GP-5, GP-6, GP-7, GP-8, GP-13, and GP-15 (see Figure 6).

## 3.4 Investigation of Groundwater

MFA sampled on-site monitoring wells MW1 through MW4 in June 2005, and MW1 through MW8 on December 27, 2005, and April 18, 2006. Sampling procedures were generally consistent with the RI work plan (MFA, 2005b). Samples were analyzed for metals (arsenic, copper, hexavalent chromium, lead, selenium, and trivalent chromium), DRO, ORO, and TCE and its breakdown products (*cis*-1,2-dichloroethene [DCE], *trans*-1,2-DCE, and vinyl chloride).

3-2
# 3.5 Investigation of Sub-Slab Soil Vapor

MFA installed seven sub-slab vapor probes (A1 through A7) on April 17 and 18, 2006, in the eastern portion of the building where soil and groundwater appear to have been impacted by TCE and its degradation products. Sampling procedures and results are discussed in detail in the 2006 Remedial Investigation and Risk Assessment (MFA, 2006b). Two of the seven probes, A3 and A5, were advanced near Geoprobe locations GP11 and GP06, respectively, where elevated concentrations of TCE had been detected in soil and groundwater samples. The remaining probes (A1, A2, A4, A6, and A7) were located outside the area of elevated TCE concentrations (see Figure 7).

MFA installed the sub-slab vapor probes and conducted vapor sampling consistent with procedures in the draft U.S. Environmental Protection Agency (USEPA) guidance titled Standard Operating Procedure for Installation of Sub-Slab Vapor Probes and Sampling Using USEPA Method TO-15 to Support Vapor Intrusion Investigations (USEPA, undated). The probes were installed as shown in Appendix F and as described below:

- A 1.375-inch outer hole was drilled approximately 2 inches into the slab.
- Drilling dust was removed with a vacuum.
- A 0.25-inch inner hole was drilled through the center of the base [or bottom] of the outer hole. The thickness of the concrete slab ranged from approximately 0.5 feet to approximately 0.8 feet. The inner hole was drilled 3 to 4 inches below the slab into the sub-slab material.
- The drilling dust was removed with a vacuum and the vapor probes were inserted into the hole so that the cap on the probe was flush with the top of the slab.
- The outer hole was filled with fast-setting Sakrete® cement (a blend of fine and coarse aggregates and special cements for quick setting) and allowed to dry a minimum of 24 hours before sampling.

Seven sub-slab vapor samples were collected from the sub-slab vapor probes on April 28, 2006. The analytical laboratory, Air Toxics Ltd. (ATL) in Folsom, California, provided a 6-liter, stainless steel sample canister (Summa® canister) and a 1-liter purge canister to accompany each sample. Each sample canister was attached to a purge canister with a T-bar connection. A flow controller was also attached to the T-bar connection to regulate the flow of soil vapor into the sample container. Tubing was connected from the sub-slab vapor sampling point to the flow controller. Photograph 1 in Appendix F shows the sampling layout.

The flow controller was set to collect soil vapor at a volumetric flow rate of approximately 167 milliliters per minute (ml/min). At the location where a field duplicate

sample was collected, A4, an additional T-bar connected the two sets of purge and sample canisters (see Photograph 2 in Appendix F). Before sample collection, the sampling equipment was purged of approximately 56 milliliters (3.5 pore volumes) of air into a purge canister. After purging of all the sample locations, the sub-slab vapor sample was drawn into the canister over a period of 30 minutes. Shaving cream containing isobutane and butane was applied to all connections as a leak check.

During sampling, the vacuum pressure gauge on the flow controllers for samples A3a, A4, A5a, A6, and A7 showed a loss of vacuum faster than 167 ml/min (the flow rate set by ATL). This rapid loss of vacuum indicates that ambient air may have leaked into the sample canister, likely through one of the connections between the flow controller and the canister. Because of this loss of vacuum, two locations, A3 and A5, were resampled (sample IDs A3b and A5b). The loss of vacuum was especially rapid at sampling location A4, possibly because of the increased number of connections required to collect both a primary and a duplicate sample. Because the primary and duplicate samples from sample point A4 are expected to be significantly impacted by ambient air and therefore not representative of conditions below the slab, these samples were not submitted for analysis.

The laboratory set the flow controllers so that the final vacuum on the canisters should be approximately 5 inches of mercury. The laboratory received the canisters at final vacuums ranging from 3.0 to 8.0 inches of mercury for samples A1, A2, A3b, and A5b. The final vacuums for both A6 and A7 were 0.81 inches of mercury. As mentioned above, the loss of vacuum in A6 and A7 is an indication that ambient air may have leaked into the sample canister.

The samples were analyzed for TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, vinyl chloride, isobutene, and butane (the leak-check compound) by USEPA Method TO-15.

# 3.6 Investigation of Indoor Air

On June 13, 2006, nine indoor air samples were collected from eight locations inside the building, and one ambient air sample (IA7) was collected outside of the south side of the building and upwind of the building. A sample and a duplicate (IA4 and IA8) were collected near Geoprobe location GP06, where elevated concentrations of TCE had been detected in soil and groundwater samples. The remaining sampling locations (IA1, IA2, IA3, IA5, IA6, and IA7) were outside the area of elevated TCE concentrations in soil and groundwater (see Figure 7). A heating, ventilation, and air-conditioning system was not operating at the time of sampling, and all doors and windows were closed for at least 24 hours before sample collection.

ATL provided a 6-liter Summa canister for each sample. A flow controller was attached to each canister, which was preset for an eight-hour collection period. Tubing was connected from the flow controller, with the air intake end of the tubing set at a height of approximately 5 feet above ground surface, using a laboratory-supplied stand. The sample was drawn into the canister over a period of eight hours. The laboratory set the flow controllers so that the final vacuum on the canisters should be approximately 5 inches of mercury. The laboratory received the canisters at final vacuums ranging from 3.5 to 10 inches of mercury.

Temperature and pressure readings were collected at each sample location: when sampling started, four hours later, and at the end of sampling (see Table 2).

The samples were analyzed for TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, vinyl chloride, 1,1-DCE, and 1,1-dichloroethane (1,1-DCA) by USEPA Method TO-15. One trip-blank canister was also submitted for analysis.

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# **4 NATURE AND EXTENT**

This section describes the nature and extent of IHSs at the site. Laboratory analytical reports for samples collected as part of the RI are included in Appendix D. MFA downloaded all analytical data into the site database and validated all data (see Appendix E).

# 4.1 Soil on Property

Tables 3 through 8 summarize soil analytical results for metals, VOCs, petroleum hydrocarbons, and PAHs. Sample locations are shown on Figure 6. IHSs in soil, including hexavalent chromium and TCE, were initially identified in the February 22, 2006, RI report (MFA, 2006a) by comparing soil analytical results to MTCA Method C CULs for direct contact (ingestion) and protection of groundwater, except for arsenic, lead, DROs, and OROs, which were compared to the MTCA Method A soil CULs. MTCA rules for cPAHs changed on October 12, 2007, so that cPAHs are now considered as a single hazardous substance when establishing compliance with CULs. Toxicity equivalency factors (TEFs) are used for each constituent, with the sum of the results screened against criteria for benzo(a)pyrene. However the MTCA rule amendment does not change the outcome of the IHS selection and subsequent risk evaluation for soil on property. Subsequent to the 2006 screening, Ecology requested the addition of trivalent chromium, DRO, and ORO as IHSs. IHSs identified in on-site soil are:

- Hexavalent chromium and trivalent chromium
- Petroleum hydrocarbons (DRO and ORO)
- TCE

The nature and extent of IHSs in soil on the property have been adequately characterized, as described below. Based on the work described in the 2006 RI report (MFA, 2006b), Ecology did not request any additional characterization for soil on the property (Ecology, 2006c).

# 4.1.1 Hexavalent Chromium and Trivalent Chromium

Hexavalent chromium detections ranged from 0.119 milligrams per kilogram (mg/kg) (GP7 at 2.0 feet bgs) to 3,500 mg/kg (GP32 at 1.0 feet bgs) (see Table 3). The highest concentrations of hexavalent chromium are located in the former chrome-shop area.

Hexavalent chromium was not detected in on-site soil samples collected from outside the building.

Trivalent chromium was detected at concentrations ranging from 16.93 mg/kg (GP11 at 6.5 feet bgs) to 3,250 mg/kg (GP32 at 1.0 foot bgs). The highest concentrations of trivalent chromium on site are in the former chrome-shop area inside the building footprint.

### 4.1.2 Petroleum Hydrocarbons (DRO and ORO)

DRO were detected in soil at concentrations below 200 mg/kg, except for a sample from GP21 at 6.5 feet bgs, which contained DRO at 5,270 mg/kg (see Table 7). ORO were detected in soil at concentrations below 1,500 mg/kg, except for a sample from GP21 at 6.5 feet bgs, which contained ORO at 19,900 mg/kg. Concentrations of DRO and ORO at GP21 increase with depth. The chromatogram for the samples from GP21 showed elution patterns that are characteristic of lube oil. Possible sources of the elevated petroleum hydrocarbons are former operations associated with the machine shop, the former steam-cleaning operations, or the former boiler UST (see Figure 3). However, according to former Precision employees, the former boiler UST contained heating oil, which would not match the elution patterns of lube oil.

### 4.1.3 TCE

TCE was detected in seven of the 64 on-site soil samples that were analyzed for VOCs at concentrations ranging from 3.43 micrograms per kilogram ( $\mu$ g/kg) (GP18 at 1.0 feet bgs) to 1,160  $\mu$ g/kg (GP6 at 14.5 feet bgs) (see Table 5). All detections were in the former chrome shop and former grinding shop (see Figure 3). Concentrations of TCE in soil at GP6 and GP11 increased with depth. GP6 was completed approximately 10 to 20 feet away from the former TCE tank. It is not known exactly where this tank was situated, but the approximate location is shown on Figure 3, based on descriptions from former Precision employees. Samples collected at a depth of 1 foot bgs from two borings completed near the area of the former TCE tank (GP18 and GP32) did not contain TCE at elevated concentrations. Deeper samples at these locations could not be collected because of drilling refusal.

### 4.2 Soil in Off-Property Ditch

Tables 3 through 8 summarize soil analytical results for metals, VOCs, petroleum hydrocarbons, and PAHs. Sample locations are shown on Figure 6. As part of the 2006 RI report (MFA, 2006b), IHSs in soil, including arsenic, cadmium, copper, hexavalent chromium, lead, and chrysene were initially identified based on a screening of soil analytical results compared to MTCA Method C CULs for direct contact (ingestion) and protection of groundwater, except for arsenic, lead, DROs, and OROs, which were

compared to the MTCA Method A soil CULs (MFA 2006a). MTCA rules for cPAHs changed on October 12, 2007 so that cPAHs are now considered as a single hazardous substance when establishing compliance with CULs. TEFs are used for each constituent, with the sum of the results screened against criteria for benzo(a)pyrene. The only PAH in soil that was originally considered to be an IHS was chrysene. For the purposes of this evaluation, chrysene continues to be considered an IHS, even though under the new rules it may not be. Subsequent to the 2006 screening, Ecology asked that trivalent chromium, DRO, and ORO also be included as IHSs. IHSs identified in ditch soil are:

- Metals (arsenic, cadmium, copper, hexavalent chromium, trivalent chromium, and lead)
- Petroleum hydrocarbons (DRO and ORO)
- Chrysene

The nature and extent of IHSs in the ditch soil are described below.

#### 4.2.1 Metals

#### Arsenic

Arsenic was detected in the soil samples from the ditch at concentrations ranging from non-detect (HA20 at 0.5 and 1.5 feet bgs, and HA 18 at 1.5 feet bgs) to 53.9 mg/kg (HA3 at 0.5 feet bgs). The highest concentrations of arsenic were in soil samples at 0.5 feet bgs from HA3, HA4, HA5, and HA22. These samples are from locations that would receive runoff from the former Precision property, from properties east and west of Precision, from 14th Avenue, and from the Highway 99/W Marginal Way S on-ramp. Arsenic was not detected above CULs in the sample collected near the discharge pipe from the western part of the former Precision property, or in samples collected just south of the paved area directly in the path of sheet flow from the former Precision property. It should also be noted that arsenic concentrations detected on the north side of the ditch, receiving flow from the former Precision property, were similar in magnitude to concentrations from the south side of the ditch, receiving sheet flow from the highway on-ramp. In addition, the highest arsenic concentrations were detected directly beneath the neighboring outfall to the west and in the area around its discharge path. Concentrations of arsenic generally decrease with depth in all locations (see Table 4).

#### Cadmium

Cadmium was detected in six of the 12 ditch-soil samples analyzed for cadmium. Concentrations were below 5 mg/kg, except in one sample with a concentration of 28.7 mg/kg collected from HA4 at a depth of 0.5 feet bgs. HA4 is the lowest point in the ditch.

### Copper

Copper was detected in soil samples from the ditch at concentrations ranging from 16.4 (HA3 at 1.5 feet bgs) to 978 mg/kg (HA4 at 0.5 feet bgs). The highest concentrations of copper were in soil samples at 0.5 feet bgs from HA3, HA4, and HA5, located near the lowest point of the ditch. Concentrations of copper generally decrease with depth (see Table 4).

### Hexavalent Chromium and Trivalent Chromium

Hexavalent chromium was detected in shallow surface samples located near the stormwater outfall from the former Precision property. One sample collected directly at the outfall pipe (HA2 at 0.5 feet bgs) contained hexavalent chromium at a concentration of 89 mg/kg. Concentrations in all other samples were below 7 mg/kg (see Table 3).

Trivalent chromium was detected at a maximum concentration of 8,480 mg/kg (HA4 at 0.5 feet bgs), located in the lowest point of the ditch.

#### Lead

Lead was detected in soil samples at concentrations ranging from non-detect (HA18 at 1.5 feet bgs) to 1,710 mg/kg (HA4 at 0.5 feet bgs). The highest concentrations of lead were in soil samples at 0.5 feet bgs from HA3, HA4, HA5, and HA22, located near the lowest point of the ditch. Concentrations of lead generally decreased with depth (see Table 4).

### 4.2.2 Petroleum Hydrocarbons (DRO and ORO)

Generally, DRO were detected in the ditch-soil samples at concentrations below 1,500 mg/kg, except in the soil sample from HA4 at 0.5 feet bgs (35,900 mg/kg). ORO were detected in the ditch soil samples at concentrations ranging from 30.1 mg/kg (HA3 at 1.5 feet bgs) to 106,000 mg/kg (HA4 at 0.5 feet bgs). The highest concentrations of petroleum hydrocarbons were in samples from HA4, which is located near the lowest point of the ditch. Concentrations of petroleum hydrocarbons decreased with depth.

### 4.2.3 Chrysene

Chrysene, a PAH, was detected in seven of the 11 ditch-soil samples analyzed for chrysene. Concentrations of chrysene were below 0.1 mg/kg, except in soil samples from HA4 at 0.5 feet bgs (0.899 mg/kg) and HA5 at 0.5 feet bgs (1.54 mg/kg). HA4 and HA5 are located near the lowest point of the ditch. Based on the lack of elevated chrysene concentrations in HA2 and HA3, it does not appear that Precision is the source of the elevated chrysene concentrations in the ditch.

### 4.3 Groundwater

Reconnaissance groundwater samples were collected from GP2, GP4 through GP8, GP13, and GP15. Tables 9 through 14 summarize reconnaissance groundwater analytical results for metals, VOCs, petroleum hydrocarbons, PAHs, and PCBs. Groundwater analytical results from monitoring well samples for metals, VOCs, petroleum hydrocarbons, and PAHs are summarized in Tables 15 through 20. Measured field parameters for groundwater samples are provided in Table 21. Sample locations are shown on Figure 6.

As part of the 2006 RI report (MFA, 2006a), IHSs in groundwater were identified by comparing analytical results for reconnaissance groundwater samples and groundwater samples collected from monitoring wells to MTCA Method C groundwater CULs, except for arsenic, DROs, and OROs, which were compared to the MTCA Method A groundwater CULs. Note that MTCA CULs for cPAHs have changed since the 2006 RI report to consider cPAHs as a single hazardous substance when screening. However the MTCA rule amendment (October 12, 2007) does not change the outcome of the IHS selection and subsequent risk evaluation for groundwater. Analytical data from samples collected in April 2006 (after the 2006 RI report) were also compared to screening levels, and no additional IHSs resulted. IHSs identified in groundwater are:

- Metals (arsenic, copper, hexavalent chromium, trivalent chromium, and selenium)
- Petroleum hydrocarbons (DRO and ORO)
- VOCs (TCE and vinyl chloride)

### 4.3.1 Metals

### Arsenic

Reconnaissance groundwater samples were not analyzed for arsenic. Arsenic was detected in groundwater samples collected from monitoring wells at concentrations ranging from 4.59 micrograms per liter ( $\mu$ g/L) (MW5) to 33  $\mu$ g/L (MW1) (see Table 16). The highest concentration was in MW1, which is in the deep WBZ and assumed to be upgradient of the former Precision building. Based on the presence of arsenic at similar concentrations in groundwater throughout the site, there is no indication that the former Precision property is a source of arsenic contamination.

### Copper

Reconnaissance groundwater samples were not analyzed for copper. Copper was detected in groundwater samples from six of the eight monitoring wells at concentrations of up to 5.1  $\mu$ g/L (MW6 in April 2006) (see Table 16). As with arsenic, copper was found at

similar concentrations throughout the site and it is therefore difficult to conclude that the former Precision property is a source of copper contamination.

### Hexavalent Chromium

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Hexavalent chromium was detected in reconnaissance groundwater samples at concentrations of up to 300 milligrams per liter (mg/L) (GP6), with higher concentrations in the former chrome shop (see Table 9). Hexavalent chromium was detected in groundwater samples from MW1 (only in June 2005), MW4 (only in April 2006), MW5, and MW7 (only in December 2005) (see Table 15). MW1 is a deep well and is assumed to be upgradient of the site features of interest. The hexavalent chromium concentration detected in MW1 in June was 0.269 mg/L. The hexavalent chromium concentration detected in MW4, a shallow well south of the building, was 0.023 mg/L. MW5 is a shallow well located in the former chrome shop and had the highest concentrations of hexavalent chromium (450 mg/L in December). The hexavalent chromium concentration detected in MW7, a deep well assumed to be downgradient of the former chrome shop, in December 2005 was 0.00738 mg/L.

### **Trivalent Chromium**

Trivalent chromium was calculated by subtracting the hexavalent chromium results from the chromium results. If hexavalent chromium was not detected, then the chromium value was assumed to be trivalent chromium. The only reconnaissance groundwater samples in which chromium was detected were in the former chrome shop, except for GP8, which is located within the building footprint and downgradient of the chrome shop. The maximum calculated concentration of trivalent chromium was in the groundwater sample from GP8 (61 mg/L; see Table 9).

The calculated trivalent chromium concentrations from monitoring wells ranged from 0.00215 mg/L (MW3 in December 2005) to 47 mg/L (MW5 in December 2005) (see Table 15).

### Selenium

Reconnaissance groundwater samples were not analyzed for selenium. Selenium was detected in groundwater samples collected from MW2, MW6, MW7, and MW8, with the highest concentration (19 mg/L) in MW6 (see Table 16). Because selenium was not detected in soil at the site, it does not appear that Precision is the source of the detected concentrations of selenium in the groundwater.

### 4.3.2 Petroleum Hydrocarbons

The reconnaissance groundwater samples from GP2 and GP4 through GP8 were analyzed for petroleum hydrocarbons, using NWTPH-HCID, with detections quantified for GRO, DRO, and ORO using NWTPH-Gx and NWTPH-Dx (see Tables 11 and 12). The

maximum concentrations of DRO (0.814 mg/L) were from a sample collected at GP8, located near the former boiler UST. ORO were not detected in the quantification analyses.

Samples from monitoring wells were analyzed for DRO and ORO. DRO were detected in shallow monitoring wells MW2, MW3, MW5, MW6, and MW8 at concentrations of up to 2.64 mg/L (MW6 in December 2005) (Table 19). DRO were not detected in deep monitoring wells or in shallow monitoring well MW4. ORO were detected in shallow monitoring wells MW2, MW6, and MW8 at concentrations of up to 1.32 mg/L (MW6 in December 2005). ORO were not detected in deep monitoring wells or in MW3, MW4, or MW5. Generally, the highest concentrations of DRO and ORO occurred in shallow groundwater in the southeast quadrant of the site.

### 4.3.3 VOCs

#### TCE

TCE was detected in three reconnaissance groundwater samples (see Table 10): GP6 (1,130  $\mu$ g/L), GP8 (16.8  $\mu$ g/L), and GP13 (0.220  $\mu$ g/L). The highest concentrations were in samples from below and downgradient of the former chrome shop. TCE was detected in only one monitoring well (MW5) at concentrations of up to 22.1  $\mu$ g/L (see Table 17). The maximum concentration of TCE in groundwater (1,130  $\mu$ g/L in a reconnaissance groundwater sample from GP6) was approximately 0.1 percent of the TCE solubility limit of 1,100,000  $\mu$ g/L, and there is no indication of TCE free product at the site.

### Vinyl Chloride

Vinyl chloride, a breakdown product of TCE, was detected in only one reconnaissance groundwater sample, from GP13 at 16.5  $\mu$ g/L (see Table 10). This vinyl chloride detection occurred within the footprint of the building in the former cylinder shop and downgradient of TCE detections in soil at GP11. Vinyl chloride was detected in only one monitoring well (MW8), at concentrations of up to 0.80  $\mu$ g/L (see Table 17).

The presence of vinyl chloride in groundwater indicates that biodegradation of TCE is occurring. The lack of TCE in groundwater at monitoring wells near the downgradient property line indicates that TCE concentrations significantly attenuate through biodegradation and other processes by the time groundwater reaches the downgradient property line.

# 4.4 Investigation of Soil Vapor

Sub-slab soil-vapor samples were collected from probes A1 through A7 (see Figure 7). Table 22 summarizes results for TCE and its breakdown products (*cis*-1,2-DCE, *trans*-1,2-DCE, vinyl chloride), as well as leak-check compounds (isobutane and butane).

#### 4.4.1 Evaluation of Soil Vapor Data Quality

The leak-check compound isobutane was detected in five of the six soil-vapor samples analyzed, and butane was detected in four of the samples. Detected concentrations of butane were lower than concentrations of isobutene. Isobutane results collected from probes A1, A2, and A3 were flagged "E" by the laboratory, indicating that the concentrations were above the instrument calibration range. Concentrations of isobutane for A1, A2, and A3 were 2.4 J parts per million by volume (ppmv), 2.3 J ppmv, and 1.1 J ppmv, respectively. The E-flagged values were flagged "J" by MFA, indicating that they are considered estimates (see Appendix E). Washington does not currently have a leakcheck compound criterion, but some other states do. The leak-check compound reporting limit criterion used by the California Environmental Protection Agency (CA EPA et al., 2003) is 10 µg/L (approximately 4 ppmv for isobutane). This criterion applies to the reporting limit. Action is not triggered just because the compound is detected above this concentration. The New Jersey Department of Environmental Protection Vapor Intrusion Guidance indicates that resampling is required only when detection of a leak-test compound in excess of 1,000 µg/L (approximately 400 ppmv isobutane) is confirmed (NJDEP, 2005). The Missouri Department of Natural Resources suggests action if a leakcheck compound is detected above 100 µg/L (40 ppmv isobutane) (MDNR, 2005). Based on the detected concentrations of isobutene in A1, A2, and A3, and the leak-check criteria described above, some leakage of ambient air into the sampling canisters may have occurred, but the estimated concentrations of the leak-test compound do not compromise the data.

Isobutane results for samples collected from probes A6 and A7 were flagged "S" by the laboratory, indicating a saturated peak. The concentrations of isobutane in these samples were far above the calibration range. The saturated peaks likely indicate that substantial leakage of ambient air into the sampling canisters occurred; therefore, A6 and A7 sub-slab sample results are not used in the nature-and-extent delineation and the risk evaluation.

Isobutane and butane were not detected in the sample collected from probe A5; the analytical results are considered usable.

#### 4.4.2 Soil Vapor Analytical Results

TCE was detected in sub-slab vapor samples A3 and A5 at concentrations of 6,100 and 37,000 micrograms per cubic meter ( $\mu$ g/m<sup>3</sup>), respectively (see Table 22). *Cis*-1,2-DCE was detected in samples A3 and A5 at concentrations of 470 and 1,700  $\mu$ g/m<sup>3</sup>, respectively. *Trans*-1,2-DCE was not detected in any samples. Vinyl chloride was detected in a sample from A5 at a concentration of 420  $\mu$ g/m<sup>3</sup>. A3 is located in the former grinding shop and A5 is located in the former chrome-plating shop. Detections of TCE and its breakdown products in soil vapor match the distribution of TCE in soil and groundwater, indicating good correlation.

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# 4.5 Investigation of Indoor Air

Indoor-air samples were collected from stations IA1 through IA8. Table 23 summarizes results for TCE and its breakdown products (*cis*-1,2-DCE, *trans*-1,2-DCE, vinyl chloride, 1,1,-DCE, and 1,1-DCA). TCE was detected in all eight samples, ranging in concentrations from 0.046  $\mu$ g/m<sup>3</sup> to 0.2  $\mu$ g/m<sup>3</sup>. No TCE breakdown products were detected in any of the samples. The lowest TCE concentration was detected in the sample collected outside and south of the building (IA7). The concentrations of TCE in the samples collected inside the building were similar to each other. TCE concentrations collected above the source area (IA4 and field duplicate IA8) are 0.14 and 0.15  $\mu$ g/m<sup>3</sup>, while the air sample with the highest TCE concentration (0.20  $\mu$ g/m<sup>3</sup>) was collected north of the source area.



# 5 LAND AND BENEFICIAL WATER USE DETERMINATION

In the late 1990s, the Duwamish Coalition completed a study on the Duwamish Industrial Area Hydrogeologic Pathways Project. The Duwamish Coalition team produced three Duwamish Industrial Area technical memoranda: *Development of a Three-Dimensional, Numerical Groundwater Flow Model for the Duwamish River Basin; Duwamish Basin Groundwater Pathways Conceptual Model Report;* and *Shallow Groundwater Use Designation* (Duwamish Coalition, 1997, 1998a,b). The Duwamish Coalition study concluded that shallow groundwater in the Duwamish industrial area is nonpotable and that the highest beneficial use of shallow groundwater was discharge to the Duwamish River. MFA, on behalf of Precision, completed a Beneficial Land and Water Use Determination at the request of Ecology that confirms that the conclusions reached by the Duwamish Coalition are also true for the former Precision property (see Appendix G). The former Precision property is located in the Duwamish industrial area and was included in the Duwamish Coalition study area. The conclusions of the beneficial land and water use report are summarized below.

# 5.1 Land Use

- Historically, the site has been used for industrial purposes. The site is currently zoned for industrial uses, and MFA understands that it will continue to be used for industrial purposes in the future.
- The only sensitive environment in the region of study that could possibly be affected by IHSs from the site is the Duwamish River.

# 5.2 Surface-Water Use

- The Duwamish River is located approximately 1,800 feet east of the site.
- No surface-water rights were identified in the region of study.
- Current surface-water beneficial uses include resident fish and aquatic life, wildlife habitat, fishing, boating, water-contact recreation, aesthetic quality, and commercial navigation and transportation.
- It is not reasonably anticipated that surface-water uses will change in the future.

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## 5.3 Groundwater Use

- The shallow groundwater gradient on site and in the region of study is toward the Duwamish River.
- The Duwamish River provides a hydrologic divide between shallow groundwater at the site and shallow groundwater east of the Duwamish River.
- No groundwater rights were identified in the region of study.
- Current groundwater beneficial uses include engineering (dewatering), and surface-water recharge.
- The highest beneficial use of shallow groundwater in the Duwamish Valley is discharge to surface water.
- Deeper groundwater below the site is not currently used for and cannot be used in the foreseeable future for beneficial purposes.
- The area of the site and region of study are supplied with potable water by the City of Seattle municipal water supply; this is expected to continue in the future.

Ecology has indicated concern that a zone of contaminated groundwater associated with the Precision site may exist downgrade of the former Precision property approaching the Duwamish River (hereinafter "zone of concern"). There are numerous individual lots, both residential and commercial/industrial, located in the zone of concern between the former Precision property and the Duwamish River. Some of these properties are in the City of Seattle and some are in unincorporated King County (see Figure 8). All of the lots in the zone of concern are currently connected to a public water supply.

As mentioned previously, groundwater in the zone of concern will not be used for drinking in the foreseeable future. Stoel Rives, LLP has investigated local restrictions on the use of groundwater for drinking that have been put in place by Ecology and the King County Board of Health (KCBOH) (see Appendix H). The KCBOH code prohibits any proposed well drilling in the zone of concern, based on the Code's (1) public-service-connection requirements; (2) source quality requirements on drinking water; and (3) physical location restrictions on the placement of wells (see Appendix H for code references).

The public-service connection requires that properties undertaking new development connect to a public water supply when the land is within an existing public-water-supply system, the system meets applicable water-quality standards, and the system is willing and able to provide service in a timely and reasonable manner. Since all of the properties in the zone of concern are already connected to public water and the quality of that water is not subject to dispute, the future development in the zone of concern would be required to connect to public water rather than install a drinking-water well. In addition, the KCBOH places a limitation on the sources of drinking water, stating that it shall be obtained from the highest-quality source feasible. Seattle city water is certainly a higherquality source than groundwater from a historically industrial area.

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The KCBOH also had restrictions on the physical placement of drinking-water wells, including minimum setbacks of 100 feet from houses and garages, public roads, sewers, chemical-storage sites, surface waters, railroad tracks, power utility or gas lines, and USTs. Stoel Rives reviewed aerial photography of the area and concluded that no property has a 200-foot-diameter area free of roads and buildings sufficient to provide the sanitary control area required to protect the well site. Factor in underground tanks, sewer lines, power and gas lines, and other possible sources of contamination, and it will be impossible to legally locate a drinking-water well in the zone of concern.

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# **6 CONCEPTUAL SITE MODEL**

The conceptual site model (CSM) describes potential chemical sources, release mechanisms, environmental transport processes, exposure routes, and receptors. The primary purpose of the CSM is to describe pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment, (2) an environmental transport medium for a released chemical, (3) a point of potential contact with the impacted medium (referred to as the exposure point), and (4) an exposure route (e.g., soil ingestion) at the exposure point.

The human-health CSM is shown in Figure 9. Elements of potentially complete exposure scenarios are further discussed in Table 24. Processes that structure the fate and transport of IHSs in the environment, as well as potential exposure scenarios and reasonable maximum exposures, are discussed below.

# 6.1 Primary Sources

Of the features of interest described in Section 2.2, the following former features are considered to be potential sources for IHSs detected in soil and groundwater samples:

- Containment vaults holding former Plating Tanks 1 and 2
- Former Plating Tanks 3, 4, 5, and 6
- · Former floor trenches and drains
- · Former TCE tank, parts washers, degreasers, and other solvent usage
- · Former steam-cleaning area
- Former boiler UST near the boiler room

Figure 3 shows the locations where these former features once stood. The primary processes by which chemicals may have been released to the environment are likely to include accidental spills of process chemicals or waste and releases from the former chromic-acid tanks, the former TCE tank, and the former UST.

# 6.2 Fate-and-Transport Processes

The primary mechanisms likely to influence the fate and transport of chemicals in environmental media at the site include leaching of chemicals from soil to groundwater, advection and dispersion in groundwater, sorption to the soil matrix, and natural biodegradation processes. The relative importance of these processes will vary, depending on the chemical and physical properties of a released contaminant. The properties of soil and the dynamics of groundwater flow also shape contaminant fate and transport.

Almost the entire former Precision property is paved or covered with a building (see Figure 2). In the few areas of the property not covered with an impermeable surface, precipitation that falls on the surface may percolate through the vadose zone, and it is possible that chemicals with relatively high solubility may leach from soil to pore water. In addition, when the water table rises and interacts with chemicals sorbed to soil, some may partition into groundwater. Once in groundwater, dissolved contaminants may be transported by diffusion and advection horizontally away from the original source. Dispersion, retardation, and biodegradation may act to reduce dissolved concentrations of chemicals in groundwater downgradient of the source area.

Volatile contaminants that are either adsorbed to soil or dissolved in groundwater may volatilize to soil pore spaces. Chemical vapors in pore spaces may eventually migrate through the soil matrix and enter outdoor air. Once the chemicals reach outdoor air, mixing with ambient air is expected to reduce airborne concentrations rapidly and substantially. If buildings are located over soil or groundwater that has been contaminated with volatile chemicals, it is possible that vapors may eventually enter indoor air by penetrating cracks in a building floor or foundation.

# 6.3 Groundwater Fate-and-Transport Modeling

The Duwamish River is located approximately 1,800 feet downgradient of the former Precision property. Fate-and-transport modeling was completed to demonstrate that siterelated IHSs in groundwater would not reach the river. Fate-and-transport modeling was then used to derive site-specific CULs for groundwater that are protective of surface water. The same model parameters were used for both of the modeling exercises. The modeling was performed using the USEPA's BIOCHLOR model (USEPA, 2002). A detailed description of the model, the model inputs, and assumptions is included in Appendix A. Conservative modeling assumptions include the following:

- The models were run using a conservative hydraulic conductivity value (0.005 centimeters per second). The assumed K value is five times the Duwamish Coalition estimate (i.e., overestimates groundwater velocity and consequently potential contaminant migration).
- Because of the high propensity of PAHs to adhere to soil (e.g., high partitioning coefficients), extremely high retardation factors were calculated for the PAHs. The high retardation factors caused the model to break down and produce unrealistic results. In order to make the model function correctly, a retardation

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factor of 10 was used for all PAHs. This is a conservative assumption (i.e., it will result in migration being overestimated) because it is orders of magnitude lower than the actual calculated retardation factors (see Appendix A). Therefore, the CULs developed using the lower retardation factors are much lower than CULs that would have been calculated had the model been able to use the higher retardation factors.

- CULs for TCE and vinyl chloride were modeled using degradation rates two times slower than values provided in literature, to account for the possibility that degradation rates can slow at lower concentrations. Note that performing the modeling with no degradation for TCE and vinyl chloride would not be representative of site conditions, as the mere presence of vinyl chloride suggests that degradation is occurring.
- It was conservatively assumed that the contaminant source is constant and nondegrading. Mass loading to the system is in fact finite due to TCE use at the property ending and the UST decommissioning and soil excavation conducted in the 1980's, the outside steam-cleaning area was relocated before 1986, that the boiler UST was abandoned in place and filled with a slurry in 1992, that chrome-plating operations ceased in 2005, and maximum concentrations in several cases were located an additional 50 to 130 feet west of the eastern property edge. Given that, it is unlikely that there is a significant ongoing source of IHSs to groundwater.
- The model projected contaminant migration over an assumed 35-year time frame. Given that the primary sources of the contamination are no longer present, it is unlikely that impacts will continue for this length of time.

None of the modeled constituents were predicted to reach the river at concentrations that were at or above method detection limits. The development of CULs based on fate and transport modeling is discussed in Section 7.1.2.3.

# 6.4 Exposure Scenarios and Reasonable Maximum Exposures

Precision performed industrial operations at the property between 1968 and 2005. As discussed in the Land and Beneficial Water Use Determination (Appendix G), the property is currently zoned for industrial use and will continue to be used for industrial purposes in the future. The site is located in the Duwamish Valley, which is a heavy-industry area south of downtown Seattle that includes approximately 5,000 acres of land designated for industrial activity. The Duwamish industrial area has been used for industrial purposes for many years, and plans for the area include maintaining the predominance of industrial use in the area (Duwamish Coalition, 1998b).

No sensitive subpopulations such as those associated with eldercare facilities, child-care facilities, or schools are located downgradient of the site (see Appendix G). No residences are located on the site, and it is unlikely that the area will be developed to support residences in the foreseeable future. Because the ditch extends off site, it is possible that nonindustrial workers (e.g., residents) could enter the ditch, as there is a residential area located north of the site. However, given that the ditch is located adjacent to a busy roadway and there is no safe and easy route for residents to access the area, an industrial-worker-exposure scenario is appropriate for the ditch.

Based on the information above, industrial workers are the type of human receptors with the greatest potential to be exposed to site-related chemicals in soil or groundwater.

As explained in more detail below, there are no significant ecological exposure pathways associated with the site.

# 6.4.1 Human Health Exposure Scenarios for Soil

The site is almost entirely covered by a building and asphalt, and the steep slopes on the north and west property boundaries are covered in concrete. These structures prevent workers from directly contacting IHSs in underlying soil. However, for the purposes of the risk evaluation, it is assumed that these exposure barriers may be removed in the future and that industrial workers could have direct contact with soil. Direct-contact exposure routes for workers include incidental soil ingestion, inhalation of vapors or particulates, and dermal contact.

Volatile chemicals have been detected in soil samples collected beneath the building, and it is assumed that indoor industrial workers could have indirect exposures to chemicals that migrate from vadose-zone soil to indoor air. An indirect exposure pathway involves intermedia transfer of a chemical before exposure. The vadose zone is the layer of unsaturated soil that lies above the water table. Depending on location and season, the depth of the vadose zone may range from approximately 4 feet bgs to 14 feet bgs (see Section 2.4.3).

In summary, the following potential soil-exposure scenarios are evaluated as reasonable maximum exposures in the RA:

- Future on-site industrial workers who incidentally ingest, inhale, and have dermal contact with site-related chemicals in soil (less than 15 feet bgs). For the purposes of the risk evaluation, it is assumed that future workers could be exposed to soil beneath the building if the building were removed at some point in the future.
- Indoor industrial workers who inhale volatile chemicals that migrate from vadosezone soil to indoor air through cracks in the building foundation.

As agreed to by Ecology, soil CULs based on leaching to groundwater are not needed to protect human health and the environment. Empirical groundwater data will be used to evaluate and manage potential risks associated with exposure to groundwater.

It should be noted that there are other potential scenarios by which people may be exposed to chemicals in soil, but these other exposure scenarios are expected to be less significant than the exposure scenarios listed above. For example, it is possible that occasional site visitors could have indirect exposure to volatile chemicals that migrate from soil to indoor or outdoor air, but relative to on-site industrial workers, visitor exposures are expected to be small.

### 6.4.2 Terrestrial Ecological Evaluation for Soil

A simplified terrestrial ecological evaluation was performed for the site, consistent with the MTCA cleanup regulations under WAC 173-340-7492. A table illustrating the evaluation is included in Appendix I. The site is completely covered by the building and asphalt, and the steep slopes on the north and west property boundaries are covered in concrete. The site does not provide important wildlife habitats. It is surrounded by Highway 99/W Marginal Way S to the south; industrial and commercial properties to the southwest, south, and east; and residential properties to the north and northwest. The ditch along the south side of the property is less than 60 feet across and does not provide good-quality habitat. Vegetation in the ditch includes a few trees, grasses, and Himalayan blackberry.

To be conservative for the purposes of this terrestrial ecological evaluation, the ditch within 500 feet of the site, along Highway 99/W Marginal Way S and 14th Avenue, was considered an area of contiguous undeveloped land. The ditch area comprises approximately 1.53 acres. The habitat quality of the ditch is classified as low, and the area is not likely to attract wildlife because of the high levels of human disturbance in the area and the poor quality of the habitat. Soil at the site does not have the contaminants listed in Question 5 of the simplified terrestrial ecological evaluation (see Appendix I). The resulting scores of the simplified terrestrial ecological evaluation show that the ecological evaluation may be ended and that terrestrial ecological receptors are not appropriate endpoints for soil.

# 6.4.3 Human Health and Ecological Exposure Scenarios for Groundwater

As explained above in Section 5.3, the facility and the surrounding area are supplied with potable water by the City of Seattle municipal water supply. There are no public water-supply systems or drinking-water wells within a 1-mile radius of the site (see Appendix G). Groundwater beneath and near the site is not currently used as a source of drinking water and is unlikely to be used as a source of drinking water in the foreseeable future (see Appendix G). As a result, human receptors such as industrial workers are unlikely to contact or ingest impacted groundwater.

It is assumed that on-site workers could inhale volatile chemicals that migrate from groundwater to indoor or outdoor air. Airborne concentrations of volatile chemicals that migrate from groundwater to indoor air of a building are expected to be higher than concentrations in outdoor air because of less complete mixing when chemicals enter indoor air relative to mixing in outdoor air. Therefore, the reasonable maximum groundwater exposure scenario is indoor workers who inhale volatile chemicals that have migrated from groundwater and penetrated a building.

During reconnaissance drilling, the depth to shallow groundwater was encountered between 5 to 8 feet bgs. However, the depth to static groundwater level in wells installed in the shallow WBZ is between 3.49 and 6.39 feet bgs (see Table 1). The higher static groundwater elevations in the monitoring wells indicate confined conditions in the alluvium and the till. It is assumed that an excavation worker could directly contact shallow groundwater if an excavation were extended below the water table. It should be noted that the Occupational Safety and Health Administration rules require that excavations be dewatered before worker entry, and it is unlikely that workers will have substantial direct contact with chemicals in groundwater. However, Ecology has requested that this exposure scenario be included in the development of CULs.

As mentioned in Section 6.3, fate and transport modeling indicates that site-related IHSs in groundwater will not migrate to sediment or surface water of the Duwamish River (see Appendix A). Therefore, human receptors will not have significant exposure to site-related chemicals that migrate from groundwater to surface water. Similarly, benthic and aquatic ecological receptors in sediment or surface water of the river will not have significant exposure to site-related chemicals that migrate from groundwater to surface water. Similarly, benthic and aquatic ecological receptors in sediment or surface water of the river will not have significant exposure to site-related chemicals that migrate in groundwater. However, Ecology has requested that this exposure scenario be considered in the development of site CULs.

In summary, the following potential groundwater exposure scenarios are evaluated as reasonable maximum exposures in the RA:

- Industrial workers who inhale volatile chemicals that migrate from groundwater
- Excavation workers who directly contact groundwater
- Potential discharge of groundwater to surface water

# 7 RISK ASSESSMENT AND SITE-SPECIFIC CLEANUP LEVELS

The RA evaluates potential risks that site-related chemicals may pose to human health and the environment by comparing chemical concentrations in environmental media with relevant CULs.

# 7.1 Cleanup Levels

Site-specific CULs were estimated using standard MTCA and USEPA RA methods (USEPA, 1989, 1996, 2001, 2004b). The methods used to estimate site-specific soil, groundwater, and soil-gas CULs are detailed in Appendix J. Method C CULs were used for soil, and Method B CULs were used for groundwater. The CULs represent soil and groundwater concentrations that are not expected to result in unacceptable risks to potential human receptors with long-term exposure to impacted soil or groundwater. The Method C acceptable risk level for industrial workers exposed to carcinogens in soil is a lifetime excess cancer risk of one in one hundred thousand (10<sup>-5</sup>). The Method B acceptable risk level for workers with direct or indirect (e.g., vapor intrusion) exposure to carcinogens in groundwater is a lifetime excess cancer risk of one in one million (10<sup>-6</sup>). The acceptable risk level for exposure to noncarcinogens is a hazard index of less than or equal to one for both Method B and Method C (WAC 173-340-720 and WAC 173-340-745). If a chemical is present in environmental media at a concentration below the risk-based CUL, it is inferred that exposure to the chemical will not result in unacceptable health risks. CULs for soil, groundwater, soil gas, and indoor air are briefly described below.

### 7.1.1 Soil CULs

Modified MTCA Method C CULs protective of industrial workers were used for soil. Method C was selected for soil because the former Precision property meets WAC (173-340-745) requirements for an industrial property for the following reasons:

- The site is zoned industrial.
- People do not live on the property.
- Public access to the property is limited.
- Food is not grown or raised on the property.
- Operations on the property were characterized by use and storage of chemicals.
- The surface of the property is covered by a building or asphalt.
- There are no other facilities on the property.

Ecology has agreed that industrial cleanup standards apply to the site (Ecology, 2006b).

Site-specific soil CULs were developed for each of the following soil exposure scenarios:

- Future on-site industrial workers who incidentally ingest, inhale, and have dermal contact with site-related chemicals in soil (less than 15 feet bgs). Some of the IHSs such as hexavalent chromium and TCE are located primarily beneath the building. For the purposes of the RA, it is assumed that the building could be removed in the future and that workers could have long-term exposure to IHSs in the soil now beneath the building.
- Indoor industrial workers who inhale volatile chemicals that migrate from soil in the vadose zone to indoor air through cracks in the building foundation. The only soil IHS considered to be a volatile chemical is TCE.

As agreed to by Ecology, soil CULs based on leaching to groundwater are not needed to protect human health and the environment. Instead, empirical groundwater data will be used to evaluate and manage potential risks associated with exposure to groundwater.

The development of soil CULs is described briefly below and in detail in Appendix J. Development of soil CULs is summarized in Tables J-4 and J-5.

# 7.1.1.1 Outdoor Industrial Worker CUL—Direct Contact with Soil

Equations 745-4 and 745-5 in WAC 173-340-745 were slightly modified to estimate industrial soil CULs based on direct-contact exposure routes (see Appendix J). The most significant modification was the addition of an exposure route to account for inhalation of airborne chemicals originating from soil. This modification was made to comply with WAC 173-340-745(5)(c)(iv), which requires an evaluation of inhalation exposures when a site-specific CUL is significantly greater than a leaching-to-groundwater CUL for the protection of drinking water. Groundwater at the site has been classified as nonpotable, and site-specific CULs are significantly different from the CUL for the protection of drinking water. The direct-contact soil CULs protective of industrial workers are shown in Tables 25, 26, 27, and 28.

Equations 745-4 and 745-5 in WAC 173-340-745 were not used to calculate industrial soil CULs for arsenic and lead. Instead, the industrial soil CULs for arsenic and lead were set at the MTCA Method A soil CULs for industrial properties. The Method A industrial soil CUL was used for arsenic because the calculated CUL for arsenic was below natural background concentrations. The Method A value accounts for natural background levels of arsenic in soil. The Method A industrial soil CUL was used for lead because no reference dose was available to calculate a CUL for lead. The USEPA uses a unique method to evaluate risks associated with exposure to lead, in part because the toxicokinetics of lead is relatively well understood.

Note that MTCA rules were amended in October 2007 so that total cPAHs would be considered a single hazardous substance when establishing compliance with CULs. Revised direct contact soil cleanup levels for total cPAHs were not calculated. The only PAH in soil that was considered to be an IHS prior to October 2007 was chrysene. Chrysene was screened for risk using the CUL established prior to October 2007.

# 7.1.1.2 Indoor Industrial Worker CUL—Indirect Exposure to Volatile Chemicals in Soil

The primary route by which an indoor worker could be exposed to chemicals in soil is through inhalation of volatile chemicals that migrate from soil and penetrate buildings. The only soil IHS considered to be a volatile chemical is TCE. A soil CUL for TCE that is protective of indoor workers was estimated using a USEPA model that simulates how volatile chemicals migrate from soil into indoor air (see Appendix J). The soil CUL protective of indoor industrial workers who may have indirect exposure to TCE in indoor air is 41.5  $\mu$ g/kg (Table 27).

It should be noted that vapor intrusion into a building is a complex process, and the USEPA models used to estimate soil CULs make a number of simplifying assumptions (USEPA, 2004a). Instead of using soil-sample results to infer potential risks associated with exposure to vapors in the building, more appropriate indoor-air sample results are available for this purpose.

### 7.1.2 Groundwater CULs

Because groundwater at the site is not used as a drinking-water source and is unlikely to be used as a source of drinking water in the foreseeable future, this exposure scenario is incomplete. Therefore, site-specific Method B CULs (WAC 173-340-720(6)(c)) have been calculated as part of this RA, based on the following exposure scenarios, which are more appropriate for the site:

- Industrial workers who inhale volatile chemicals that migrate from groundwater
- Excavation workers who directly contact groundwater
- Potential discharge of groundwater to surface water

The development of groundwater CULs is described briefly below and in detail in Appendix J. CULs for groundwater IHSs are shown in Tables 29 through 33.

# 7.1.2.1 Indoor Industrial Worker CULs—Indirect Exposure to Volatile Chemicals in Groundwater

Site-specific groundwater CULs protective of indoor workers were developed for TCE and vinyl chloride, the two IHSs that are considered volatile chemicals. These CULs protective of indoor workers will also be protective of outdoor workers.

The method for estimating risk-based CULs for groundwater protective of indoor workers is very similar to the methods discussed above for volatiles in soil (Appendix J). The only difference is that a transfer factor simulating migration of a chemical in groundwater (not soil) to indoor air is used to estimate the groundwater CUL. The groundwater CULs for TCE and vinyl chloride are 10.8  $\mu$ g/L and 71.5  $\mu$ g/L, respectively (Table 31).

As mentioned above, a number of factors structure vapor migration from groundwater into a building, and the USEPA models used to simulate this process include a number of assumptions. Empirical indoor-air sample results are more appropriate for evaluating risks associated with exposure to volatile chemicals in indoor air than comparisons of groundwater sample results with model-derived CULs.

### 7.1.2.2 Excavation Worker CUL-Direct Contact with Groundwater

Neither CULs nor methods to calculate CULs for potential excavation workers who may directly contact chemicals in groundwater are included in MTCA WAC 173-340-700 through WAC 173-340-760. However, the DEQ has developed RBCs for this potential exposure scenario. The DEQ RBCs are calculated using conservative exposure assumptions and acceptable risk levels that are identical to those used for MTCA Method B groundwater CULs. Although excavation workers are expected to have short-term exposure durations (e.g., acute or subchronic), the DEQ's RBCs are calculated using chronic toxicity data and therefore overestimate potential risks. The DEQ assumes that excavation workers inhale volatile chemicals that migrate from groundwater to air in an excavation, and that workers have dermal contact with chemicals in groundwater. Equations and assumptions used to calculate the RBCs are described in Appendix B of the September 2003 DEQ *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (DEQ, 2003). These DEQ RBCs were used as groundwater CULs protective of potential excavation workers (see Table 29).

No DEQ RBC is available for ORO. The DEQ RBC for DRO has been set at the solubility limit because maximum dissolved concentrations of DRO are not expected to pose unacceptable risks to excavation workers (DEQ, 2003). Concentrations of ORO are lower than concentrations of DRO, ORO is expected to be less soluble than DRO, and dissolved ORO is not expected to pose unacceptable risk to potential excavation workers. No free-phase petroleum product has been observed on groundwater at the site.

### 7.1.2.3 CULs Protective of Surface Water

Groundwater CULs at the property boundary that would be protective of surface water of the Duwamish River have been developed for all of the groundwater IHSs through the fate and transport modeling described in Section 6.3. Because fate and transport modeling shows that IHSs present at the site will not reach the Duwamish River, groundwater CULs that exceed surface-water CULs can be established consistent with WAC 173-340-720(6)(c)(i)(E). Appendix A provides the modeling output for the development of CULs. Groundwater CULs applicable at the eastern property boundary were developed by setting the target concentration at the point where groundwater discharges to the Duwamish River equal to surface-water screening levels, and accounting for attenuation that occurs between the property boundary and the Duwamish River. The most conservative Ecology or USEPA surface-water criteria (see Appendix A) were used as target concentrations. The CULs are provided in Tables 29 through 33.

It will likely be appropriate to establish the downgradient monitoring wells near the eastern property boundary, as a conditional point of compliance for the CULs for protection of surface water. In order for Ecology to approve this conditional point of compliance, Precision must demonstrate that it is not practicable to meet the CUL throughout the site within a reasonable restoration timeframe (see WAC 173-340-720(8)(c)).

### 7.1.3 Soil-Gas Preliminary CULs

Sub-slab soil-gas preliminary CULs were developed for TCE and vinyl chloride, a breakdown product of TCE. Both of these VOCs were detected in sub-slab soil-gas samples. These

preliminary CULs were estimated by applying an attenuation factor to the MTCA Method C air CUL for each chemical. The attenuation factor was calculated using a USEPA model that simulates migration of vapors across a slab and into a building (Appendix J). The sub-slab soil-gas preliminary CULs for TCE and vinyl chloride are 8,150  $\mu$ g/m<sup>3</sup> and 103,000  $\mu$ g/m<sup>3</sup>, respectively (Table 34).

### 7.1.4 Indoor-Air CULs

To aid interpretation of indoor-air sample results (Table 35), airborne chemical concentrations were compared to MTCA Method C air CULs (Ecology, 2006a).

## 7.2 Risk Results

Potential risks that IHSs in soil, groundwater, soil gas, and indoor air may pose to human health are evaluated below by comparing detected concentrations in these media with site-specific CULs. Tables 7-1, 7-2, and 7-3 and Figures 7-1 and 7-2, immediately following this page, show CUL exceedances. These exceedances are described in the sections below.



## Table 7-1 IHS Exceedances in Soil Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Depth (ft. bgs)	Soil Chromium (Hexavalent) (mg/kg)	Arsenic (mg/kg)	Lead (mg/kg)	Trichloro- ethene (µg/kg)
MTCA Method & CIII s for Uprestricted Land Use				19	20	NR	30
MTCA Method B CILLs for Ingestion only				240	0.67	NR	2,500
MTCA Method C CUI s for Ingestion Only				11,000	88	NR	330,000
MTCA Method C COLS for Ingestion Only				775	20 <sup>a</sup>	1000 <sup>a</sup>	6,780
				NV	NV	NV	42
CUL for vapor inclusio							Q. 1. 1977
Preliminary Cleanup	GPR-S-14.5	6/16/2005	14.5				1,160
GP6 GP11	GP11-S-2.0	6/17/2005	2	1			87.2
	GP11-S-8.5	6/17/2005	6.5				281
CD19	GP18-S-1.0	12/13/2005	1	2,300 J			-
CP22	GP32-S-1.0	12/14/2005	1	3,500 J	101.44	-	
Off Cite Hand Augor	Sampling		1				
	HA3-0.5	12/15/2005	0.5	+-	53.9		μ.
НАЗ	HA4-0.5	12/15/2005	0.5		44.3	1,710	1
	HA5-0.5	12/15/2005	0.5	100 march	35.9	1,440	.44
	HA22-S-0.5	1/10/2007	0.5	-	53.5		1
NOTES: Bold indicates concentra = not detected at or ab CUL = cleanup level. ft. bgs = feet below groun IHS = indicator hazardou J = estimated concentrat mg/kg = milligrams per k MTCA = Washington Sta µg/kg = micrograms per	ations that exceed one hove CULs. Ind surface. us substance. tion. tilogram. ate Department of Ecol kilogram.	or more of the re ogy's Model Toxi	levant CULs	.ct.			

NV = no value.

\*MTCA Method A—Industrial Use.



# Table 7-2 IHS Exceedances in Sub-Slab Vapor (µg/m<sup>3</sup>) Precision Engineering, Inc. Seattle, Washington

Location	Date	Trichloroethene
PCUL for Vapor Intr	rusion	8150
A5	04/18/2006	37,000
Bold indicates concer	ntrations that exceed	one or more of the



### Table 7-3 IHS Exceedances in Groundwater Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Chromium (Hexavalent) (mg/L)	Chromium (Trivalent) (mg/L)	Arsenic (µg/L)	Trichloro- ethene (µg/L)	Vinyl Chloride (µg/L)
MTCA Method A Groundwater CIII s			NV	NR	5	5	0.2
MTCA Method	B Groundwater CIII	0.048	NR	0.0583	0.109	0.0292	
MTCA Method C Groundwater CULs			88	NR	0.0583	1.1	0.29
MTCA Method C Globinowater COLS			1.22	800 <sup>a</sup>	2.46	37	92
MICA Method C Surface Water COLS			ND	NR	0.018	25	0.025
AVVQC-Hum	AWQC—Human Health		0.015	180	360	NR	NR
Preliminary Cleanup Level			0.015	57	190	NR	NR
AWQC-Aqua	AWQC—Aquatic Life—Chronic		U.UT	NV	NV	309	71.5
CUL for Vapor	CUL for Vapor Intrusion		INV	INV	inv.	505	11.0
Site-Specific C Surface Water	Groundwater CUL for t	he Protection of	0.085	950,000	0.06	600	4
Excavation We	Excavation Worker Direct Contact Groundwater CUL			190	5.8	130	1100
Monitoring W	/ell Groundwater Dat	a	All some series			1	
MIN/1	MW1-W-35.0	6/16/2005	0.269	NC	NA	NA	44
	MIN/1-122705	12/27/2005			32.3		
	MM/1-041908	04/18/2006	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		33		
MANO	MIND 10005	12/28/2005			5.63		
IVIVV2	WIV2-122000	04/10/2006	-		3.8		
	NIV2-041906	12/20/2005			15.3		
MIVV3	WIVV3-122905	12/29/2005	a part of the second	a	13		
	101003-041706	10/07/2005			15.1		
MVV4	MVV4-122705	12/2//2005			15.1		(a) (a) (b) (b) (b) (b) (b) (b) (b) (b) (b) (b
	MVV4-041806	04/18/2006	100		1.50		
MW5	MW5-122805	12/28/2005	450	NC	4.05	· I ·	pel Ster
	MW5-041906	04/19/2006	350	NC	4.9		-
MW6	MW6-122905	12/29/2005			11.5		1112
	MW6-041906	04/19/2006			24		
MW7	MW7-122805	12/28/2005			0.02		-
	MW7-041806	04/18/2006			7.1		
MW8	MW8-122805	12/28/2005			6.41		
	MW8-041806	04/18/2006			4.8		
Reconnaissa	ince Groundwater Da	ata			1 110	1	-
GP2	GP2-W-17-RECON	6/9/2005	32.38	-	NA		
GP4	GP4-W-8.0	6/16/2005	31	236	NA		
GP6	GP6-W-18.0	6/16/2005	43	300	NA	1130	
GP8	GP8-W-10.0	6/16/2005	61	294	NA		
GP-13	GP13-W-8.0	12/14/2005					16.5
NOTES: Bold indicates = not detected >Max = greater ARAR = applica	concentrations that excee d at or above CULs. than 100,000. able or relevant and appro-	d one or more of the r priate requirement.	elevant CULs.				
MVGC = amble CUL = cleanup IHS = indicator I mg/L = milligrar MTCA = Washi µg/L = microgra NA = not availal NC = not calcula	haver quality crienta. hazardous substance. ms per liter. ngton State Department o ms per liter. ble. ated.	f Ecology's Model To	xics Control Act.			1 	) T T
NR = MTCA rep NV = no value.	ported the CUL as not res	sarched.			↓		

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Approved By: M, G



#### 7.2.1 Soil on Former Precision Property

Only two IHSs were detected in soil on the former Precision property at a concentration greater than a site-specific soil CUL: hexavalent chromium and TCE. The spatial extent of CUL exceedances for these IHS is discussed below. Because no CULs were developed for DRO and ORO, a risk evaluation of petroleum hydrocarbons is also discussed below. See Tables 25 through 28 for soil screening results. Note that Table 28 includes all seven cPAHs (even though chrysene was the only original IHS) along with a total cPAH value calculated by applying TEFs.

#### 7.2.1.1 Hexavalent Chromium

Two soil samples collected beneath the building (GP18 and GP36) had concentrations of hexavalent chromium above the direct-contact CUL of 775 mg/kg for industrial workers. The concentration at GP18 was 2,300 mg/kg, and the concentration at GP32 was 3,500 mg/kg (Table 25). Both of the samples with hexavalent chromium concentrations above the CUL were collected at approximately 1 foot bgs (Table 25), and both were collected within approximately 5 feet of each other (Figure 6). Hexavalent chromium concentrations in several samples collected at multiple depths surrounding GP18 and GP32 were below the industrial-worker CUL. As a result, it appears that soil with hexavalent chromium concentrations above a CUL is limited to a relatively small and well-defined area immediately beneath the building slab.

At present, the building prevents workers from having direct contact with hexavalent chromium in soil, and there is no current unacceptable risk to human health, based on hexavalent chromium in soil. Unacceptable risk would occur only if the building was removed in the future, contaminated soil was left on the ground surface for an extended period of time, and humans were present in the contaminated area.

#### 7.2.1.2 TCE

Soil samples collected at 14.5 feet bgs at GP6, and at 2 and 6.5 feet bgs at GP11, had concentrations of TCE above the vapor-intrusion CUL of 41.5  $\mu$ g/kg (Table 27). The maximum detected concentration of TCE in soil was 1,160  $\mu$ g/L at GP6. TCE was not detected in soil at concentrations exceeding a direct-contact CUL. As mentioned previously, risk estimates based on comparisons of soil analytical results with soil CULs for vapor intrusion are less reliable than those based on interpretations of indoor-air sample results. TCE was not detected in indoor air at concentrations that exceed the indoor-air CUL. Risks associated with potential exposure to TCE in indoor air are discussed in Section 7.2.5.

#### 7.2.1.3 TPH

Concentrations of extractable petroleum hydrocarbons and other constituents for the soil sample with the highest petroleum-hydrocarbon concentrations (GP21 at 6.5 feet) were input into Ecology worksheets for evaluating petroleum hydrocarbons in soil. The result from the worksheet showed that this soil sample passed the calculated exposure pathways for industrial land use and Method B potable groundwater protection (see Appendix K), and that concentrations of petroleum hydrocarbons in soil do not pose a threat to human health or the environment.

# 7.2.1.4 Cumulative Risk for Soil on Former Precision Property

Chemical-specific direct-contact CULs for on-site soil do not require adjustment to account for exposure to multiple hazardous substances via multiple pathways (WAC 173-340-745(6)). Soil direct-contact CULs were calculated assuming multiple potential exposure pathways (e.g., ingestion, inhalation, dermal contact), and all significant alternative exposure routes were considered. Two IHSs were identified for on-site soil: hexavalent chromium and TCE. Total excess cancer and noncancer risk estimates associated with direct-contact exposures to on-site soil are shown in Table 36. Both cancer and noncancer risk estimates associated with exposure to the maximum concentration of TCE in on-site soil are orders of magnitude below the acceptable risk level. The noncancer CUL for hexavalent chromium is lower than the cancer CUL. Because risks associated with exposure to TCE are so low, the noncancer CUL for hexavalent chromium does not need to be adjusted downward in order to achieve acceptable risk levels associated with exposure to multiple chemicals.

# 7.2.2 Soil in Off-Property Drainage Ditch

The only IHSs that were detected in off-property drainage-ditch soil at a concentration greater than a site-specific soil CUL were lead and arsenic. The spatial extent of CUL exceedances for these IHSs is discussed below. Because no CULs were developed for DRO and ORO, a risk evaluation of petroleum hydrocarbons is also discussed below.

# 7.2.2.1 Arsenic

The concentrations of arsenic in four shallow soil samples collected from the drainage ditch south of the building (HA3, HA4, HA5, and HA22) were above the direct-contact CUL of 20 mg/kg (Table 26 and Figure 6). The maximum detected concentration was 53.9 mg/kg. All four samples are in locations that would receive runoff from a discharge pipe from the industrial property east of the former Precision property, especially HA22, which is located directly beneath where the outfall discharges (see Section 2.4.1 and Figure 6). As discussed in Section 1.2.2, data collected during this RI indicate that the arsenic in samples from the ditch likely originated from multiple sources.

# 7.2.2.2 Lead

The concentrations of lead in two shallow soil samples collected from the drainage ditch south of the building (HA4 and HA5) were above the direct contact CUL of 1,000 mg/kg (Table 26 and Figure 6). The maximum detected concentration was 1,710 mg/kg. As discussed in section 1.2.2, data collected during this RI indicate that the lead in samples from the ditch likely originated from multiple sources.

# 7.2.2.3 TPH

Concentrations of extractable petroleum hydrocarbons and other constituents for the soil sample with the highest petroleum hydrocarbon concentrations (HA4 at 0.5 feet bgs) and ditch-soil samples closer to the site (HA2 and HA3 at 0.5 feet bgs) were entered into Ecology worksheets for evaluating petroleum hydrocarbons in soil. The result from the worksheet showed that these

soil samples passed the calculated exposure pathways for industrial land use and Method B potable groundwater protection (see Appendix K), and that concentrations of petroleum hydrocarbons in soil do not pose a threat to human health or the environment.

#### 7.2.3 Groundwater

The only IHSs that were detected in groundwater at concentrations greater than a site-specific groundwater CUL were arsenic, trivalent and hexavalent chromium, and TCE. Concentrations of PAHs (Table 32), and TPH (Table 33) were below available excavation-worker CULs. Note that Table 32 shows all seven cPAHs along with a total cPAH value calculated by applying TEFs under the new MTCA amendment (Ecology, 2007b), however, the risk results remain unchanged. Risk associated with CUL exceedances for IHSs in groundwater is discussed below.

#### 7.2.3.1 Metals

Concentrations of trivalent chromium in three reconnaissance groundwater samples (GP-4, GP-6, and GP-8) were above the excavation-worker CUL (Table 29). All three of these sample locations are under the southern portion of the building.

On-site groundwater concentrations of hexavalent chromium exceeded the CUL for the protection of surface water. All other IHSs and the modeled PAHs in groundwater were below their respective CULs. Hexavalent chromium concentrations that exceeded CULs for the protection of surface water were detected in groundwater samples collected from borings and MW5, located within the building footprint, and from one sample collected from MW1, which is a deep well assumed to be upgradient of the building. Concentrations of hexavalent chromium in wells located near the eastern property line were not detected above their method reporting limits and did not exceed CULs.

Most groundwater samples had concentrations of arsenic that were above the excavation-worker CUL (Table 30). As mentioned previously, arsenic is present at similar concentrations in groundwater throughout the site, and there is no indication that the former Precision property is a source of arsenic contamination. Arsenic in groundwater does not appear to be related to the site, and ambient levels of arsenic in groundwater are above the excavation-worker CUL.

#### 7.2.3.2 TCE

The concentrations of TCE in reconnaissance groundwater samples GP-6 and GP-8 were above the groundwater CUL protective of indoor industrial workers who may have indirect exposure to chemicals that migrate from groundwater to indoor air (Table 31). Also, a sample from MW-5 in December 2005 had a concentration of TCE above the groundwater CUL. Risk estimates based on comparisons of groundwater analytical results with groundwater CULs are less reliable than those based on interpretations of indoor-air sample results. Based on empirical indoor-air sample results, TCE does not pose unacceptable risks to future workers (see Section 7.2.4). The reconnaissance groundwater sample collected at GP6 had a concentration of TCE that was above the excavation-worker CUL (Table 31).

#### 7.2.4 Soil Gas

A sub-slab soil-gas sample collected at A5 had a concentration of TCE above the preliminary soil-gas CUL (Table 34). The concentrations of TCE and vinyl chloride in all other sub-slab soil-gas samples were below soil-gas CULs protective of indoor industrial workers. Based on empirical indoor-air sample results discussed in Section 7.2.5, TCE does not pose unacceptable risks to future workers.

# 7.2.5 Indoor Air

As shown in Table 35, TCE was detected both in indoor-air samples and in an outdoor-air sample collected south of the building. Breakdown products of TCE were not detected in indoor-or outdoor-air samples. The presence of TCE in the outdoor-air sample suggests that there are significant sources of TCE near the site that are unrelated to the former Precision facility. The concentrations of TCE in indoor-air samples were higher than the concentration in the outdoor-air sample. However, all TCE concentrations in indoor air were below the MTCA Method C air CUL.

The presence of TCE breakdown products (e.g., vinyl chloride) in groundwater downgradient of the source area indicates that in situ degradation of TCE is taking place. The TCE release must have occurred before the mid-1980s, when Precision stopped using TCE. TCE concentrations in soil and groundwater are expected to continue to decline over time because of natural degradation processes. Absent any new TCE releases, current conditions represent the worst-case conditions for the foreseeable future. TCE concentrations in indoor air are currently below MTCA Method C CULs, indicating that these concentrations do not pose an unacceptable risk to future workers in the building.

# 7.3 Risk Summary

# 7.3.1 Hexavalent and Trivalent Chromium

Hexavalent chromium concentrations are above CULs in a limited area of shallow soil immediately beneath the building slab. The building prevents workers from having direct contact with hexavalent chromium in soil. There is no current unacceptable risk to human health based on hexavalent chromium in soil. However, it is assumed that workers could contact soil if the building was removed in the future, if contaminated soil was left on the ground surface for an extended period of time, and if humans were present in the contaminated area.

Hexavalent chromium concentrations that exceeded CULs for the protection of surface water were detected in groundwater samples collected from borings and MW5, located within the building footprint, and from one sample collected from MW1, located upgradient of the building. Concentrations of hexavalent chromium in wells located near the eastern property line were not detected above their method reporting limits and did not exceed CULs. Concentrations of

trivalent chromium in shallow groundwater beneath the building were above the excavation-worker CUL.

#### 7.3.2 Lead and Arsenic

The concentrations of lead and arsenic in some shallow-soil samples collected from the drainage ditch south of the former Precision property are above direct-contact CULs. These samples are in locations that would receive runoff from the former Precision property, from properties east and west of the former Precision property, from 14th Avenue, and from the Highway 99/W Marginal Way S on-ramp. Data collected during this RI indicate that the lead and arsenic in samples from the ditch originated from sources other than the former Precision property. For example, neither lead nor arsenic was detected above CULs in the sample from HA2, near the discharge pipe from the western part of the former Precision property, and from the two samples collected just off of the paved area, directly in the path of sheet flow from the eastern portion of the site (HA20 and HA21). In addition, lead and arsenic concentrations detected on the north side of the ditch, near the site, were similar in magnitude to concentrations from the south side of the ditch, receiving sheet flow from a different source, the highway on-ramp. Data collected indicate that the arsenic and lead in samples from the ditch likely originated from multiple sources.

Despite evidence of multiple sources of contamination, Ecology indicated that Precision is at least partially responsible for the exceedances of CULs and did not accept Precision's previous proposal of taking no action in the off-property ditch. Therefore, as a cost-effective way to address the comments and concerns expressed by Ecology, Precision proposed to excavate all ditch soil containing IHSs at concentrations that exceed CULs. A separate work plan for removal of soil from the ditch (MFA, 2007) was approved by Ecology via electronic mail on August 2, 2007 (Ecology, 2007a).

Ditch excavation work and confirmation sampling were completed on October 24 and 25, 2007 (see Section 8). Approximately 100 cubic yards of soil were removed and properly disposed of off site. After excavation was complete, the entire area of soil disturbance was backfilled and stabilized with hydroseed. Because two perimeter confirmation samples exceeded CULs, additional sampling was conducted on November 19, 2007, to delineate any potential contamination surrounding the samples. The results of this additional sampling indicated that there is no widespread contamination outside of the area excavated.

As a precautionary measure, two additional small areas where chemical concentrations in confirmation samples were above conservative CULs were excavated on March 27, 2008. Approximately 4 cubic yards of soil was removed and properly disposed of off site. The excavated areas were backfilled with clean soil and stabilized with grass seed. Confirmation soil samples were collected from the bottom of the excavation. One confirmation sample had concentrations of arsenic and lead that exceeded CULs by 8 percent and 2 percent, respectively. Because these concentrations are only slightly above conservative CULs, residual soil impacts are both isolated and small in extent, and over a foot of clean fill material covers the sample location, no additional removal activities were warranted. All disturbed areas were stabilized with hydroseed, and contaminants are not expected to be mobile.

# 7.3.3 TCE

TCE was detected in soil, groundwater, and sub-slab soil-gas samples collected beneath the building at concentrations above model-derived CULs protective of indoor industrial workers. Concentrations of TCE in groundwater beneath the building were also above the CUL protective of excavation workers. Concentrations of TCE in indoor air of the building were below the applicable CUL, and TCE was present in outdoor air near the site, suggesting that there are sources in the region unrelated to the former Precision property. Given that TCE concentrations in indoor air were lower than model predictions, it can be reasoned that the transport models used to estimate soil, groundwater, and sub-slab soil-gas CULs overpredicted indoor-air concentrations of TCE. Based on empirical indoor-air sample results, site-related volatile chemicals do not appear to pose unacceptable risks to future workers.

Ecology has requested that Precision complete additional investigation of the indoor-air pathway. However, Precision has decided that the most cost-effective way to address this pathway is to proceed with the installation of a sub-slab vapor mitigation system to remediate any potential risks associated with the presence of sub-slab TCE concentrations (see Section 8).

# 8 CLEANUP ACTIONS

#### 8.1 Off-Property Ditch

Despite evidence of multiple sources of contamination, Ecology did not accept Precision's previous proposal of taking no action in the off-property ditch because of the belief that Precision is at least partially responsible for the exceedances of soil CULs. Therefore, as a cost-effective way to address the comments and concerns expressed by Ecology, Precision proposed to excavate all ditch soil containing IHSs at concentrations that exceed CULs. A separate work plan for removal of soil from the ditch (MFA, 2007) was submitted to and subsequently approved by Ecology (Ecology, 2007a).

In October 2007, approximately 100 cubic yards of soil was removed and properly disposed of off site. After excavation was complete, the entire area of soil disturbance was backfilled and stabilized with hydroseed. Subsequent sampling and removal activities were also completed in November 2007 and March 2008, and are described below.

#### 8.1.1 Procedures

General Environmental Management, Inc. completed the ditch excavation work on October 24 and 25, 2007. A silt fence was installed prior to the excavation work to prevent soil from being transported off the site and entering natural drainages. Consistent with the approved work plan, the area of excavation included approximately 2,685 square feet surrounding sample locations HA3, HA4, HA5, and HA22, where CUL exceedances had been documented (see Figure 10). The depth of excavation was approximately 1 foot, for an approximate excavation volume of 2,685 cubic feet or approximately 100 cubic yards. Based on the area delineated in the work plan for removal of soil from the ditch (MFA, 2007), the excavation area was measured out and flagged prior to digging.

Following the excavation, MFA collected confirmation samples from the bottom of the excavation (B1 through B13) and from the side walls/surface soil along the perimeter of the excavation (P1 through P9). Consistent with the approved work plan, all the samples were analyzed for arsenic and lead. In addition, sample B5 was analyzed for PAHs, GRO, DRO, ORO, and benzene, toluene, ethylbenzene, and xylenes (BTEX). Because of elevated concentrations of arsenic and lead in two perimeter confirmation samples,

additional surface soil samples (SS1 through SS6) were collected on November 19, 2007, and analyzed for arsenic and lead.

Two composite soil samples were collected from the excavated soil and analyzed for eight Resource Conservation and Recovery Act metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver) by TCLP (toxicity characteristic leaching procedure) analysis for the purpose of characterization for disposal. No metals were detected through the TCLP analysis, so the soil was classified as nonhazardous for disposal.

Approximately 123 tons of soil was disposed of at Waste Management's Columbia Ridge facility in Arlington, Oregon. Following confirmation sampling, clean topsoil was backfilled in place of the excavated soil and graded to replicate the original contours. For erosion control, stabilization, and durability, the disturbed surface was hydroseeded with a fiber-bonded grass-seed mix. The fiber-bonding prevents erosion while the grass establishes a root system that will stabilize the soil.

#### 8.1.2 Confirmation Sampling Results

Figure 10 and Tables 37 through 40 provide the locations and analytical results for the 31 initial confirmation samples that were analyzed. Confirmation sampling results indicated one duplicate sample (B13, duplicate of B12) from the bottom of the excavation and one sample (P1) on the perimeter of the excavation that had slight exceedances of the direct-contact CUL of 20 mg/kg for industrial workers for arsenic. Arsenic concentrations at B13 and P1 were 26.3 mg/kg and 22 mg/kg, respectively.

An additional sample on the north border of the excavation (P9) had detections of arsenic and lead (at 111 mg/kg and 2,410 mg/kg, respectively), which exceeded CULs for both arsenic (20 mg/kg) and lead (1,000 mg/kg). On November 19, 2007, additional sampling (SS-1 through SS-6) was conducted in the area surrounding P1 and P9, to delineate the extent of soil exceeding CULs. Analytical results are provided in Table 37. A sample from 1.5 feet bgs at SS-6 contained arsenic at a concentration of 23.7 mg/kg, which slightly exceeded the CUL for arsenic. All other samples contained arsenic and lead below CULs.

The results of this additional sampling indicated that there is no widespread contamination outside of the area excavated. Based on the spatial pattern in concentrations, the exceedances near the boundary of the excavation encompass a very small area.

#### 8.1.3 Followup Excavation

General Environmental Management, Inc. completed additional excavation of the soil surrounding sample points P9, P1, and SS6 on March 27, 2008. An area of approximately

31 square feet was excavated around sample point P9 to a depth of 2 feet (see Figure 10). The 2 cubic yards of excavated material was disposed of as hazardous waste, based on the high concentration of lead detected in sample P9. An area of approximately 39 square feet was excavated around sample points P1 and SS6 to a depth of 1.5 feet. The 2 cubic yards of material excavated from this area was disposed of as nonhazardous waste. The excavated areas were backfilled with clean soil and stabilized with grass seed.

Following the excavation, MFA collected confirmation samples from the bottom of the excavation (C1 through C3). Perimeter samples were not needed, since the surrounding area had been investigated in previous efforts. The soil samples were analyzed for arsenic and lead. The concentrations of the chemicals of concern were below CULs in all of the samples except sample C3. Concentrations of arsenic and lead in sample C3 exceeded CULs by 8 percent and 2 percent, respectively. No additional removal actions were deemed warranted for several reasons: the concentrations are very close to soil CULs, residual soil impacts are both isolated and small in extent, and over a foot of clean fill material covers the sample location.

# 8.2 Indoor Air

Ecology has requested that Precision complete additional investigation of the indoor-air pathway. However, Precision has decided that the most cost-effective way to address this pathway is to proceed with the installation of a sub-slab vapor mitigation system to remediate any potential risks associated with the presence of sub-slab TCE concentrations. On February 13, 2008, Precision submitted a separate cleanup action plan to Ecology that described the proposed sub-slab vapor mitigation system (Pioneer, 2008).



# LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.



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# Table Notes Precision Engineering, Inc. Seattle, Washington

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R = applicable or relevant and appropriate requirement.	
QC = ambient water quality criteria.	
= below ground surface.	
<sup>3</sup> C = chemical of potential concern.	
s soil concentration.	
. = cleanup level.	
-, = Cleanup level based on cancer effects.	
are = Cleanup level based on noncancer effects.	
- degrees Celsius.	
f = detected using Northwest Total Petroleum Hydrocarbon identification scan.	
R = excess lifetime cancer risk (ELCR = C <sub>s</sub> *10 <sup>-5</sup> /CUL <sub>2</sub> ).	
feet.	
ax = greater (han 100,000.	
= greater than saturation.	
= hazard quotient (HQ=C_/CUL <sub>nc</sub> ).	
= indicator hazardous substance.	
estimated concentration.	
kg = millgrams per kilogram.	
1. = milligrams per liter.	
E = measuring point elevation.	
CA = Washington Department of Ecology's Model Toxics Control Act.	
kg = micrograms per kilogram.	
L = micrograms per liter.	
$m^3 = micgrograms$ per cubic meter. cm = microsiemens per centimeter.	
= not available.	
= not calculated.	
= not detected using Northwest Total Petroleum Hydrocarbon identification scan.	
VD = National Geodetic Vertical Datum 1929.	
I = MTCA reported the CUL as not researched.	
Us = nephelometric turbidity units.	
t = ⊓o value.	
F = Toxixity Equivalency Factors	
= not detected at or above the method reporting limit.	Concerning and the second
ivalent chromium concentrations were calculated by subtracting the hexavalent chromium value from the total chromium value. In I	nexavalent chroninu

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# Table 1 Water-Level Elevations Precision Engineering, Inc. Seattle, Washington

Location	Date	Measuring-Point Elevation (MPE) (ft NGVD)	Depth to Water (ft bgs)	Water-Level Elevation (ft NGVD)
MALA	10/07/2005	23.16	2.03	21.13
WW-1	1/17/2000	23.16	0.61	22.55
11000	6/8/2006	23.16	1.57	21.59
MALO	12/27/2005	18.86	4.82	14.04
IVIVV-2	1/17/2000	18.86	4.65	14.21
	6/8/2006	18.86	4.64	14.22
MIAL 2	12/27/2005	19.51	5.48	14.03
WW-3	4/17/2006	19.51	5.79	13.72
10 C 10 C 10	6/8/2006	19.51	5.93	14.61
MALA	12/27/2005	20.54	5.77	14.77
IVI V V-44	4/17/2006	20.54	5.55	14.99
	6/8/2006	20.54	5,61	14.93
MIALS	12/27/2005	19.86	5.52	14.34
10100-0	4/17/2006	19.86	5.32	14,54
	6/8/2006	19.86	5.29	14.57
MALE	12/27/2005	17.99	4.70	13.29
10100-0	4/17/2006	17.99	4,27	13.72
<ul> <li>••••••••••••••••••••••••••••••••••••</li></ul>	6/8/2006	17.99	4.10	13.89
MMAL7	12/27/2005	17.84	5.77	12.07
	4/17/2006	17.84	4.64	13.20
	6/8/2006	17.84	5.17	12.67
MMA/-8	12/27/2005	17.35	3.32	14.03
1010 0-0	4/17/2006	17.35	3.12	14.23
	6/8/2006	17.35	3.33	14.02
Staff Gauge	12/27/2005	19.61 ft NGVD @ 8.00	Dry	Dry
oran oddge	4/17/2006	19.61 ft NGVD @ 8.00	Dry	Dry
	6/8/2006	19.61 ft NGVD @ 8.00	0.02	19.63

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Table 2

# Indoor-Air Temperature and Pressure Readings Precision Engineering, Inc. Seattle, Washington

		Initial Rea	dings		Four-Hour Rt	eadings		Eight-Hour R	eadings
Sample	Time	Temperature (°C)	Atmospheric Pressure (inches of mercury)	Time	Temperature (°C)	Atmospheric Pressure (inches of mercury)	Time	Temperature (°C)	Atmospheric Pressure (inches of mercury)
141	7-46	20.8	30.03	11:43	21.7	30.00	15:46	23.8	30.00
147	7-49	20.9	30.03	11:42	21.7	30.00	15:49	23.9	30.00
143	7-50	20.9	30.03	11:44	22.0	30.00	15:50	24.0	30.00
IAA	7-53	21.0	30.03	11:48	22.2	30.00	15:53	24.0	30.00
145	7.57	211	30.03	11:49	22.3	30.00	15:57	23.8	30.00
IAG	7.55	21.1	30.03	11:51	22.5	30.00	15:55	23.9	30.00
IA7	7.42	20.4	30.03	11:37	21.3	30.00	15:45	22.9	30.00
IA8	7:53	21.0	30.03	11:48	22.2	30.00	15:53	24.0	30.00

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Table 3
Chromium in Soil (mg/kg)
Precision Engineering, Inc.
Seattle, Washington

Location	Sample ID	Date	Depth (ft bgs)	Chromium	Chromium (Hexavalent)	(Trivalent) <sup>a</sup>
On-Site	Geoprobe Samp	ling				
GP1	GP1-S-1.5	6/7/2005	1.5	205	152	53
	GP1-S-6.0	6/7/2005	6	147	31.8	115.2
	GP1-S-10.0	6/9/2005	10	73.5	14.4	59.1
GP2	GP2-S-1.0	6/7/2005	1	2680	523	2157
1. Sec. 1.	GP2-S-10.0	6/9/2005	10	24.9	0.109 U	24.9
GP3	GP3-S-2.0	6/9/2005	2	915	27.7	887.3
-	GP3-S-6.0	6/9/2005	6	1100	49.8	1050.2
	GP3-S-14	6/9/2005	14	941	34.4	906.6
GP4	GP4-S-1.5	6/16/2005	1.5	1230	53.4	1176.6
GP5	GP5-S-1.5	6/16/2005	1.5	18.9	0.111 U	18.9
	GP5-S-14.0	6/16/2005	14	20.1	0.115 U	20.1
GP6	GP6-S-1.0	6/16/2005	1	584	627	NC
0.01	GP6-S-14.5	6/16/2005	14.5	259	0.181	258.819
GP7	GP7-S-2.0	6/16/2005	2	23.6	0.119	23,481
2. 4	GP7-S-8.0	6/16/2005	8	21	0.113 U	21
GP8	GP8-S-1.5	6/16/2005	1.5	22.2	0.661	21.539
GP9	GP9-S-2.0	6/17/2005	2	43.3	2,97	40.33
GP10	GP10-S-1.5	6/17/2005	1.5	21.8	0.142	21.658
11.12	GP10-S-13.5	6/17/2005	13.5	24.1	0.106 U	24.1
GP11	GP11-S-2.0	6/17/2005	2	21.7	0.573	21.127
	GP11-S-6.5	6/17/2005	6.5	17.3	0.37	16.93
GP12	GP12-S-3.0	12/13/2005	3	24.3	1.1 UJ	24.3
-1.14	GP12-S-5.0	12/13/2005	5	25.2	1.0 UJ	25.2
GP13	GP13-S-1.0	12/14/2005	1	26.6	1.4 UJ	26.6
	GP13-S-6.0	12/14/2005	6	46.6	1.3 UJ	46.6
GP14	GP14-S-3.0	12/13/2005	3	24.8	2.0 UJ	24,8
	GP14-S-6,0	12/13/2005	6	31.4	1.2 J	30.2
GP15	GP15-S-3.0	12/13/2005	3	24.7	1.2 UJ	24.7
0.10	GP15-S-6.0	12/13/2005	6	20.2	1.2 UJ	20.2
GP16	GP18-S-1.0	12/13/2005	1	30.0	2.1 UJ	30.0
0.10	GP16-S-5.0	12/13/2005	5	26.2	2.1 UJ	26.2
GP17	GP17-S-1.0	12/13/2005	1	254	1.7 UJ	254
	GP17-S-6.0	12/13/2005	6	1660	60 J	1600
GP18	GP18-S-1.0	12/13/2005	1	4430	2300 J	2130
GP19	GP19-S-1.0	12/13/2005	1	22.0	2.5 UJ	22.0
an in	GP19-S-1.0-Dup	12/13/2005	1	24.8	2.0 UJ	24.8
	GP19-S-7.0	12/13/2005	7	27.1	2.7 UJ	27.1
GP20	GP20-S-1.0	12/14/2005	1	17.6	1.1 UJ	17.6
	GP20-S-6.0	12/14/2005	6	24.5	1.5 UJ	24.5
GP21	GP21-S-1.0	12/14/2005	1	25.6	1.0 UJ	25.6
	GP21-S-6.5	12/14/2005	6.5	23.0	1.3 UJ	23.0
GP22	GP22-S-1.0	12/13/2005	1	46.8	2.9 J	43.9
Con passa	GP22-S-10.0	12/13/2005	10	32.1	1.3 UJ	32.1
GP23	GP23-S-7.0	12/14/2005	7	23.3	1.1 UJ	23.3
	GP23-S-10.5	12/14/2005	10.5	979	1.2 UJ	979
GP24	GP24-S-3.0	12/14/2005	3	30.2	1.0 UJ	30.2
OF 44	GP24-S-3.0-Dup	12/14/2005	3	26.2	1.1 UJ	26.2
	L CD24 S 65	12/14/2005	6.5	29.3	2.4 UJ	29.3

 
 GP24-S-6.5
 12/14/2005
 6.5
 29.3
 2.4

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# Table 3 Chromium in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

Sample ID	Date	Depth (ft bgs)	Chromium	Chromium (Hexavalent)	Chromium (Trivalent) <sup>a</sup>
Geoprobe Sam	pling				
GP25-S-1.0	12/12/2005	1	19.3	1.8 UJ	19.3
GP25-S-7.0	12/12/2005	7	19.8	1.7 UJ	19.8
GP26-S-1.0	12/12/2005	1	23,7	2.2 UJ	23,7
GP26-S-9.5	12/12/2005	9.5	24.0	2.1 UJ	24.0
GP27-S-1.0	12/12/2005	1	22.0	2.2 UJ	22.0
GP27-S-13.0	12/12/2005	13	18.6	2.1 UJ	18.6
GP28-S-1.0	12/12/2005	1	20.5	2.2 UJ	20.5
GP28-S-7.0	12/12/2005	7	22.4	1.8 UJ	22.4
GP29-S-1.0	12/12/2005	1	29.6	2.4 UJ	29.6
GP29-S-6.0	12/12/2005	6	31.9	2.6 UJ	31.9
GP30-S-1.0	12/12/2005	1	27.2	2.1 UJ	27.2
GP30-S-6.0	12/12/2005	6	32.7	2.4 UJ	32.7
GP31-S-1.0	12/12/2005	1	19.2	2.1 UJ	19.2
GP31-S-6.0	12/12/2005	6	23.6	3.0 UJ	23.6
GP32-S-1.0	12/14/2005	1	6750	3500 J	3250
Hand-Auger Sa	ampling	10002		and the second second	
HA1-0.5	12/15/2005	0.5	34.3	2.9 UJ	34.3
HA1-1.5	12/15/2005	1.5	110	6.5 J	103.5
HA1-1.5-Dup	12/15/2005	1.5	84.5	2.8 UJ	84.5
HA2-0.5	12/15/2005	0.5	206	89 J	117
HA2-1.5	12/15/2005	1.5	215	3.2 J	211.8
HA3-0.5	12/15/2005	0.5	1590	2.6 UJ	1590
HA3-1.5	12/15/2005	1.5	55.2	2.4 UJ	55.2
HA4-0.5	12/15/2005	0.5	8480	7.2 UJ	8480
HA4-1.5	12/15/2005	1.5	280	3.0 UJ	280
HA5-0.5	12/15/2005	0.5	155	5.8 UJ	155
HA5-1.5	12/15/2005	1.5	32.7	2.9 UJ	32.7
HA6-0.5	04/18/2006	0.5	-	3.33 J	NC
HA7-0.5	04/18/2006	0.5		0.22 J	NC
HA8-0.5	04/18/2006	0.5	4-1.4	0,26 J	NC
HA9-0.5	04/19/2006	0.5		3.4 J	NC
HA10.05	04/19/2006	0.5		0.074 J	NC
HA10.05	04/10/2006	0.5	-	0.45 J	NC
	Sample ID           Geoprobe Sam           GP25-S-1.0           GP26-S-9.5           GP26-S-9.5           GP27-S-1.0           GP27-S-1.0           GP28-S-1.0           GP27-S-1.0           GP28-S-1.0           GP28-S-1.0           GP29-S-1.0           GP29-S-1.0           GP29-S-1.0           GP30-S-6.0           GP31-S-1.0           GP31-S-1.0           GP32-S-1.0           GP31-S-1.0           GP32-S-1.0           HA1-0.5           HA1-5           HA1-5           HA1-0.5           HA1-1.5           HA2-0.5           HA3-0.5           HA3-0.5           HA4-0.5           HA4-0.5           HA4-0.5           HA5-0.5           HA6-0.5           HA7-0.5           HA8-0.5           HA9-0.5           HA9-0.5           HA9-0.5           HA10.05           HA11-0.5	Sample ID         Date           Geoprobe Sampling           GP25-S-1.0         12/12/2005           GP25-S-7.0         12/12/2005           GP26-S-1.0         12/12/2005           GP26-S-9.5         12/12/2005           GP27-S-1.0         12/12/2005           GP27-S-1.0         12/12/2005           GP28-S-1.0         12/12/2005           GP28-S-1.0         12/12/2005           GP28-S-1.0         12/12/2005           GP29-S-1.0         12/12/2005           GP29-S-1.0         12/12/2005           GP30-S-1.0         12/12/2005           GP30-S-6.0         12/12/2005           GP31-S-1.0         12/12/2005           GP31-S-1.0         12/12/2005           GP31-S-1.0         12/12/2005           GP32-S-1.0         12/12/2005           HA1-0.5         12/15/2005           HA1-1.5         12/15/2005           HA2-0.5         12/15/2005           HA2-1.5         12/15/2005           HA3-0.5         12/15/2005           HA3-0.5         12/15/2005           HA3-0.5         12/15/2005           HA4-0.5         12/15/2005           HA4-0.5         12/15/2005	Sample ID         Date         Depth (ft bgs)           Geoprobe Sampling         9           GP25-S-1.0         12/12/2005         1           GP26-S-7.0         12/12/2005         7           GP26-S-1.0         12/12/2005         1           GP26-S-9.5         12/12/2005         1           GP26-S-9.5         12/12/2005         1           GP27-S-1.0         12/12/2005         1           GP28-S-7.0         12/12/2005         1           GP28-S-7.0         12/12/2005         1           GP28-S-7.0         12/12/2005         1           GP29-S-1.0         12/12/2005         1           GP29-S-1.0         12/12/2005         1           GP29-S-6.0         12/12/2005         1           GP30-S-6.0         12/12/2005         1           GP31-S-1.0         12/12/2005         1           GP31-S-1.0         12/12/2005         1           GP31-S-1.0         12/12/2005         1           GP32-S-1.0         12/15/2005         1.5           HA1-0.5         12/15/2005         1.5           HA2-0.5         12/15/2005         1.5           HA2-0.5         12/15/2005         1.5	Sample ID         Date         Depth (ft bgs)         Chromium           Geoprobe Sampling         12/12/2005         1         19.3           GP25-S-1.0         12/12/2005         7         19.8           GP26-S-1.0         12/12/2005         1         23.7           GP26-S-9.5         12/12/2005         1         23.7           GP26-S-9.5         12/12/2005         1         22.0           GP27-S-1.0         12/12/2005         1         22.0           GP27-S-1.0         12/12/2005         1         22.0           GP28-S-1.0         12/12/2005         1         20.5           GP28-S-1.0         12/12/2005         1         29.6           GP29-S-1.0         12/12/2005         6         31.9           GP30-S-1.0         12/12/2005         6         32.7           GP31-S-1.0         12/12/2005         6         23.6           GP31-S-1.0         12/12/2005         1         6750           Had-Auger Sampling	Sample ID         Date         Depth (ft bgs)         Chromium Chromium (Hexavalent)           Geoprobe Sampling           GP25-S-1.0         12/12/2005         1         19.3         1.8 UJ (BP26-S-7.0)           GP26-S-7.0         12/12/2005         1         23.7         2.2 UJ (BP26-S-9.5)           GP26-S-9.5         12/12/2005         1         22.0         2.1 UJ (BP27-S-13.0)           GP28-S-1.0         12/12/2005         1         22.0         2.2 UJ (BP27-S-13.0)           GP28-S-7.0         12/12/2005         1         20.5         2.2 UJ (BP28-S-7.0)           GP28-S-1.0         12/12/2005         1         20.5         2.2 UJ (BP29-S-6.0)           GP29-S-1.0         12/12/2005         1         29.6         2.4 UJ (GP30-S-6.0)           GP30-S-1.0         12/12/2005         1         27.2         2.1 UJ (GP31-S-1.0)           GP31-S-1.0         12/12/2005         1         19.2         2.1 UJ (GP31-S-6.0)           GP31-S-1.0         12/12/2005         1         19.2         2.1 UJ (GP32-S-1.0)           GP31-S-6.0         12/12/2005         1         6750         3500 J           HA1-0.5         12/12/2005         1.5         34.3         2.9 UJ (HA1-1.5           H



Table 4 Metals in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

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ocation	Sample ID	Date	Depth (ft bgs)	Antimony	Arsenic	Beryllium	Cadmium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
On-Site	Geoprobe Sampli	bu		1.000	010	O FDA LI	0 E04 11	17.6	2 45	0.131 H	25.6	0.591 U	0.591 U	0.591 U	32.9
GP12	GP12-S-3.0	12/13/2005	3	1.77 U	RJ-Z	0.186.0	0.081.0	0.00	1 1 1	0.16811	24.8	0 593 11	0.593 U	0.593 U	84.9
GP13	GP13-S-1.0	12/14/2005	-	1.78 U	9.45	0.593 U	RZ-L	73.0	21.1	0.000.0	0.17	110000	0 600 11	n BNG U	38.4
GP14	GP14-S-3.0	12/13/2005	3	1.83 U	3.00	0.609 U	0.609 U	14.4	2.20	0.120.0	32.Y	0.600.0	0 2000	0 50010	74.6
CD15	GP15-S-3.0	12/13/2005	3	1.59 U	7.76	0.529 U	0.714	30.4	18.7	0.154 U	16.4	0.529 U	0.529 U	0.525.0	0.17
20110	CD10 0 10	12/13/2005	5	184 U	3.55	0.615 U	0.615 U	113	26.3	1.10	23.1	0.615 U	0.615 U	U 619.0	40.9
66718	01-0-01-0	SUDDIN NOT	*	1 78 11	5.47	0 592 U	0.592 U	29.4	10.1	0.152 U	13.0	0.592 U	0.592 U	0.592 U	49.3
GP20	GP2U-S-1.U	12/14/2005	+ ¢	11001	30.5	0.542 11	0.54211	16.5	3.09	0.115 U	28.5	0.542 U	0.542 U	0.542 U	44.3
GP24	GP24-S-3.0	CUU2/41/21		11091	3.64	0 532 11	0.532 U	14.3	3.33	0.107 U	25.3	0.532 U	0.532 U	0.532 U	50.4
	GP24-S-3.0-Dup	GUUZ/41/21	0,	0.001	100	0.502.0	0 5020	19.61	154	0.144 U	22.5	0.542 U	0.542 U	0.542 U	24.9
GP28	GP28-S-1.0	12/12/2005	-	1.03 U	1.03	0.242.0	0 440.0	0.31	10.01	0.076	0.7.0	0.577 H	0.577 U	0.577 U	36.9
GP29	GP29-S-1.0	12/12/2005	*	1.73 U	5.91	0.577 U	0.5// U	0.01	10.0	0.010	21.1	0.100	DEADIL	0 54011	AG 1
GP31	GP31-S-1.0	12/12/2005	-	1.65 U	5.72	0.549 U	0.549 U	40.2	14.2	0.131 U	14.4	0.548 U	0.243 0	0.040.0	
OFF OWN	Month Amore Com	nline													
UTI-SITE	Hand-Auger Sain	ADIA FINDE	20	11211	2.84	0 576 11	0.576.U	32.8	34.6	0.132 U	21.3	0.576 U	0.576 U	0.576 U	140
HA1	C.U-TAH	GUU2/G1/21	2.0	0011	10.0		O CEO II	16.71	1531	0 328	247.J	0.550 U	0.550 U	0.550 U	L 8.07
	HA1-1.5	12/15/2005	1.5	1.65 U	C 89.7	n nee.n	0.000.0	10.2.0		0.0001	1 001	0 707 11	0.70711	0 707 11	L 293 J
	HA1-1 5-Dup	12/15/2005	1.5	2.12 U	8.35 J	0.707 U	0.707 U	68.4 J	P 2.3 J	0.304 U	r oni	0.101.0	100-0	110000	440
0111	HAD OF	40/45/0015	0.5	9471	3.94	0.723 U	0.984	20.9	81.4	0.142 U	36.0	0.723 U	0.723 U	0.723.0	140
THA	142-0.0	4014E1000E	44	1 84 11	271	0.613 U	0.613 U	28.2	36.5	0.232	31.0	0.613 U	0.613 U	0.613 U	134
	C.1-2417	2007/01/21	2.1	1.00.0	500	U SAR II	253	528	545	2.65	98.4	0.648 U	0.648 U	0.648 U	433
HA3	HA3-0.5	GUUZ/91/21	0.0	0 48.1	5.05	0.040.0	0.58511	16.4	841	0.109 U	30.8	0.585 U	0.585 U	0.585 U	46.2
	HA3-1.5	c002/c1/21	G.1	0.0/1	0.30	1 00000	7 90	078	1710	2.28	2.66	1.63 U	1.63 U	1.63 U	2620
HA4	HA4-0.5	12/15/2005	<b>G</b> .0	0.00	C.44	0 001	20.1		2003	0 580 11	010	0.819 U	0.819 U	0.819 U	86.3
	HA4-1.5	12/15/2005	1.5	2.46 U	5.25	0.819.0	0.818.0	40.0	0.00	0.000	44 6	11011	11011	11911	358
HAS	HA5-0.5	12/15/2005	0.5	3.56 U	35.9	1,19 U	3,13	129	1440	0.810	44.0	0 2020	0.002.0	11 002 0	110
0.41	HAG-1 5	12/15/2005	1.5	2.11 U	12.5	0.703 U	1.09	39.6	209	0.488 U	22.2	0.703.0	U. 7U3 U	0.0000	110
H417	HA12-0.5	04/19/2006	0.5	1	9.0	1	0.48.J	39	220	1	1	1	1	1	
TI VII	11AT C DE	7006/014	0.5	1	6.61	1	1	1	278	1	ţ	1	i.	1	1
INU	1177 C.4 5	1/0/2001	51	1	5.3	1	1	1	23.5	1	1	t	1	1	•
OF SAL	SUCCESSION STATE	10021011	0.5	,	5 03	1	1	1	61.5	1	1	1	i	1	1
HA18	C.U-C-01AH	INNZIAN	0.0		11010				11 61 6	1	ł	1	1	I	4
	HA18-S-1.5	1/9/2007	1.5	1	N 71.2	1	1		C 1 1 0						

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Table 4 Metals in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

ation	Sample ID	Date	(ft bgs)	Antimony	Arsenic	Beryllium	Cadmium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
ff-Site	Hand-Auger Sam	oling cont.													
IA19	HA19-S-0.5	1/9/2007	0.5	ł	12.7	1	1	ŀ	134	1	4	1	1	i	1
7	HA19-S-1.5	1/9/2007	1.5	1	4.02	1	1	1	11.3	1	1	1	1	1	i
1A20	HA20-S-0.5	1/9/2007	0.5	1	2.02 U	1	1	ì	27.9	1	ł.	1	1	ı	1
I	HA20-S-1.5	1/9/2007	1.5	1	1.81 U	1	-	ł	8.91	I	t	4	1	1	ī
1A21	HA21-S-0.5	1/10/2007	0.5	1	5.72	Ì	ŀ	1	398	r	ļ	i	1	1	i
	HA21-S-1.5	1/10/2007	1.5	1	5.83	I	1	1	121	t	1	1	ì	i	1
1A22	HA22-S-0.5	1/10/2007	0.5	1	53.5	1	1	1	986	t	i.	1	į	1	I
	HA22-S-1.5	1/10/2007	1.5	1	10.3	I	I	1	32.4	1	I	į.	Ì	i	ţ
HA23	HA23-S-0.5	1/10/2007	0.5	1	4.44	1	į	1	26.9	1	ţ	į	1	1	1
	HA23-S-1.5	1/10/2007	1.5	1	4.91	•	ł	1	20.5	1	1	1	1	1	1
HA24	HA24-S-0.5	1/10/2007	0.5	1	4.9	î	ŗ	ì	63.9	1	ţ	į	1	1	1
	HA24-S-1.5	1/10/2007	1.5	i	5.23	t	ı	1	24.3	ï	1	ţ	1	1	1
HA25	HA25-S-0.5	1/10/2007	0.5	1	11.6	•	ľ	t	302	i	1	1	(	Ì	ı
	HA25-S-1.5	1/10/2007	1.5	1	11.8	I	1	ł	15.5	1	1	1	1	Î	1

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1.1-Dichloro-39.8 U 41.9 U 44.8 U 35.1 U 40.5 U 42.5 U 44.2 U 37.1 U 55.8 U 1.12 U 79.5 U 38.5 U 51.7 U 35,6 U propene 0.839 U 0.96 U 41.4 U 49.3 U 43 U 38.2 U 39 U 44 U ï ī 1 1 1,1-Dichloro-8.37 U 8.61 U 7.03 U 8.28 U 7.81 U 8.84 U 9.86 U 7.42 U 7.96 U 8.81 U 8.96 U 7.12 U 1.12 U 15.9 U U 177 U 10.3 U ethene 8.1 U 8.5 U 0.839 U 7.65 U 0.96 U 23.7 Ĩ 11 0 1 ĩ. 1,1-Dichloro-39.8 U 55.8 U 41.9 U 1.12 U 35.1 U 40.5 U 42.5 U 41.4 U 44.2 U 38.2 U 79.5 U 44.B U 38.5 U 35.6 U 49.3 U 37.1 U 0.839 U 0.96 U 43 U ethane 51.7 U 39 U 44 U 1 ١ Ĭ. 1 I 1 1 1 1,1,2-Trichloro-55.8 U 39.8 U 44.2 U 0.839 U 44.8 U 38.5 U 51.7 U 35.6 U 35.1 U 42.5 U 41.4 U 49.3 U 37.1 U 41.9 U 1.12 U 43 U 38.2 U 0.96 U 40.5 U 39 U ethane 44 U 79.5 U I. ١ 1 1 1 ĩ 1 Í. 1,1,2,2-Tetrachloroethane 11.2 U 8,61 U 9.86 U 7.96 U 7.03 U 8.28 U 7.81 U 8.84 U 7.42 U 8.37 U 8.96 U 1.12 U 7.12 U 0.96 U 8.81 U 15.9 U 7.71 U 8.5 U 0.839 U 7.65 U 8.1 U 10.3 U 1 1 1 1 1 1 1 1,1,1-Trichloro-8.61 U 7.81 U 11.2 U 7.96 U 8.37 U 7.03 U 8.28 U 7.12 U 8.81 U 15.9 U 8.96 U 7.71 U 10.3 U 8.84 U 0.839 U 1.12 U 7.65 U 8.1 U 8.5 U 9.86 U 7.42 U ethane 0.96 U 4 t 1 1 ١ 1 1 1 1,1,1,2-Tetrachloroethane 41.9 U 44.2 U 49.3 U 55.8 U 39.8 U 35.1 U 41.4 U 38.5 U 35.6 U 40.5 U 1.12 U 79.5 U 44.8 U 37.1 U 38.2 U 0.96 U 51.7 U 42.5 U 39 U 43 U 0.839 U 44 U t 1 ł ł 1 1 1 (ft bgs) 13.5 14.5 2.2 Depth 6.5 1.5 3 1.5 9 1.5 N 00 2 01 00 9 3 6 μ, Ω 4 14 2 10 00 10 6 9 -N 12/13/2005 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 6/17/2005 6/17/2005 6/17/2005 6/17/2005 6/16/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/9/2005 6/7/2005 6/7/2005 6/7/2005 6/9/2005 6/9/2005 6/9/2005 6/9/2005 Date Geoprobe Sampling GP15-S-6.0 GP10-S-13.5 GP15-S-3.0 GP11-S-6.5 GP12-S-3.0 GP12-S-5.0 GP13-S-1.0 GP14-S-3.0 GP14-S-6.0 GP10-S-1.5 GP11-S-2.0 GP13-S-6.0 GP6-S-14.5 GP5-S-14.0 GP5-S-1.5 GP5-S-8.0 GP6-S-1.0 GP7-S-2.0 GP7-S-8.0 GP8-S-1.5 GP9-S-2.0 GP1-S-10.0 GP4-S-1.5 3P2-S-10.0 GP3-S-2.0 GP3-S-6.0 GP1-S-1.5 GP1-S-6.0 GP2-S-1.0 GP3-S-14 Sample ID On-Site GP15 GP13 GP14 GP12 GP10 GP11 Location GP8 GP9 GP4 GP5 GP6 GP7 GP3 GP2 GP1

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1,1-Dichloropropene í. t 1 1 1 1 1 ï 1 1 1 1 4 1 1 ı à t 1 t t t 1 1,1-Dichloroethene 1 1 1 ŧ. t. 1 1 1 1 I 1 1 ł. 1 1 1 1 1 u, ۱ 1 1 1 1 ١ 1 1 1,1-Dichloroethane l U 1 1 1 1 I. 1 a. 1 ۱ 1 1 1 1 1 t t t 1 t 1 1 1 1 1 1 1,1,2-Trichloroethane 1 1 1 t 1 1 1 ٢ t ı 1 в 1 b 1 1 Î t 1 1 t 1 1 1 1,1,2,2-Tetrachloroethane t t 1 1 1 I. 1 1 1 1 1 1 ١ 1 1 1 1 1 1 1 - 1 1 4 Į, 1 1 1,1,1-Trichloroethane 1 Į. 1 1 ł. ī t 1 1 Ţ ï 1 ÷ ï 1 ţ ١ 1 1 ١ t ۱ 1 1,1,1,2-Tetrachloroethane 1 X. 1 ł I. 1 I. 1 1 ł 1 ţ 1 1 1 1 1 1 1 т 1 1 I ł. 1 ١ 1 1 1 (ft bgs) 10.5 Depth 9.5 6.5 6.5 13 9 -9 3 3 N 6 40 9 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/14/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 Date **On-Site Geoprobe Sampling** GP24-S-3.0-Dup GP19-S-1.0-Dup GP27-S-13.0 GP22-S-10.0 GP23-S-10.5 GP25-S-7.0 GP26-S-9.5 GP27-S-1.0 GP28-S-1.0 GP28-S-7.0 GP29-S-1.0 GP29-S-6.0 GP24-S-6.5 GP25-S-1.0 GP26-S-1.0 GP20-S-6.0 GP21-S-1.0 GP21-S-6.5 GP22-S-1.0 GP23-S-7.0 GP24-S-3.0 GP19-S-7.0 GP20-S-1.0 GP19-S-1.0 GP17-S-6.0 GP16-S-1.0 GP16-S-5.0 GP17-S-1.0 GP18-S-1.0 Sample ID GP29 GP28 GP24 GP25 GP26 GP27 Location GP22 GP23 GP19 GP16 GP18 GP20 GP21 GP17

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1,1-Dichloro-7.49 U 5.02 U 73.9 U 6.12 U propene 6.91 U 26.4 U 7.30 U 169 U 5.73 U 4.61 U 93.8 U 1 ļ 1 t 1,1-Dichloro-4.49 U 4.15 U 15.8 U 2.77 U 93.8 U 3.01 U 44.4 U 3.67 U 169 U 3.44 U 4.38 U ethene İ t 1 1 1 1,1-Dichloro-2.99 U 29.6 U 2.45 U 2.01 U 169 U 2.29 U 2.77 U 10.6 U 2.92 U 1.84 U 93.8 U ethane l 1 1 1 1,1,2-Trichloro-1.87 U 1.53 U 169 U 1.73 U 6.60 U 1.15 U 93.8 U 1.26 U 18.5 U 1.43 U 1.83 U ethane i i ۱ 1 1,1,2,2-Tetrachloroethane 6.12 U 7.49 U 5.02 U 73.9 U 6.91 U 26.4 U 7.30 U 4.61 U 93.8 U 169 U 5.73 U I. t 1 t t 1,1,1-Trichloro-13.2 U 2.30 U 93.8 U 2.51 U 37.0 U 3.06 U 169 U 3.74 U 3.46 U 3.65 U 2.87 U ethane ï 1 I ï 1 1,1,1,2-Tetrachloroethane 6.12 U 7.49 U 26.4 U 7.30 U 4.61 U 93.8 U 5.02 U 169 U 6.91 U 73.9 U 5.73 U t 1 1 I 1 (ft bgs) Depth 0.5 0.5 1.5 0.5 0.5 1.5 1.5 1.5 1.5 0.5 -9 0 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/12/2005 12/12/2005 12/15/2005 12/15/2005 12/12/2005 12/12/2005 12/14/2005 Date Off-Site Hand-Auger Sampling **On-Site Geoprobe Sampling** HA1-1.5-Dup GP32-S-1.0 GP31-S-6.0 GP30-S-1.0 GP30-S-6.0 GP31-S-1.0 HA5-0.5 HA5-1.5 HA3-1.5 HA1-1.5 HA2-0.5 HA3-0.5 HA4-0.5 HA4-1.5 Sample ID HA1-0.5 HA2-1.5 Location GP30 GP32 HA5 GP31 HAZ HA3 HA4 HA1

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1,2-Dichloro-41.9 U 41.4 U 55.8 U 35.6 U 35.1 U 40.5 U 42.5 U 44.2 U 49.3 U 39.8 U benzene 37.1 U 1.12 U 44.8 U 38.5 U 51.7 U 38.2 U 79.5 U 43 U 0.839 U 39 U 44 U 0.96 U t 1 Þ. 1 t 1 1,2-Dibromo-1.46 U 1.53 U 1.58 U 1.29 U 1.48 U 1.56 U 1.51 U 1.43 U 1.62 U 1.36 U 0.839 U 1.64 U 1.41 U 2.04 U 1.8 U 1.12 U 0.96 U 1.61 U 2.91 U 1.89 U 1.3 U 1.4 U ethane 1 1 Ì. ١ 1 1 1 1,2-Dibromo-3chloropropane 55.8 U 39,8 U 41.9 U 44.2 U 35.1 U 42.5 U 41.4 U 37.1 U 44.8 U 38.5 U 51.7 U 35.6 U 40.5 U 39 U 49.3 U 43 U 38.2 U 0.96 U 79.5 U 0.839 U 1.12 U 44 U t t, х Į. 1 ŧ 1 methylbenzene 41.4 U 44.2 U 49.3 U 55.8 U 39.8 U 35.1 U 1,2,4-Tri-42.5 U 37.1 U 41.9 U 1.12 U 38.2 U 79.5 U 44.8 U 38.5 U 51.7 U 35.6 U 40.5 U 43 U 39 U 0.839 U 0.96 U 44 U 1 Ð t 1 I Į. chlorobenzene 44.2 U 55.8 U 39.8 U 41.9 U 1,2,4-Tri-35.1 U 42.5 U 41.4 U 1.12 U 38.2 U 44.8 U 38.5 U 35.6 U 49.3 U 37.1 U 0.96 U 79.5 U 51.7 U 40.5 U 39 U 43 U 0.839 U 44 U ŧ. ١ Ĩ 1 1 1 1 1,2,3-Trichloro-7.12 U 7.81 U 8.84 U 9.86 U 7.96 U 7.03 U 8.28 U 11.2 U 8.37 U 8.61 U 8.81 U 8.96 U U 17.7 7.42 U propane 7.65 U 8.5 U 0.839 U 1.12 U 0.96 U 15.9 U 10.3 U 8.1 U 1 1 t 1 1 ł 1,2,3-Trichloro-41.9 U 55.8 U 39.8 U 35.1 U 42.5 U 44.B U 35.6 U 40.5 U 41.4 U 44.2 U benzene 1.12 U 38.2 U 79.5 U 38.5 U 51.7 U 37.1 U 43 U 0.839 U 0.96 U 39 U 49.3 U 44 U Û ł ١ \$ 1 t (ft bgs) 13.5 14.5 1.5 6.5 Depth 1.5 1.2 3 1.5 2 3 50 9 3 9 9 2 -14 0 5 5 14 8 9 0 10 0 5 -12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 6/17/2005 6/17/2005 6/17/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/9/2005 6/9/2005 6/9/2005 6/9/2005 6/9/2005 6/7/2005 6/7/2005 6/7/2005 Date **On-Site Geoprobe Sampling** GP10-S-13.5 GP15-S-3.0 GP13-S-6.0 GP14-S-3.0 GP14-S-6.0 GP15-S-6.0 GP10-S-1.5 GP11-S-2.0 GP11-S-6.5 GP12-S-3.0 GP12-S-5.0 GP13-S-1.0 GP5-S-14.0 GP6-S-14.5 GP7-S-8.0 GP8-S-1.5 GP9-S-2.0 GP7-S-2.0 GP6-S-1,0 GP1-S-10.0 GP2-S-10.0 GP4-S-1.5 GP5-S-1.5 GP5-S-8.0 GP3-S-2.0 GP3-S-6.0 GP3-S-14 GP1-S-1.5 GP1-S-6.0 GP2-S-1.0 Sample ID GP15 GP12 GP13 GP14 GP10 GP11 Location GP8 GP9 GP5 GP5 GP6 GP2 GP3 GP7 GP1

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Table 5

### Volatile Organic Compounds in Soil (µg/kg) Precision Engineering, Inc. Seattle, Washington

					-	-	_	_	-			-	-1-		-	-	1	-		T	-	1	-	T	-	T		T		
1,2-Dichloro- benzene		1	'	1	'	1	1	1	1	1	1	1	'		'	1	1	t	1	'	1		i ,	1	i	į	ť	1	1	1
1,2-Dibromo- ethane		1	1	1	ı	ı	1	1	i	1	1	i	1	1	1	1	1	ì	ĩ	1	1	1	i	1	I	1	i	1	,	1
1,2-Dibromo-3- chloropropane			1	1	1	1	1	1	1	Ĭ	1	i	r	1	r	ı	t	ı	i	1	1	1	1	ţ	ł	4	t	1	1	1
1,2,4-Tri- methylbenzene		ν	ı	1		1	I.	r	1	ţ	t	4	1	1	1	1	1	1	ļ	1	í	1	(	1	ł	4	1	I	r	1
1,2,4-Tri- chlorobenzene		1	1	1	4	1	)	1	1	1	1	1	ł	ţ	1	1	ī	I	ŗ	-	1	1	j.	r	i	-	1	1	1	1
1,2,3-Trichloro- propane		4	1	1	t	1	1	1	1	1	4	1	1	1	,	1	,	1	1	t	ì	ł	ŀ	ŧ	Ŀ	1	•	1	ŀ	1
1,2,3-Trichloro- benzene		r	1	1.	-	-	-	1	t	1	ŀ	ı	ſ	1	1	1		ł	į	4	1	1	4	1	1	1	1	ţ	i	,
Depth (ft bgs)		-	5	1	9	1	1	1	7	+	9	+	6.5	1	10	1	10.5	3	6	6.5	1	7	F	9.5	1	13	1	7	Ļ	9
Date	6	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005
Sample ID	Seoprobe Samplin	GP16-S-1.0	GP16-S-5.0	GP17-S-1.0	GP17-S-6.0	GP18-S-1.0	GP19-S-1.0	GP19-S-1,0-Dup	GP19-S-7.0	GP20-S-1.0	GP20-S-6.0	GP21-S-1.0	GP21-S-6.5	GP22-S-1.0	GP22-S-10.0	GP23-S-7.0	GP23-S-10.5	GP24-S-3.0	GP24-S-3.0-Dup	GP24-S-6.5	GP25-S-1.0	GP25-S-7.0	GP26-S-1.0	GP26-S-9.5	GP27-S-1.0	GP27-S-13.0	GP28-S-1.0	GP28-S-7.0	GP29-S-1.0	GP20_S_6 0
Location	On-Site G	GP16		GP17		GP18	GP19			GP20		GP21		GP22		GP23		GP24			GP25	Ţ	GP26		GP27		GP28		GP29	

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Y					a o o Táblan	4 9 A Tri	194-Tri-	1 2-Dibromo-3-	1,2-Dibromo-	1,2-Dichloro-
Location	Sample ID	Date	(ft bgs)	1,2,3-1 richloro- benzene	1,2,3-11IGNU0- propane	chlorobenzene	methylbenzene	chloropropane	ethane	benzene
On Sito	Geonrohe Samn	lina								
211-0110	denhone online	G						1	1	•
GP30	GP30-S-1.0	12/12/2005	s	Î	1	l			1	Ŧ
	GP30-S-6.0	12/12/2005	9	1	1	1	1		1	1
GP31	GP31-S-1.0	12/12/2005	-	•	T	1	i		ı	1
	GP31-S-6.0	12/12/2005	9	1	i)	1	1		1	ı
GP32	GP32-S-1.0	12/14/2005	1	1	1	1				
Off-Site	Hand-Auger Sar	npling						44 5 11	£ 73 []	573.0
HA1	HA1-0.5	12/15/2005	0.5	5.73 U	5.73 U	5.73 U	D./3 U	0 0 11	0.010	6 01 11
	TIAN A E	10/15/2005	15	6.91 U	6.91 U	6.91 U	6.91 U	13.8 U	0.910	
	C.1-IAH		2 1	11 4 90	111 20	26.4.11	26.4 U	52.8 U	26.4 U	26.4 U
	HA1-1.5-Dup	12/15/2005	C'L	Z0.4 U	0 4.02	0.001	11002	11 E U	7 30 U	7.30 U
HA7	HA2-0.5	12/15/2005	0.5	7.30 U	7.30 U	1.30 0	0.00-1		16111	46111
	HAD 1 E	12/15/2005	1.5	4.61 U	4.61 U	4.61 U	4.61 U	9.22 U	0 000	110.00
	N1-2011	LOOGLAND	10	02.811	03.8.11	93.8 U	93.8 U	469 U	93.8 U	20.00
HA3	HA3-0.5	CON7/GL/ZL	c'n	1001	E 00 11	5 02 11	5.02 U	10.0 U	5.02 U	5.02 U
	HA3-1.5	12/15/2005	C'L	N 20.0	0.40.0	110 04	73.011	148 U	73.9 U	73.9 U
HA4	HA4-0.5	12/15/2005	0.5	73.9 0	(3.9 U	10.20	0.00	116.08	R 1711	6 12 U
	UAA 1 E	10/15/2005	5	6.12 U	6.12 U	6.12 U	6.12 U	12.2.0	0.12.0	1001
	C.1-941	1000101171	2.0	46011	16011	169 U	169 U	844 U	169 U	n Rol
HA5	HA5-0.5	GUUZ/GL/Z1	0.0	10201	11 07 1	7,49 U	7.49 U	15.0 U	7.49 U	7.49 U
	HA5-1.5	GUU2/GL/21	0.1	0 64.1	0000					

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l ocation	Sample ID	Date	Depth	1,2-Dichloro-	1,2-Dichloro-	1,3,5-Trimethyl- henzene	1,3-Dichloro- henzene	1,3-Dichloro- propane	1,4-Dichloro- benzene	2,2-Dichloro-
			(in ugs)	culatic	hippana					
On-Site	Geoprobe Sampli	Вu		and and a	1.000	11 000 0	0.83011	0.830.11	0.839 U	0.839 U
GP1	GP1-S-1.5	6/7/2005	1.5	0.839 0	0.839 0	0.002	0 0000	1 4 4 0 11	11.01 1	11211
1	GP1-S-6.0	6/7/2005	9	1.12 U	1.12 U	1.12 U	0.21.1	1.12 U	1.12.00	11000
	GP1-S-10.0	6/9/2005	10	7.65 U	7.65 U	7.65 U	38.2 U	7.65 U	38.2 0	0.200
CDO	GD7.9.1 0	6/7/2005	*	0.96 U	0.96 U	0.96.0	0.96 U	0.96.0	0.96.0	0.96.0
V D	CD C 100	6/0/2005	10	8.81 U	8.81 U	8.81 U	44 U	8.81 U	44 U	44 U
500	002 0 0	6/0/2005	6	15.9 U	15.9 U	15.9 U	79.5 U	15.9 U	79.5 U	79.5 U
649	0.2-0-0.00	CUDUCIONS		8.96.11	8.96 U	8.96 U	44.8 U	8.96 U	44.8 U	44.8 U
	0.0-0-0-0-0	CUDIE COUCE	NI VI	7 71 11	7.71 U	U 17.7	38.5 U	7.71 U	38.5 U	38.5 U
	010-0-14	RIARIZOUS.	10	10311	10.3 U	10.3 U	51.7 U	10.3 U	51.7 U	51.7 U
644	GP4-0-1.0		24	11.04 2	11617	7.12 U	35.6 U	7.12 U	35.6 U	35.6 U
GP5	GP5-S-1.5	0/10/2/01/0	2 .	11.12.0	7 0311	7 03 U	35.1 U	7.03 U	35,1 U	35.1 U
	GP5-S-8.0	GUUZ/01/0	• ;	11.00	1110	8411	40.5.0	8.1 U	40.5 U	40.5 U
	GP5-S-14.0	6/16/2005	14	0.10	0.10	0110	A9 511	850	42.5 U	42.5 U
GP6	GP6-S-1.0	6/16/2005	F	8.5 0	U C.D	0.000	0.074	11 00 0	41411	414 U
	GP6-S-14.5	6/16/2005	14.5	8.28 U	8.28 U	8.28 U	41.4 N	0.20 U	0.1.100	1100
CD7	GP7-S-7 0	6/16/2005	2	7.81 U	7.81 U	7.81 U	39 U	1.81 U	0.80	0.60
5	CD7-CBU	6/16/2005	~	8.84 U	8.84 U	8.84 U	44.2 U	8.84 U	44,2 U	44.2 U
000	0.00015	6/16/2005	15	9.86 U	9.86 U	9.86 U	49.3 U	9.86 U	49.3 U	49.3 U
640	0000000			11 67 2	7 42 11	7.42 U	37.1 U	7.42 U	37.1 U	37.1 U
GP9	0-7-9-6-19	cnn7/////g	7	0.74.1	110 **	116 14	55.811	11.2 U	55.8 U	55.8 U
GP10	GP10-S-1.5	6/17/2005	1.5	11.2 U	0711	11.20	11000	7 06 11	30.811	39.8 U
	GP10-S-13.5	6/17/2005	13.5	7.96 U	7.96 U	1.90 U	23.0 0	11200	1010	41.911
GP11	GP11-S-2.0	6/17/2005	2	8.37 U	8.37 U	8.37 U	41.9 U	0.21 0	11.07	11.04
	GP11-S-6.5	6/17/2005	6.5	8.61 U	8.61 U	8.61 U	43.0	8.61 U	0.04	0.00
GP12	GP12-S-3.0	12/13/2005	3	1	1	1	1	1	1	
	GP12-S-5.0	12/13/2005	2	4	1	i	1	1		
GP13	GP13-S-1.0	12/14/2005	1	1	1	1	1	1	1	
	GP13-S-6.0	12/14/2005	9	3	1	1	î	1	1	1
GP14	GP14-S-3.0	12/13/2005	3	t	1	1	i	1	1	1
	GP14-S-6.0	12/13/2005	9 9	1	1	1	j.	ľ	1	-
GP15	GP15-S-3.0	12/13/2005	3	1	Ĩ	1	ţ	1	1	1
2	CD15.5.60	12/13/2005	9	1	1	1	1	1	1	1
	22222	A DESCRIPTION OF THE OWNER OWNER OF THE OWNER								

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2,2-Dichloropropane 1 1 h I ï 1 1 1 Ì ĺ. 1 1 Î 1 t 1 i. ï ł 1 ١ 1 i 1 1 1,4-Dichlorobenzene 1 1 I. I. t 1 t ۱ 1 1 ł 1 ï 1 ١ 1 л 1 Ĵ, 1 1 1 1 1 1 1 ł 1 1,3-Dichloropropane t 1 t t 1 ١ 1 1 1 T 1 1 1 1 1 1 1 ł 1 1 Ŧ 1 t 1 1 1 ı 1,3-Dichlorobenzene 1 1 1 ł t 1 1 ï 1 1 1 1 į, I. 1 1 1 1 1 1 ۱ 1 ī ž ì. 1 1,3,5-Trimethylbenzene 1 1 1 1 ï t j, t L 1 t 1 t. l 1 1 Ĩ. 1 1 Ì. 1 ۱ 1 1 1 1 1 1,2-Dichloropropane 1 1 1 ŧ 1 1 L. н 1 L 1 t 1 T 1 1 1 1 1 I. ł t 1 t 1 1 1,2-Dichloroethane 1 1 ١ 1 1 1 1 1 4 1 1 1 1 1 1 1 1 1 1 ì. 1 1 Ē 1 1 1 1 1 (ft bgs) 10.5 Depth 6.5 9.5 3 9 6.5 10 3 1 1 ÷. e 9 -5 Θ 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/12/2005 12/14/2005 12/13/2005 12/13/2005 12/14/2005 12/13/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 Date **On-Site Geoprobe Sampling** GP24-S-3.0-Dup GP19-S-1.0-Dup GP27-S-13.0 GP29-S-6.0 GP23-S-10.5 GP22-S-10.0 GP27-S-1.0 GP28-S-1.0 GP28-S-7.0 GP29-S-1.0 GP26-S-1.0 GP26-S-9.5 GP24-S-3.0 GP24-S-6.5 GP25-S-1.0 GP25-S-7.0 GP23-S-7.0 GP20-S-6.0 GP21-S-6.5 GP22-S-1.0 GP16-S-1.0 GP18-S-1.0 GP19-S-7.0 GP20-S-1.0 GP21-S-1.0 GP16-S-5.0 GP17-S-1.0 GP17-S-6.0 GP19-S-1.0 Sample ID GP29 GP28 GP25 GP26 GP27 GP24 GP19 GP22 GP23 Location GP16 GP18 GP20 GP21 GP17

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			Denth	1.2-Dichloro-	1.2-Dichloro-	1,3,5-Trimethyl-	1,3-Dichloro-	1,3-Dichloro-	1,4-Dichloro-	2,2-Dichloro-
Location	Sample ID	Date	(ft bgs)	ethane	propane	benzene	benzene	propane	benzene	propane
On-Site (	Geoprobe Sampl	ling								
GP30	GP30-S-1.0	12/12/2005		1	ŗ	I	4	1	1	ı
	GP30-S-6.0	12/12/2005	9	4	L	1	4	1	1	
GP31	GP31-S-1.0	12/12/2005	1	ţ	1	۴	i.	ı	1	i,
	GP31-S-6.0	12/12/2005	9	r	1	1	1	1	1	1
GP32	GP32-S-1.0	12/14/2005	1	1	1	1	I	1	1	1
Off-Site	Hand-Auger San	npling						1 101 1	11011	44 6 11
HA1	HA1-0.5	12/15/2005	0.5	1.43 U	5.73 U	5.73 U	5.73 U	5./3 U	0.67.0	0001
	HA1-15	12/15/2005	1.5	1.73 U	6.91 U	6.91 U	6.91 U	6.91 U	6.91 U	13.8 U
	UNA 4 E Dun	ADIGIZEICE	15	6 60 U	26.4 U	26.4 U	26.4 U	26.4 U	26.4 U	52.8 U
	dn	A 14 PORTO	30	4 82 11	7 30 11	7 30 U	7.30 U	7.30 U	7.30 U	14.6 U
HAZ	C.U-ZAH	C007/C1/71	2.0.	0.001	11 10 1	11191	46111	461 U	4.61 U	9.22 U
	HA2-1.5	12/15/2005	C.1	0.01.1	4.01.0	0.04	11000	110.00	03 8 11	03.8.11
HA3	HA3-0.5	12/15/2005	0.5	93.8 U	93.8 U	93.8 U	83.0 0	20.00	0.000	
	HA3-15	12/15/2005	1.5	1.26 U	5.02 U	5.02 U	5.02 U	5.02 U	0 ZU2 U	10,00
110.4	TAADE	19/15/2005	0.5	1850	73.9 U	73.9 U	73.9 U	73.9 U	73.9 U	148 U
HA4	C-0-641	12/13/2000	1	1 53 11	61211	612 1)	6.12 U	6.12 U	6.12 U	12.2 U
	G.1-4AH	CUU2/C1/21	C'1	0.00.1	0.41.0	11000	16011	16011	169 (1	169 U
HA5	HA5-0.5	12/15/2005	0.5	169 U	169.0	0 801	0 201		1107 -	AE OTI
	UNE 1 E	12/15/2005	5	1 87 U	7.49 U	7.49 U	7.49 U	7.49 U	1,49 U	0.00

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ocation	Sample ID	Date	Depth (ft bgs)	2-Butanone	2-Chloro- toluene	4-Chloro- toluene	4-Isopropyl- toluene	4-Metnyl-z- pentanone	Acetone	Benzene
On-Site	Geoprobe Sample	ling								
GP1	GP1-S-1.5	6/7/2005	1.5	4.2 U	0.839 U	0.839 U	0.839 U	4.2 U	17.6	0.839 U
5	GP1-S-60	6/7/2005	9	5.6 U	1.12 U	1.12 U	1.12 U	5.6 U	29.1	2.55
	GP1-S-10.0	6/9/2005	10	191 U	38,2 U	38.2 U	38.2 U	191 U	191 U	7.65 U
CDD	GP2-S-10	6/7/2005		4.8 U	0.96 U	0.96 U	0.96 U	4.8 U	13.4	0.96 U
л 5	GP2-S-10.0	6/9/2005	10	220 U	44 U	44 U	44 U	220 U	220 U	8.81 U
GP3	GP3-S-2.0	6/9/2005	2	397 U	79.5 U	79.5 U	79.5 U	397 U	397 U	15.9 U
5	GP3-S-6 0	6/9/2005	9	224 U	44.8 U	44.8 U	44.B U	224 U	224 U	8.96 U
	GP3-S-14	6/9/2005	14	193 U	38.5 U	38.5 U	38.5 U	193 U	193 U	7.71 U
GPA	GP4-S-15	6/16/2005	1.5	259 U	51.7 U	51.7 U	51.7 U	259 U	259 U	10.3 U
GDS	GP5-S-15	6/16/2005	1.5	178 U	35.6 U	35.6 U	35.6 U	178 U	178 U	7.12 U
5	GP5-S-8,0	6/16/2005	8	176 U	35.1 U	35.1 U	35.1 U	176 U	176 U	7.03 U
	GP5-S-14.0	6/16/2005	14	202 U	40.5 U	40.5 U	40.5 U	202 U	202 U	8.1 U
GPG	GP6-S-1.0	6/16/2005	1	213 U	42.5 U	42.5 U	42.5 U	213 U	213 U	8.5 U
5	GP6-S-14.5	6/16/2005	14.5	207 U	41.4 U	41.4 U	41.4 U	207 U	207 U	8.28 U
CD7	GP7-S-2 0	6/16/2005	2	195 U	39 U	39 U	39 U	195 U	195 U	7.81 U
5	GP7-S-8.0	6/16/2005	8	221 U	44.2 U	44.2 U	44.2 U	221 U	221 U	8.84 U
CDR	GD8-S-15	6/16/2005	1.5	246 U	49.3 U	49.3 U	49.3 U	246 U	246 U	9.86 U
Dag.	C.P.O.D	6/17/2005	6	185 U	37.1 U	37.1 U	37.1 U	185 U	185 U	7.42 U
010	CP10.5.1 E	6/17/2005	15	279 U	55.8 U	55.8 U	55.8 U	279 U	279 U	11.2 U
2	GP10-S-13.5	6/17/2005	13.5	199 U	39.8 U	39.8 U	39.8 U	199 U	199 U	7.96 U
GP11	GP11-S-20	6/17/2005	2	209 U	41.9 U	41,9 U	41.9 U	209 U	209 U	8.37 U
5	GP11-S-6.5	6/17/2005	6.5	215 U	43 U	43 U	43 U	215 U	215 U	8.61 U
GP12	GP12-S-3.0	12/13/2005	en	14.3 U	1	1	1	1	1	1
	GP12-S-5.0	12/13/2005	2	13.6 U	1	t	Į.	1	1	1
GP13	GP13-S-1.0	12/14/2005	+	215	i	1	1	4	1	1
	GP13-S-6.0	12/14/2005	9	47.6	,	1	1	1	1	1
GP14	GP14-S-3.0	12/13/2005	3	14.7 U	1	1	1	ł	į	1
	GP14-S-6.0	12/13/2005	9	15.7 U	1	Ĩ	1	t	1	1
GP15	GP15-S-3.0	12/13/2005	3	123	ı	ļ	1	1	I	1
	GP15-5-6.0	12/13/2005	9	63.0 U	1	-	t	4	1	1



0	Т		Т	-	Т	T	-	-	T	-	T	-	Τ	-	T	-	T	-		T		T		Τ		T		Τ		1
Benzen		1	'	1	1	1	1	1	1	r	1	1	1	1		•	1	1	1		1			1	1	1	1	1		1
Acetone		1	1	1	1	i	1	1	1	1	1	1	1	ŗ	1	ŀ	ł	ł	1	1	ı	1	1	1	ŀ	1	ŀ	+	1	1
4-Methyl-2- pentanone		ì	1	1	ì	I	i	ŀ	1	1	1	1	1	į	1	1	4	1	1	1	1	t	ı,	I	Î	ì	I	4	1	1
4-Isopropyl- toluene		1	,	1	1	1	1	4	4	1	ţ	1	r	ŀ	1	1	1	ť		,	1	Ì	1	1	1	1	1	1	1	1
4-Chloro- toluene		1	1	1	1	1	1	1	I	1	1	1	1	1	1	ļ	1	ł	)	ł	1	I	1	L	I	r	1	ı	1	i
2-Chloro- toluene		1	1	ı	1	1	1.	ı	ſ	ł	F	ŀ	1	1	i	1	ľ	1	1	1	ļ	i	ų	1	1	1	1	1	1	1
2-Butanone		11.1 U	12.7 U	29.5	22.3	14.2 U	60.1	37,5	16.3 U	21.7	66.3	13.1 U	66.7	13.6 U	12.8	10.8 U	13.6 U	15.5 U	15.0 U	17.0 U	12.8 U	14.8 U	12.1 U	15.9 U	13.2 U	12.3 U	11.2 U	13.0 U	14.8 U	14.6 U
Depth (ft bgs)		1	5	1	9	1		*	7	1	9	Ļ	6.5	1	10	1	10.5	3	n	6.5	1	7	1	9.5	1	13	t.	1	1	9
Date	6	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005
Sample ID	eoprobe Samplin	GP16-S-1.0	GP16-S-5.0	GP17-S-1.0	GP17-S-6.0	GP18-S-1.0	GP19-S-1.0	SP19-S-1.0-Dup	GP19-S-7.0	GP20-S-1.0	GP20-S-6.0	GP21-S-1.0	GP21-S-6.5	GP22-S-1.0	GP22-S-10.0	GP23-S-7.0	GP23-S-10.5	GP24-S-3.0	GP24-S-3.0-Dup	GP24-S-6.5	GP25-S-1.0	GP25-S-7.0	GP26-S-1.0	GP26-S-9.5	GP27-S-1.0	GP27-S-13.0	GP28-S-1.0	GP28-S-7.0	GP29-S-1.0	GP29-S-6.0
Location	On-Site G	GP16		GP17		GP18	GP19	0		GP20		GP21		GP22		GP23		GP24			GP25		GP26		GP27		GP28		GP29	

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cation	Sample ID	Date	Depth (# hos)	2-Butanone	2-Chloro- toluene	4-Chloro- toluene	4-Isopropyi- toluene	4-Metnyr-z-	Acetone	Benzene
- City	Tanada Camp	ind	Information and						1	
alle-un	dittine annihoan	Rill							t	,
3P30	GP30-S-1.0	12/12/2005	1	16.9	•	1	1			1
	GP30-S-6.0	12/12/2005	9	52.6	t	1	1	1		
5P31	GP31-S-1.0	12/12/2005	1	12.1 U	1	1	ł	1	1	
	GP31-S-6.0	12/12/2005	9	56.8	4	1	1	T	1	1
GP32	GP32-S-1.0	12/14/2005	1	14.2 U	1	1	1		ŕ	
Off-Site	Hand-Auger San	npling						11000	11 4 40	1162 1
LA1	HA1.0 5	12/15/2005	0.5	17,2 U	5.73 U	5.73 U	5.73 U	0 A.77	D #.#D	1.14
	A A A A	10/15/2005	5	20.7 U	6.91 U	6.91 U	6.91 U	27.7 U	41.5 U	2.07 U
	0-1-140		. 4	116.02	26.411	26.4 U	26.4 U	106 U	158 U	7.92 U
	HA1-1.5-Dup	CUUZICITZT	1.3	13.4 0	2 1.07	1100 1	11002	110.00	43,811	0 19 U
HA2	HA2-0.5	12/15/2005	0.5	21.9 U	7.30 U	/.30.0	n nc' /	10 7.87		1 22 1
	HA7-15	12/15/2005	1,5	13.8 U	4.61 U	4.61 U	4.61 U	18.4 U	21.1 0	0001
SVII	UAS DE	10/15/2005	0.5	938 U	93.8 U	93.8 U	93.8 U	938 U	938 U	83.8 0
CHH	0.0-CAN	12/10/2005	, r.t.	1510	5.02 U	5.02 U	5.02 U	20.1 U	30.1 U	1.51 U
	C.1-CAM	1211012000	20	11 666	73.011	73.9 U	73.9 U	296 U	444 U	22.2 U
HA4	HA4-0.5	CON7/GL/ZL	0.0	0 777	1104.0	11013	6 12 11	24.5 U	36.7 U	1.84 U
	HA4-1.5	12/15/2005	1.5	18.4 U	0.12 U	0.12.0	0.4.0	IT DOOR	160011	15011
HAG	HA5-D 5	12/15/2005	0.5	1690 U	169 U	169 U	169 U	0 0601	1020 0	0.001
	UNE 1 E	19/15/2005	5	27.2	7.49 U	7.49 U	7.49 U	29.9 U	80,3	n cz.z

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Table 5

# Volatile Organic Compounds in Soil (µg/kg) Precision Engineering, Inc. Seattle, Washington

Cocation On-Site G GP1	Campo		הקוווו	-ninnin	PIOIIIONICIIIO		2		- Lances	octhon.
On-Site G GP1	הם בולווומה	Date	(ft bgs)	benzene	methane	form	methane	Tetrachloride	penzene	Inethall
GP1	soprobe Sampli	bu						11000	110000	0.92011
5	GP1-S-1.5	6/7/2005	1.5	0.839 U	0.839 U	0.839 U	0.839 U	0.839 0	0.838 0	0.6000
	CP1-S-60	6/7/2005	9	1.12 U	1.12 U	1.12 U	1.12 U	1.12 U	1.12 U	0.2L.F
	CD1 C-100	6/0/2005	10	38.2 U	38.2 U	38.2 U	38.2 U	7.65 U	38.2 U	38.2.U
000	0100000	6/7/2005		0.96.0	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U	0.96 U
GPZ.	012-2-10	6/0/2002		44.11	44 U	44 U	44 U	8.81 U	44 U	44 U
	002 0 0 0	Elorande Blorande	0	79.5 U	79.5 U	79.5 U	79.5 U	15.9 U	79.5 U	79.5 U
643	GP3-3-2.0	CUDINOE	1 (1	44.8.11	44.B U	44.8 U	44.8 U	8.96 U	44.8 U	44.8 U
	CD2 C 11	6/0/2003	14	38.5 U	38.5 U	38.5 U	38.5 U	7.71 U	38,5 U	38.5 U
	41-0-010	CUDIENO RIARIDUDE	4.5	51710	51.7 U	51.7 U	51.7 U	10.3 U	51.7 U	51.7 U
GP4	0.1-0-4-0	0/10/2002	1	DE ETI	35.6 U	35.6 U	35,6 U	7.12 U	35.6 U	35.6 U
GP5	GP5-5-1.5	6/16/2005	0.0	35.411	35.1 []	35.1 U	35.1 U	7.03 U	35.1 U	35,1 U
1	GP5-S-8.0	6/10/2002	0 **	11.500	AD 5 11	40.5 U	40.5 U	8.1 U	40.5 U	40.5 U
	GP5-S-14.0	CUU2/01/0	4	112 04	112 CV	42.5 U	42.5 U	8.5 U	42.5 U	42.5 U
GP6	GP6-S-1.0	GU02/91/9		n c.24	11 7 7 7	0 0 27	41411	8.28 U	41.4 U	41.4 U
	GP6-S-14.5	6/16/2005	14.5	41.4 U	41.4 0	01.00	1106	7.8111	3911	39 U
GP7	GP7-S-2.0	6/16/2005	2	39 U	39 0	0.85	0.80	11100	116.44	11 6 44
	GP7-S-8.0	6/16/2005	80	44.2 U	44.2 U	44.2 U	44.2 U	0.04.0	N 7.44	11007
CDR	GP8-S-15	6/16/2005	1.5	49.3 U	49.3 U	49.3 U	49.3 U	9,86 U	49.3 U	48.0 0
	000000	RIVTIONE	6	37.1 U	37.1 U	37.1 U	37.1 U	7.42 U	37.1 U	37.10
CLa 0000	012-0-2-0	CONTINUE	1 2	65.811	55.8.0	55.8 U	55.8 U	11.2 U	55.8 U	55.8 U
GP10	0.1-0-01-00	2012/11/0	13.5	39.8.11	39.8 U	39.8 U	39.8 U	7.96 U	39.8 U	39.8 U
	0010-0100	C1772005	0	41911	41.9 U	41.9 U	41.9 U	8.37 U	41.9 U	41.9 U
1149	074000	5/17/2005	1 2	43 U	43 U	43 U	43 U	8.61 U	43 U	43 U
CD10	GP12-S-3.0	12/13/2005	0	1	4	1	£	t	i	1
1	GP12-S-50	12/13/2005	5	I	1	1	1		1	1
CD13	GP13-S-10	12/14/2005	1	1	1	,	ı	1	1	1
2	GP13-S-6.0	12/14/2005	9	ſ	1	1	1	1	1	1
GP14	GP14-S-3.0	12/13/2005	ŝ	ţ	1	1	1	t	1	ţ
	GP14-S-6.0	12/13/2005	9	ľ	1	1	1	•	1	-
GP15	GP15-S-3.0	12/13/2005	3	1	1	1	1	1	1	
	GP15-S-6.0	12/13/2005	9	1	ì	1	r	1	-	

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Chlorobromomethane ľ ١ 1 1 1 1 i 1 ì 1 1 í ï 1 i. ì 1 1 Ì 1 1 1 1 benzene Chloro-1 1 l 1 ŧ t 1 t 1 t ł 1 t 1 L 1 1 I ł 1 1 1 1 ł Tetrachloride Carbon - 1 I. ١ t ł 1 ۱ ŧ 1 1 1 1 1 ۱ 1 1 1 t Ì 1 1 1 1 1 methane Bromoi 1 1 1 1 1 1 1 i. 1 I. 1 1 1 1 1 t 1 1 1 ŧ 1 1 h. 1 1 Bromo-I. ١ I. 1 form 1 1 ì 1 1 t. 1 ۱ ١ i ì 1 1 ¢ 1 í Ĭ i. 1 1 1 Bromodichloromethane 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 t I. 1 ì ì ł 1 İ. ī 1 1 benzene Bromo-Ĭ. 1 1 l ł. t 1 1 1 1 1 4 Ĭ. 4 1 J. 1 ŧ 1 1 Î. 1 ï ı 1 1 ĩ I. Depth (ft bgs) 10.5 6.5 9.5 13 6.5 10 ø ÷ 3 3 3 - 0 -6 -5 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/14/2005 12/12/2005 12/13/2005 12/14/2005 12/12/2005 12/12/2005 12/14/2005 12/13/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 Date **On-Site Geoprobe Sampling** GP24-S-3.0-Dup GP19-S-1.0-Dup GP27-S-13.0 GP23-S-10.5 GP28-S-7.0 GP29-S-1.0 GP29-S-6.0 GP22-S-10.0 GP26-S-9.5 GP27-S-1.0 GP28-S-1.0 GP23-S-7.0 GP24-S-3.0 GP24-S-6.5 GP25-S-1.0 GP25-S-7.0 GP26-S-1.0 GP19-S-7.0 GP20-S-1.0 GP20-S-6.0 GP21-S-1.0 GP21-S-6.5 GP22-S-1.0 GP19-S-1.0 GP16-S-1.0 GP17-S-6.0 GP18-S-1.0 GP16-S-5.0 GP17-S-1.0 Sample ID GP29 GP26 GP28 GP25 GP27 Location GP22 GP23 GP24 GP16 GP18 GP19 GP20 GP21 GP17

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							Dromo	Carhon	Chlorn-	Chlorobromo-
Location	Sample ID	Date	(ft bas)	Bromo- benzene	Bromodicnloro- methane	form	methane	Tetrachloride	benzene	methane
On-Site	Geoprope Samp	ling								
	line oraciono		-				1	1	t	1
GP30	GP30-S-1.0	12/12/2005	-	1	1					,
	GP30-S-6.0	12/12/2005	9	1	4	1	1	'		
GP31	GP31-S-1.0	12/12/2005	L	ĵ.	r	1	ł			
	GP31-S-6.0	12/12/2005	9	ĵ	1	1	-	1	1	1
GP32	GP32-S-1.0	12/14/2005	1	1	t	1	1	1	1	
Off-Site	Hand-Auger Sar	mpling					10.00		11000	6 7211
HA1	HA1-0.5	12/15/2005	0.5	5.73 U	5.73 U	5.73 U	11.5 U	5.73 U	D 67.7	0.100
	UN4 4 E	10/15/2005	5	691 U	6.91 U	6.91 U	13.8 U	6.91 U	2.77 U	6.91 U
	0.1-144	10001171		111 30	26.41I	26411	52.8 U	26.4 U	10.6 U	26.4 U
	HA1-1.5-Dup	GUUZ/GL/ZL	C'L	0 4 OZ	o tiny	2	11011	1100 2	11000	7 30 11
HA2	HA2-0.5	12/15/2005	0.5	7.30 U	7.30 U	7.30 U	14.6 U	D 00.1	11 70 7	16111
	HA7-1.5	12/15/2005	1.5	4.61 U	4.61 U	4.61 U	9.22 U	4.61 U	1.04 U	0.0.4
1140	DU GVII	10/15/2005	0.5	93.8.U	93.8 U	93.8 U	93.8 U	93.8 U	93.8 U	93.8 U
HAS	C.D.CAL	12110/2005	4.0	E 02 11	502 U	5.02 U	10.0 U	5.02 U	2.01 U	5.02 U
	C'I-CHH	CDU2/01/21	1.0	0 40.0	79.011	73 011	148.11	73.9 U	29.6 U	73.9 U
HA4	HA4-0.5	12/15/2005	9.0	13.9 0	10.90	0.001	11007	11 64 3	2 4511	612 U
	HA4-15	12/15/2005	1.5	6.12 U	6.12 U	6.12 U	12.2 U	0.12.0	2.40.0	11008
1.411	11AF OF	ADIAE/2005	0.5	16911	169 U	169 U	169 U	169 U	169 U	1 PA N
CAH	C.U-CAH			11 07 2	11 07 2	7.49 U	15.0 U	7.49 U	2.99 U	7.49 U
	C.L-CAH	CUUZICITZI	0.1	1.40 0	> >++	C and a lot				

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40.5 U 41.4 U 49.3 U 55.8 U 44.8 U 35.1 U 42.5 U 44.2 U 37.1 U Dibromomethane 38.5 U 35.6 U 39.8 U 41.9 U 38.2 U 0.839 U 1.12 U 0.96 U 43 U 79.5 U 51.7 U 44 U 39 U I ï 1 1 1 chloromethane 39.8 U 37.1 U 55.8 U 35.6 U 35.1 U 40.5 U 42.5 U 44.2 U 49.3 U 38.5 U 41.4 U 41.9 U Dibromo-0.839 U 38.2 U 79.5 U 44.8 U 43 U 1.12 U 0.96 U 51.7 U 39 U 44 U 1 i. t 1 1 1 1 cis-1,3-Dichloro-44.2 U 49.3 U 37.1 U 55.8 U 41.9 U 35.1 U 39.8 U propene 44.8 U 38.5 U 51.7 U 35.6 U 40.5 U 42.5 U 41.4 U 1.12 U 79.5 U 43 U 38.2 U 0.96 U 39 U 0.839 L 44 U Ĭ. ٠ 1 4 1 L Ł t Dichloroethene 55.8 U 41.9 U 2.73 U 11.9 U 2.93 U 3.15 U 3.26 U 12.6 U 39.8 U 2.86 U 35.1 U 42.5 U 44.2 U 3.47 U 1.12 U 38.2 U 79.5 U 44.8 U 38.5 U 35.6 U 49.3 U 37.1 U 40.5 U cis-1,2-0.839 U 51.7 U 39 U 78.8 0.96 U 44 U 149 44.2 U 49.3 U 37.1 U 55.8 U 39.8 U 41.4 U 35.1 U 42.5 U 41.9 U methane 44.8 U 35.6 U 0.839 U 1.12 U 38.2 U 0.96 U 79.5 U 38.5 U 51.7 U 39 U 43 U 40.5 U Chloro-44 U 1 1 Ì í 1 4 1 Chloroform 41.9 U 44.2 U 49.3 U 55.8 U 39.8 U 37.1 U 35.1 U 40.5 U 42.5 U 44.8 U 38.5 U 51.7 U 35.6 U 0.839 U 1.12 U 38.2 U 79.5 U 43 U 0.96 U 41.4 U 39 U 44 U ï ł. L L 1 79.6 U 83.7 U 86.1 U U 1.77 70.3 U 82.8 U 78.1 U 112 U 89.6 U 71.2 U 88.4 U 98.6 U 0.96 U 74.2 U 1.12 U 103 U 0.839 U 76.5 U 88.1 U 159 U 81 U 85 U Chloroethane 1 t. 1 1 1 1 l 1 13.5 (ft bgs) 14.5 6.5 1.5 1.5 Depth 2 5 2 0 10 9 3 0 3 5 1.5 14 N 14 8 N 00 10 60 10 N 0 12/13/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 6/17/2005 6/17/2005 6/17/2005 6/16/2005 6/17/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/9/2005 6/7/2005 6/9/2005 6/7/2005 6/9/2005 6/9/2005 6/9/2005 6/7/2005 Date **On-Site Geoprobe Sampling** GP10-S-13.5 GP14-S-6.0 GP15-S-3.0 GP15-S-6.0 GP12-S-3.0 GP13-S-1.0 GP13-S-6.0 GP14-S-3.0 GP11-S-2.0 GP11-S-6.5 GP12-S-5.0 GP10-S-1.5 GP6-S-14.5 GP5-S-14.0 GP1-S-10.0 GP5-S-1,5 GP5-S-8.0 GP6-S-1.0 GP7-S-2.0 GP7-S-8.0 GP8-S-1.5 GP9-S-2.0 GP2-S-10.0 GP4-S-1.5 GP3-S-2.0 GP3-S-6.0 GP2-S-1.0 GP3-S-14 Sample ID GP1-S-1.5 GP1-S-6.0 GP15 GP14 GP13 GP10 GP11 GP12 Location GP8 GP9 GP5 GP6 GP4 GP7 GP2 GP3 GP1

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1.1

Dibromomethane 1 I 1 t ١ ŧ ł 1 ï ì t i i í. Ĩ ł 1 1 i. ų, l 1 chloromethane Dibromot. 1 1 t t 1 1 ł. Ľ 1 1 I. 1 1 ъ 1 1 1 1 1 1 cis-1,3-Dichloropropene 1 1 ŧ. ŧ. ŧ. 4 1 1 Q. 1 4 t. 1 1 1 1 1 1 1 ١ 1 1 1 1 1 1 1 ١ Dichloroethene 3.00 U 3.40 U 2.56 U 2.97 U 3.18 U 2.45 U 2.24 U 2.61 U 2.72 U 2.16 U 2.72 U 3.09 U 3.35 U 2.27 U 2.63 U 3.15 U 5.42 U 2.61 U 2.41 U 2.72 U 2.83 U 3.20 U 2.88 U 3.26 U 4.94 9.96 2.51 U 2.55 U 2.22 U cis-1,2methane Chloro-1 1 1 1 1 1 1 1 1 1 1 L ł Ĩ Ľ 1 1 1 L 1 ł. 1 1 1 1 ١ Chloroform 1 1 1 D. ۱ 1 1 1 t i. 1 1 1 1 1 1 1 ۱ T. 1 1 1 1 Chloroethane 1 1 1 1 1 1 1 1 1 1 1 1 1 1 T 1 1 1 1 1 1 1 1 1 1 ł. Depth (ft bgs) 10.5 9.5 6.5 13 9 6.5 20 3 1 -1 -3 1 6 ~ -5 6 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/14/2005 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 Date **On-Site Geoprobe Sampling** GP24-S-3.0-Dup GP19-S-1.0-Dup GP23-S-10.5 GP27-S-13.0 GP29-S-1.0 GP28-S-1.0 GP29-S-6.0 GP22-S-10.0 GP27-S-1.0 GP28-S-7.0 GP24-S-6.5 GP26-S-1.0 GP26-S-9.5 GP23-S-7.0 GP24-S-3.0 GP25-S-1.0 GP25-S-7,0 GP20-S-1.0 GP20-S-6.0 GP21-S-1.0 GP21-S-6.5 GP22-S-1.0 GP17-S-6.0 GP18-S-1.0 GP19-S-1.0 GP19-S-7.0 GP16-S-1.0 GP16-S-5.0 GP17-S-1.0 Sample ID GP29 GP28 GP24 GP25 GP26 GP27 Location GP18 GP19 GP23 GP20 GP22 GP16 GP21 GP17

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						Chloro	cie 1 2	rie-1 3-Dichloro-	Dibromo-	Upromo-
cation	Sample ID	Date	(ft bgs)	Chloro- éthane	Chloroform	methane	Dichloroethene	propene	chloromethane	methane
Cito	Geonrohe Samu	ind								
ann-III	dunda and and	- ALANDOR				,	2 87 U	1		1
3P30	GP30-S-1.0	CNN7/71/71		1						1
	GP30-S-6.0	12/12/2005	9	1	1	1	3.99 U	-		
2021	GP31-S-10	12/12/2005		1	j	1	2.42 U	1	1	t
10 10	GP31-S-6 II	12/12/2005	9	1	1		4.09 U	1	L	T
0202	GP32-S-10	12/14/2005		,	1	1	- 2.84 U	1	I.	ł
30 10	01 02 02 10									
Off-Site	Hand-Auger San	upling						11021	E 7311	57311
HA1	HA1-0.5	12/15/2005	0.5	5.73 U	2.87 U	11.5 U	3.44 U	0.73.0	0.1.0	
	HA115	12/15/2005	12	6.91 U	3.46 U	13.8 U	4,15 U	6.91 U	6.91 U	0.91 U
	S'ILIVII	200010171		112.00	110.05	ED B II	15,811	26.4 U	26.4 U	26.4 U
	HA1-1.5-Dup	12/15/2005	C.L	70'4 N	13.2 0	75.0 0	2001		11001	1 20 11
HAZ	HA2-0.5	12/15/2005	0.5	7.30 U	3.65 U	14.6 U	4.38 U	1.30.0	- n nc./	11 43 4
	HA2-1.5	12/15/2005	1.5	4.61 U	2.30 U	9.22 U	2.77 U	4.61 U	4.010	10.04
CVIT	HASOR	12/15/2005	05	93.8 U	93.8 U	469 U	93.8 U	93.8 U	93.8 U	83.8 U
CYL		1014610005	4.5	5 07 11	2.51 U	10.0 U	3.01 U	5.02 U	5.02 U	5.02 U
	C'I-CHL	1000/12/07	201	72 0 11	37 0 11	148.11	44.4 U	73.9 U	73.9 U	73.9 U
HA4	HA4-0.5	CUUZ/GUZI	0.0	0 8.01	00.10	II C CF	0 6711	E 1211	6.12 U	6.12 U
	HA4-1.5	12/15/2005	1.5	6.12 U	3.06 U	17.2 U	0.10.0	0.12.0	11007	11008
HAF	HARDE	12/15/2005	0.5	169 U	169 U	844 U	169 U	169 U	169 U	n ROL
CAL		ADIAE/DODE	4 4	7 40 11	3 74 11	15.0 U	4.49 U	7.49 U	7.49 U	7.49 U

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Naphthalene 55.8 U 39.8 U 41.9 U 35.1 U 38.5 U 35.6 U 40.5 U 41.4 U 44.2 U 49.3 U 37.1 U 0.839 U 38.2 U 0.96 U 79.5 U 51.7 U 42.5 U 39 U 43 U 44.8 U 1.12 U 44 U ï 1 i Methylene 7.96 U 8.61 U 8.84 U 9.86 U 7.42 U 7,03 U 8.28 U 8.37 U chloride 1.12 U 7.65 U 8.96 U U17.7 10.3 U 7.12 U 8.1 U 8.5 U 7.81 U 17.9 0.839 U 0.96 U 8.81 U 15.9 U I. į. 1 ١ 1 1 1 m,p-Xylene 83.7 U 79.6 U 86.1 U 82.8 U 78.1 U 88.4 U 98.6 U 112 U 89.6 U 71.2 U 70.3 U 2.24 U 1.92 U 88.1 U 77,1 U 103 U 81 U 85 U 74.2 U 76.5 U 159 U 1.68 U 1 1 I Ì 1 1 1 Isopropyl-55.8 U 39.8 U 44.8 U 44.2 U 49.3 U 51.7 U 35.6 U 35.1 U 41.9 U 43 U benzene 38.5 U 42.5 U 37.1 U 1.12 U 38.2 U 0.96 U 41.4 U 0.839 U 79.5 U 40.5 U 39 U ï 44 U ł i Î 1 1 1 Hexachloro-55.8 U 39.8 U 41.9 U butadiene 37.1 U 35.6 U 35.1 U 40.5 U 44.2 U 49.3 U 1.12 U 0.96 U 44.8 U 38.5 U 43 U 0.839 U 38.2 U 79.5 U 42.5 U 41.4 U 51.7 U 44 U 39 U I ١ I. 1 t I I. 55.8 U 41.9 U 39.8 U 35.6 U 35.1 U 44.2 U 49.3 U 40.5 U 41.4 U benzene 0.839 U 1.12 U 38.2 U 0.96 U 79.5 U 44.8 U 38.5 U 51.7 U 42.5 U 37.1 U 43 U 39 U Ethyl-44 U 1 ų. 1 1 1 1 ١ 1 difluoromethane 41.9 U 44.2 U 55.8 U 35.1 U 40.5 U 42.5 U 41.4 U 39.8 U 35.6 U 37.1 U 38.2 U 44.8 U 49.3 U 43 U Dichloro-0.839 U 79.5 U 38.5 U 39 U 1.12 U 0.96 U 51.7 U 44 U 1 1 1 £ 1 1 1 (ft bgs) 13.5 14.5 6.5 Depth 1.5 22 0 0 0 1.5 2 3 5 9 3 1,5 14 14 2 00 2 1.5 10 8 10 9 2 9 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 6/17/2005 6/17/2005 6/17/2005 6/17/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/9/2005 6/9/2005 6/7/2005 6/7/2005 6/9/2005 6/7/2005 6/9/2005 6/9/2005 Date **On-Site Geoprobe Sampling** GP10-S-13.5 GP13-S-6.0 GP14-S-3.0 GP14-S-6.0 GP15-S-3.0 GP15-S-6.0 GP12-S-3.0 GP13-S-1.0. GP11-S-6.5 GP12-S-5.0 GP10-S-1.5 GP11-S-2.0 GP5-S-14.0 GP6-S-14.5 GP7-S-2.0 GP7-S-8.0 GP8-S-1.5 GP9-S-2,0 GP2-S-10.0 GP6-S-1.0 GP1-S-10.0 GP3-S-6.0 GP4-S-1.5 GP5-S-1.5 GP5-S-8.0 GP3-S-2.0 GP2-S-1.0 GP1-S-1.5 GP1-S-6.0 GP3-S-14 Sample ID GP13 GP14 GP15 GP12 GP10 GP11 Location GP8 GP9 GP6 GP1 GP3 GP4 GP5 GP2 GP7

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Naphthalene		t.	1	1	t	1	t	ŀ	1		1	ı	t.	I.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Methylene chloride		l	1	1	1	1	1	1	į	1	ĩ	1	1	i	t	i	ı	1	t	1	1	1	r	1		1	ı	ł	1	1
m,p-Xylene		1	t	r	t	I	1	1	1	Î	1	i	Î	ŀ	•	,	1	1	1	1	1	1	1	1	1	1	1	1	1	t,
Isopropyl- benzene		1	1	1	1	1	1	1	1	4	1	ţ	1	1	4	1	r	1	ţ	t	i	1	1	1	1	1	,		1	1
Hexachloro- butadiene		1	ĩ	1	1	1	I	1	L	ļ	1	t	1	i	1	1	1	1	1	ì	r	1	r	1	,	1	i	ì	1	
Ethyl- benzene		ī	1	1	I	1	1	1	1	1	i	1	ì	t	ŗ	1	ı	1	ţ	4	ţ	4	i	ł	1		1	4	i	1
Dichloro- difluoromethane		1	j	1	ļ	1	1	1	1	1		1	1	r		1	4	4		4	1	4	ı	i	ţ	đ.	4	¢	ł	1
Depth (ft bgs)			5		9	1	-	+	7	1	9		6.5	1	10	7	10.5	3	3	6.5 -	۰,	7		9.5	1	13	-	7	1	9
Date	<u>B</u>	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005
Sample ID	eoprobe Samplir	GP16-S-1.0	GP16-S-5.0	GP17-S-1.0	GP17-S-6.0	GP18-S-1.0	GP19-S-1.0	GP19-S-1.0-Dup	GP19-S-7.0	GP20-S-1.0	GP20-S-6.0	GP21-S-1.0	GP21-S-6.5	GP22-S-1.0	GP22-S-10.0	GP23-S-7.0	GP23-S-10.5	GP24-S-3.0	GP24-S-3.0-Dup	GP24-S-6.5	GP25-S-1.0	GP25-S-7.0	GP26-S-1.0	GP26-S-9.5	GP27-S-1.0	GP27-S-13.0	GP28-S-1.0	GP28-S-7.0	GP29-S-1.0	GP29-S-6.0
Location	On-Site G	GP16		GP17		GP18	GP19			GP20		GP21		GP22		GP23		GP24			GP25		GP26		GP27		GP28	I	GP29	

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cation	Sample ID	Date	Depth (4 hoc)	Dichloro-	Ethyl- henzene	Hexachloro- hutadiene	Isopropyl- benzene	m,p-Xylene	Methylene chloride	Naphthalene
			(choil)							
On-Site	Geoprobe Samp	ling								
GP30	GP30-S-1.0	12/12/2005		1	1	1	t	,	1	I
	GP30-S-6.0	12/12/2005	9	1	Î	1	i	1	1	1
GP31	GP31-S-1.0	12/12/2005	1	•	1	ł	1	1	1	1
	GP31-S-6.0	12/12/2005	9		1	1	1	I	t	1
GP32	GP32-S-1.0	12/14/2005	1	1	1	r	1	t	1	1
Off-Site	Hand-Auger San	npling								1 10 1
HA1	HA1.05	12/15/2005	0.5	5.73 U	4.58 U	5.73 U	5.73 U	į	0.10.A	D 27.0
5	UN1 1 E	10/145/2005	4 4	6910	5.53 U	6.91 U	6.91 U	i	4.84 U	6.91 U
	01-1VII	1014510005	, u	26.41I	21111	26.4 U	26.4 U	1	18.5 U	26.4 U
	dnn-c.I-LAH	CUUZICI 121	0.1	0 1.03			1001		E 44 11	11 US 2
HA2	HA2-0.5	12/15/2005	0.5	7.30 U	5.84 U	7.30 U	/.30.0	1	0.11.0	1.100
	HA7-15	12/15/2005	1.5	4.61 U	3.69 U	4.61 U	4.61 U	1	3.23 U	4.61 U
CVII	TIN2 O E	10/15/2005	0.5	93.8 U	93.8 U	93.8 U	93.8 U	I,	938 U	93.8 U
CHU	11A3 1 5	10/15/2005	, r.	5.02 U	4.02 U	5.02 U	5.02 U	1	3.51 U	5.02 U
UAA	DUPAN SUPAN	10/15/2005	0.5	73.9 U	59.1 U	73.9 U	73.9 U	1	51.8 U	73.9 U
144		101451006	14	6 12 11	4 89 11	6.12 U	6.12 U	1	4.28 U	6.12 U
	C.1-44H	2002/21/21	2.40	16011	16911	169 U	169 U	1	1690 U	169 U
CAH	C'O-CAH	12/12/2009	0.0	11012	5 99 11	7 49 U	7.49 U	1	5.24 U	7.49 U

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chloroethene 7.96 U 8.61 U 7.42 U 11.2 U 8.37 U 7.03 U 8.28 U 7.81 U 8.84 U 8.96 U 9.86 U 7.71 U 1.12 U 0.96 U 15.9 U 10.3 U 7.12 U 8.1 U 0.839 U 8.5 U 7.65 U 8.81 U 1 Tetraž 1 ī 44.2 U 55.8 U 39.8 U 35.1 U 49.3 U 37.1 U tert-Butyl-44.8 U 38.5 U 35.6 U 40.5 U 41.9 U 43 U benzene 51.7 U 1.12 U 38.2 U 0.96 U 79.5 U 42.5 U 41.4 U 39 U 0.839 U 44 U ŧ 1 1 1 1 ī. 1 t 55.8 U 39.8 U 35.1 U 42.5 U 44.2 U 41.9 U 41.4 U 37.1 U 35.6 U 40.5 U 49.3 U 44.8 U 43 U Styrene 0.839 U 1.12 U 38.2 U 0.96 U 79.5 U 39 U 38.5 U 51.7 U 44 U 1 1 1 1 1 t 1 1 sec-Butyl-39.8 U 41.9 U 44.2 U 55.8 U 44.8 U 51.7 U 35.6 U 35.1 U 40.5 U 42.5 U 41.4 U 49.3 U benzene 37:1 U 0.839 U 1.12 U 38.2 U 38.5 U 43 U 0.96 U 39 U 79.5 U 1 Ĭ. i 44 U ï 1 t 1 1 55.8 U 39.8 U 41.9 U 37.1 U 44.2 U o-Xylene 0.839 U 35.6 U 35.1 U 40.5 U 49.3 U 38.5 U 41.4 U 43 U 1.12 U 44.8 U 42.5 U 0.96 U 79.5 U 38.2 U 44 U 51.7 U 39 U ï 1 1 ł ) 1 1 41.9 U 44.2 U 49.3 U 55.8 U 39.8 U 35.6 U 35.1 U 40.5 U 37.1 U n-Propylbenzene 44.8 U 38.5 U 51.7 U 43 U 0.839 U 1.12 U 0.96 U 79.5 U 41.4 U 38.2 U 42.5 U 39 U ï 1 44 U ĵ. 1 ł 1 ł 55.8 U 41.9 U benzene 42.5 U 41.4 U 44.2 U 39,8 U 38.5 U 35.6 U 35.1 U 40.5 U 1.12 U 38.2 U 0.96 U 79.5 U 44.8 U 49.3 U 37.1 U 43 U n-Butyl-0.839 U 39 U 51.7 U 44 U 1 1 1 t 1 I 1 13.5 (ft bgs) Depth 14.5 6.5 1.2 1.5 0 0 0 0 0 1,5 12 4 2 3 5 N 00 N 1.5 4 10 80 10 9 6 N 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 6/17/2005 6/17/2005 6/17/2005 6/17/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/9/2005 6/9/2005 6/9/2005 6/7/2005 6/9/2005 6/7/2005 6/9/2005 6/7/2005 Date **On-Site Geoprobe Sampling** GP15-S-6.0 GP10-S-13.5 GP15-S-3.0 GP12-S-3.0 GP13-S-6.0 GP14-S-3.0 GP14-S-6.0 GP11-S-2.0 GP11-S-6.5 GP12-S-5.0 GP13-S-1.0 GP10-S-1.5 GP5-S-14.0 GP6-S-14.5 GP1-S-10.0 GP2-S-10.0 GP5-S-1.5 GP6-S-1.0 GP7-S-2.0 GP7-S-8.0 GP8-S-1.5 GP9-S-2.0 GP4-S-1.5 GP5-S-8.0 GP3-S-6.0 GP1-S-1.5 GP1-S-6.0 GP2-S-1.0 GP3-S-2.0 GP3-S-14 Sample ID GP15 GP14 GP12 GP13 GP10 GP11 Location GP9 GP8 GP4 GP5 GP6 GP7 GP3 GP1 GP2

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Tetra- chloroethene		t	1	1			L	1			1	1		1	1	1		1			I		( )	-	1	1	¢ (	ē.	PI V	
tert-Butyl- benzene c		•	1	1		1	ŀ	ı	1	ı	1	r	1	i	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Styrene		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	,	I.	l	ſ	Ċ		ï	1	1	1	i	1	1	
sec-Butyl- benzene		1	1	1	i	1	1	ŀ	1	ł	ł	I	1	ł	1	i	1	ł	ì	1	ĥ	1	ŀ	t	1	1	ĸ	1	I	
o-Xylene		1	1	1	1	1	1	i,	ŗ	1	1	ı	1	)	ł	i	1	1	i	1	1	1	1	1	1	4	ł	1	1	
n-Propyl- benzene		1	4	1	1	1	t	ï	1	1	1	1	1	1	1	1	i	í	Î	1	1	1	I	1	1	1	1	1	1	
n-Butyl- benzene		1	1	1	1	1	1	ł	-	1	-	1	1	1	1	1	-	1	1	1	1	1	ĵ		- 1	1	1	ţ	ł	
Depth (ft bgs)		+	5	1	9	1	1	-	7	-	9	-	6.5	+	10	7	10,5	3	3	6.5	ł	7	1	9.5	1	13	1	7		
Date	0	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/13/2005	12/13/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/14/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	12/12/2005	
Sample ID	eoprobe Samplin	GP16-S-1.0	GP16-S-5.0	GP17-S-1.0	GP17-S-6.0	GP18-S-1.0	GP19-S-1.0	3P19-S-1.0-Dup	GP19-S-7.0	GP20-S-1.0	GP20-S-6.0	GP21-S-1.0	GP21-S-6.5	GP22-S-1.0	GP22-S-10.0	GP23-S-7.0	GP23-S-10.5	GP24-S-3.0	GP24-S-3.0-Dup	GP24-S-6.5	GP25-S-1.0	GP25-S-7.0	GP26-S-1.0	GP26-S-9.5	GP27-S-1.0	GP27-S-13.0	GP28-S-1.0	GP28-S-7.0	GP29-S-1.0	
Location	On-Site Go	GP16		GP17		GP18	GP19	0		GP20		GP21		GP22		GP23		GP24			GP25		GP26	1	GP27		GP28		GP29	

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										Taken
Location	Sample ID	Date	Depth (ft hos)	n-Butyl- henzene	n-Propyl- benzene	o-Xylene	sec-Butyl- benzene	Styrene	tert-Butyl- benzene	chloroethene
10.00	Comp of the Comp	ine.	In Bank						t	
alic-un	denhinne ognin	hun								1
GP30	GP30-S-1.0	12/12/2005	F	1	1	1	1	ı		10
	GP30-S-6.0	12/12/2005	9	1	1	1	1	1	1	
GP31	GP31-S-1.0	12/12/2005	+	1	1	4	1	1	1	ŀ
	GP31-S-6.0	12/12/2005	9	ł	i	1	1	1	1	r
GP32	GP32-S-1.0	12/14/2005	1	1	1	1	1	1	ī	r
Off-Site	Hand-Auger San	npling						10000	11011	11000
HA1	HA1_D F	12/15/2005	0.5	5.73 U	5.73 U	1	5.73 U	1.15 U	5./3 N	D 87.2
ŝ	HAT TE	49/45/2005	15	6.91 U	6.91 U	1	6.91 U	1.38 U	6.91 U	2.77 U
	C.1-14H		2 4	11 / 20	26.4.11	1	26.4 U	5.28 U	26.4 U	10.6 U
	dnn-c.1-TAH	CUUZICI IZI	C'1	n t.n2	0 1.04		1.00 1	11 01 1	1106.2	11000
HA2	HA2-0.5	12/15/2005	0.5	7.30 U	7.30 U	ì	1.00.1	1.40 U	0.00.1	1100 0
	HA2-1.5	12/15/2005	1.5	4.61 U	4.61 U	1	4.61 U	0.922.0	4.61 U	n +0.1
CVD	HARDE	12/15/2005	0.5	93.8 U	93.8 U	1	93.8 U	93.8 U	93.8 U	93.8 U
CAL		12/16/2005	24	5 02 U	5.02 U	1	5.02 U	1.00 U	5.02 U	2.01 U
	C.1-CMU	1211010101	140	72.011	73 011	1	73.9 U	14.8 U	73.9 U	29.6 U
HA4	C.U-44H	CONTROL /71	0.0	0.00	11070		R 1711	11001	61210	2.45 U
	HA4-1.5	12/15/2005	1.5	6.12 U	0.12 U	1	0.12.0	0.771	11008	16011
HAG	HAGAD 5	12/15/2005	0.5	169 U	169 U	,	169 U	169 0	D ROI	0 001
	LINE 1 E	10/14/2005	15	7 49 11	7.49 U	1	7.49 U	1.50 U	7.49 U	2.99 U
	C.I-CHL	IZI INIEVON	2.1							

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Xylenes, Total t ł I 1 1 1 k 1 1 ï ł Ŭ. L 1 ł 1 İ. 2.72 U 2.27 U 2.89 U 2.44 U 2.62 U 8.61 U 10.5 U 7.81 U 8.84 U 7.42 U 11.2 U 7.96 U 8.37 U 2.39 U 9.89 U chloride U 60.7 8.28 U 8.96 U 7.71 U 7.12 U 0.839 U 1.12 U 0.96 U 8.81 U 15.9 U 10.3 U 8.5 U 9.86 U 8.1 U 7.65 U Vinyl fluoromethane 44.2 U 49.3 U 37.1 U 55.8 U 41.9 U Trichloro-35.1 U 42.5 U 39.8 U 44.8 U 1.12 U 38.5 U 51.7 U 35.6 U 41.4 U 43 U 38.2 U 40.5 U 39 U 0.839 U 79.5 U 0.96 U 44 U 1 1 ŧ t. Ŀ ļ, 1 ۱ 2.72 U 10.5 U 7.96 U 2.39 U 2.27 U 9.89 U 2.89 U 2.62 U 11.2 U Trichloro-7.03 U 7.81 U 8.84 U 9.86 U 8.96 U 7.12 U 7.42 U 7.65 U 15.9 U 87.2 4.49 0.839 U 1.12 U ethene 0.96 U 8.81 U U 17.7 10.3 U 8.1 U 1160 40.5 281 Dichloropropene 39.8 U 55.8 U trans-1,3-35.1 U 42.5 U 49.3 U 37.1 U 41.9 U 1.12 U 38.2 U 0.96 U 79.5 U 44.8 U 38.5 U 51.7 U 35.6 U 41.4 U 44.2 U 43 U 39 U 0.839 U 44 U 40.5 U Ì. 1 1 1 1 1 1 1 Dichloroethene 2.89 U 2.72 U 2.44 U 2.27 U 2.62 U 44.2 U 55.8 U 39.8 U 41.9 U 2.39 U 10.5 U 9.89 U trans-1,2-35.1 U 43 U 44.8 U 38.5 U 35.6 U 40.5 U 37.1 U 1.12 U 38.2 U 79.5 U 42.5 U 41.4 U 49.3 U 0.839 U 39 U 0.96 U 51.7 U 44 U 55.8 U 41.9 U 44.2 U 49.3 U 44.B U 35.6 U 35.1 U 40.5 U 42.5 U 41.4 U 37.1 U 39.8 U 38.2 U 38.5 U Toluene 79.5 U 51.7 U 43 U 0.839 U 0.96 U 39 U 44 U ĵ. 1 1 1 1 1.62 l 1 (ft bgs) 13.5 14.5 1.5 6.5 Depth 10 2 1.5 2 0 3 Ó 3 0 1.5 3 5 1.5 14 2 14 00 NO 10 9 9 2 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 6/17/2005 6/17/2005 6/16/2005 6/17/2005 6/17/2005 6/17/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/16/2005 6/9/2005 6/9/2005 6/9/2005 6/9/2005 6/7/2005 6/7/2005 6/9/2005 6/7/2005 Date **On-Site Geoprobe Sampling** 3P10-S-13.5 GP15-S-3.0 GP15-S-6.0 GP14-S-3.0 GP11-S-6.5 GP12-S-3.0 GP13-S-1.0 GP13-S-6.0 GP14-S-6.0 GP10-S-1.5 GP12-S-5.0 GP11-S-2.0 GP6-S-14.5 GP5-S-14.0 GP8-S-1.5 GP9-S-2.0 GP7-S-2.0 GP7-S-8.0 GP1-S-10.0 GP2-S-10.0 GP5-S-1.5 GP5-S-8.0 GP6-S-1.0 GP3-S-6.0 GP4-S-1.5 GP1-S-1.5 GP1-S-6.0 GP2-S-1.0 GP3-S-2.0 GP3-S-14 Sample ID GP15 GP12 GP13 GP14 GP10 GP11 Location GP9 GP8 GP3 GP4 GP5 GP6 GP1 GP2 GP7



Xylenes, Ì I. Total t 1 4 1 1 i 1 ł t ú 1 i 1 1 1 1 2.17 U 2.05 U 2.01 U 2.65 U 2.19 U 2.47 U 2.43 U 1.80 U 2.27 U 2.58 U 2.50 U 2.83 U 2.13 U 2.47 U 1.87 U 2.18 U 2.79 U 2.26 U 1.89 U 2.40 U 2.72 U 2.62 U 4.52 U chloride 2.09 U 2.27 U 2.36 U 2.67 U 2.12 U 1.85 U Vinyl fluoromethane Trichloro-1 1 t. 1 1 1 ۱ t 1 1 1 L Į. 1 r ١ 1 1 1 J. 0 t 1. 1 1 1 Ĭ. 1.87 U 2.47 U 2.43 U 2.47 U 2.01 U 2.65 U 2.19 U 2.05 U 2.17 U 2.50 U 1.80 U 2.58 U 2.83 U Trichloro-2.18 U 2.79 U 2.26 U 1.89 U 2.27 U 2.13 U 2.40 U 2.62 U 4.52 U 2.72 U 2.67 U 2.12 U 2.09 U 2.27 U ethene 3.63 3.43 Dichloropropene trans-1,3-1 1 1 ï 1 1 1 1 1 1 1 I ï 1 ï I. 1 1 1 1 i ĩ 1 I Dichloroethene 2.43 U 2.47 U 2.05 U 2.17 U 1.89 U 2.27 U 2.58 U 2.50 U 2.83 U 2.13 U 2.01 U 2.65 U 2.19 U 1.87 U 2.47 U trans-1,2-2.79 U 1.80 U 2.40 U 2.72 U 2.62 U 4.52 U 2.18 U 2.12 U 2.27 U 2.67 U 2.26 U 2.09 U 2.36 U 1.85 U Toluene 1 t ŧ. ŧ. 1 ۱ ۱ 1 1 1 1 1 1 1 1 4 ۱ 1 1 1 1 1 1 1 (ft bgs) 10.5 Depth 9.5 6.5 6.5 13 9 10 3 1 ÷ ŝ 6 -50 0 -12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/12/2005 12/14/2005 12/14/2005 12/12/2005 12/14/2005 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/14/2005 12/13/2005 12/14/2005 12/13/2005 12/13/2005 12/14/2005 12/14/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 12/13/2005 Date **On-Site Geoprobe Sampling** GP24-S-3.0-Dup GP19-S-1.0-Dup GP23-S-10.5 GP27-S-13.0 GP28-S-7.0 GP29-S-1.0 GP29-S-6.0 GP27-S-1.0 GP22-S-10.0 GP26-S-1.0 GP26-S-9.5 GP28-S-1.0 GP24-S-6.5 GP25-S-1.0 GP25-S-7.0 GP22-S-1.0 GP23-S-7.0 GP24-S-3.0 GP20-S-6.0 GP21-S-1.0 GP21-S-6.5 GP19-S-1.0 GP19-S-7,0 GP20-S-1.0 GP16-S-1.0 GP17-S-6.0 GP18-S-1.0 GP16-S-5.0 GP17-S-1.0 Sample ID GP29 GP25 GP26 GP28 GP23 GP24 GP27 Location GP18 GP22 GP16 GP19 GP20 GP17 GP21

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Table 5 Volatile Organic Compounds in Soil (µg/kg) Precision Engineering, Inc.

Seattle, Washington

15.0 U 12.2 U 506 U 13.8 U 14.6 U 9.22 U 281 U 10.0 U 148 U 11.5 U 52.8 U Xylenes, Total 1 Ĭ. 1 1 1 3.74 U 93.8 U 37.0 U 3.06 U 169 U 3.46 U 13.2 U 3.65 U 2.30 U 2.51 U chloride 2.39 U 3.32 U 2.02 U 3.41 U 2.37 U 2.87 U Vinyl fluoromethane 7.49 U 73.9 U 6.12 U 169 U 6.91 U 4.61 U 5.02 U Trichloro-5.73 U 26.4 U 7.30 U 93.8 U ŧ. 1 į, 1 Trichloro-ethene 3.74 U 93.8 U 2.51 U 37.0 U 3.06 U 169 U 3.46 U 13.2 U 3.65 U 2.30 U 2.87 U 2.39 U 3.32 U 2.02 U 3.41 U 2.37 U Dichloropropene 1.87 U trans-1,3-1.73 U 93.8 U 1.26 U 18.5 U 1.53 U 6.60 U 1.15 U 169 U 1.83 U 1.43 U Í t ١ 1 Dichloroethene 3.06 U 3.74 U 2.51 U trans-1,2-2.30 U 93.8 U 3.46 U 13.2 U 3.65 U 2.02 U 3.41 U 2.37 U 2.87 U 37.0 U 169 U 2.39 U 3.32 U 2.25 U 1.84 U 169 U 1.51 U 22.2 U 1.72 U 2.07 U 7.92 U 2.19 U 1,38 U 93.8 U Toluene 1 1 1 1 L Depth. (ft bgs) 0.5 1.5 0.5 0.5 1.5 0.5 1.5 1.5 1.5 0.5 ×-Ó ω 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/15/2005 12/14/2005 12/15/2005 12/15/2005 12/12/2005 12/15/2005 12/15/2005 12/15/2005 12/12/2005 12/12/2005 12/12/2005 Date Off-Site Hand-Auger Sampling HA1 HA1-0.5 12/15 **On-Site Geoprobe Sampling** HA1-1.5-Dup GP30-S-1.0 GP32-S-1.0 GP30-S-6.0 GP31-S-1.0 GP31-S-6.0 HA5-1.5 HA2-1.5 HA1-1.5 HA2-0.5 HA3-0.5 HA3-1.5 HA4-0.5 HA4-1.5 HA5-0.5 Sample ID Location GP32 HA5 GP30 GP31 HA3 HA4 HA2

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Table 6
Petroleum Hydrocarbon Identification in Soil
Precision Engineering, Inc.
Seattle, Washington

Location	Sample ID	Date	Depth (ft bgs)	Gasoline-Range Organics	Diesel-Range Organics	Oil-Range Organics
On-Site	Geoprobe Samp	oling				
GP1	GP1-S-1.5	6/7/2005	1.5	ND	ND	ND
	GP1-S-6.0	6/7/2005	6	ND	ND	ND
Sec. 11	GP1-S-10.0	6/9/2005	10	ND	ND	ND
GP2	GP2-S-1.0	6/7/2005	1	ND	ND	ND
014	GP2-S-10.0	6/9/2005	10	ND	ND	ND
GP3	GP3-S-2.0	6/9/2005	2	ND	ND	ND
0.0	GP3-S-6.0	6/9/2005	6	ND	ND	ND
A 11.11	GP3-S-14	6/9/2005	14	ND	ND	ND
GPA	GP4-S-15	6/16/2005	1.5	ND	ND	ND
GP5	GP5-S-15	6/16/2005	1.5	ND	ND	ND
GFU	GP5-S-140	6/16/2005	14	ND	ND	ND
CDS	GP6-S-10	6/16/2005	1	ND	ND	ND
GFU	GP6-S-14.5	6/16/2005	14.5	ND	ND	ND
CP7	GP7-S-2.0	6/16/2005	2	ND	ND	ND
GFT	GP7-S-8.0	6/16/2005	8	ND	ND	ND
GPR	GP8-S-1.5	6/16/2005	1.5	ND	ND	ND
GPO	GP9-S-2.0	6/17/2005	2	ND	ND	ND
GP10	GP10-S-15	6/17/2005	1.5	ND	ND	ND
GFIU	GP10-S-13.5	6/17/2005	13.5	ND	ND	ND
CP11	GP11-S-2.0	6/17/2005	2	ND	ND	ND
GPTI	GP11-S-6.5	6/17/2005	6.5	ND	ND	ND



Table 7
Petroleum Hydrocarbons in Soil (mg/kg)
Precision Engineering, Inc.
Seattle, Washington

			Depth	Gasoline-Range	Diesel-Range	Oil-Range
ocation	Sample ID	Date	(ft bgs)	Organics	Organics	Organics
On-Site	Geoprobe Sampling	1			10.711	00.011
GP12	GP12-S-3.0	12/13/2005	3	44	10.70	20.00
GP13	GP13-S-6.0	12/14/2005	6		12.8 0	50.1
GP14	GP14-S-6.0	12/13/2005	6		10.8 U	20.90
GP15	GP15-S-3.0	12/13/2005	3		17.7	59.1
GP16	GP16-S-5.0	12/13/2005	5		11.2 U	28.00
GP17	GP17-S-1.0	12/13/2005	1		11.6	63.1
GP18	GP18-S-1.0	12/13/2005	1		156	142
GP19	GP19-S-1.0	12/13/2005	1		52.8	172
GP19	GP19-S-1.0-Dup	12/13/2005	1	+	18.2	43.8
GP19	GP19-S-7.0	12/13/2005	7	· · · · · · · · · · · · · · · · · · ·	14.5 U	56.7
GP20	GP20-S-1.0	12/14/2005	1	· · · · · · · · · · · · · · · · · · ·	198	301
GP20	GP20-S-6.0	12/14/2005	6		75.9	294
GP21	GP21-S-1.0	12/14/2005	1	-	11.2 U	28.0 U
GP21	GP21-S-6.5	12/14/2005	6.5	÷	5270	19900
GP22	GP22-S-10.0	12/13/2005	10		11.3 U	28,2 U
GP23	GP23-S-7.0	12/14/2005	7		10.8 U	26.9 U
GP24	GP24-S-3.0	12/14/2005	3		11.1 U	27.8 U
GP25	GP25-S-7.0	12/12/2005	7		10,6 U	26.6 U
GP26	GP26-S-1.0	12/12/2005	1		36.4	121
GP26	GP26-S-9.5	12/12/2005	9.5		10.8 U	27.1U
GP27	GP27-S-13.0	12/12/2005	13		10.9 U	27.2 U
GP28	GP28-S-10	12/12/2005	1		10.8 U	27.0 U
CP28	GP28-S-7.0	12/12/2005	7		10.4 U	26.0 U
CP20	GP20-S-1.0	12/12/2005	1		80.4	249
CP29	GP29-S-6 0	12/12/2005	6	4	12.8 U	32.0 U
CD20	GP30-S-1.0	12/12/2005	1	÷	14.9	90.5
CP20	GP30-S-6.0	12/12/2005	6	A	39.6	165
GP30	GP31-S-10	12/12/2005	1	-	145	1300
GP31	GP31-S-6.0	12/12/2005	6		58.9	157
GP31	GP32-S-1.0	12/14/2005	1	1	11.3 U	28.3 U
OF SI	Hand Auger Same	ling				1
UA4	HA1-0.5	12/15/2005	0.5	11.4	210	1170
HAT	HA1-1.5	12/15/2005	1.5	6.57 U	37.6	182
HAT	HA1-1 5-Dup	12/15/2005	1.5	7.00 U	67.0	328
HAT	HA2.05	12/15/2005	0.5	8.20 U	636	3170
HA2	HA2-0.5	12/15/2005	1.5	4.79 U	73.8	409
HAZ	HA2-1.0	12/15/2005	0.5	7.58 U	278	2470
HAS	HA3-0.5	12/15/2005	1.5	5.65 U	11.7 U	30.1
HA3	HA3-1.5	12/15/2005	0.5	22.1 U	35900	106000
HA4	HA4-0.5	12/15/2005	1.5	10.2 U	1350	3550
HA4	HA4-1.5	12/15/2005	0.5	21.3 U	1130	7330
HA5	HA5-0,5	12/15/2005	15	8110	61.8	347



Table 8 Polycyclic Aromatic Hydrocarbons in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

ample ID	Date	Depth (ft. bgs)	1-Methyl- naphthalene	2-Methyl- naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene
e Samplin	5							
8-S-1.0	12/13/2005	1	0.0167	0.0202	0.0111 U	0.0111 U	0.0111 U	0.0235
9-S-1.0	12/13/2005	1	0.0124 U	0.0124 U	0.0124 U	0.0124 U	0.0124 U	0.0124 U
0-5-10	12/14/2005	-	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U
0-2-6.0	12/14/2005	9	0.0139 U	0.0139 U	0.0139 U	0.0139 U	0.0139 U	0.0139 U
1-S-6.5	12/14/2005	6.5	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U
9-S-1.0	12/12/2005		0.0119 U	0.0119 U	0.0119 U	0.0119 U	0.0137	0.0750
0-S-6.0	12/12/2005	9	0.0146 U	0.0146 U	0.0146 U	0.0146 U	0.0146 U	0.0154
31-S-1.0	12/12/2005	1	0.0117 U	0.0117 U	0.0117 U	0.0117 U	0.0117 U	0.0117 U
31-S-6.0	12/12/2005	60	0.0134 U	0.0134 U	0.0134 U	0.0134 U	0.0134 U	0.0211
uger Samp	ling							
A1-0.5	12/15/2005	0.5	0.0151 U	0.0151 U	0.0151 U	0.0151 U	0.0151 U	0.0151 U
A1-1.5	12/15/2005	1.5	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U
-1 5-Dun	12/15/2005	15	0.0152 U	0.0152 U	0.0152 U	0.0152 U	0.0152 U	0.0288
A2-0.5	12/15/2005	0.5	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U	0.0176 U
A2-1.5	12/15/2005	1.5	0.0125 U	0.0125 U	0.0125 U	0.0125 U	0.0125 U	0.0125 U
A3-0.5	12/15/2005	0.5	0.0133 U	0.0133 U	0.0133 U	0.0133 U	0.0133 U	0.0340
A3-1.5	12/15/2005	1.5	0.0118 U	0.0118 U	0.0118 U	0.0118 U	0.0118 U	0.0118 U
A4-0.5	12/15/2005	0.5	0.340 U	0.340 U	0.340 U	0.340 U	0.340 U	0.554
A4-1.5	12/15/2005	1.5	0.0159 U	0.0159 U	0.0159 U	0.0159 U	0.0159 U	0.0159 U
A5-0.5	12/15/2005	0.5	0.267 U	0.267 U	0.267 U	0.267 U	0.267 U	0.862
A5-1.5	12/15/2005	1.5	0.0153 U	0.0153 U	0.0153 U	0.0153 U	0.0153 U	0.0153 U

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Polycyclic Aromatic Hydrocarbons in Soil (mg/kg)

1

## Precision Engineering, Inc. Seattle, Washington

Dat
13/2005 1 0
13/2005 1 0
14/2005 1
14/2005 6
14/2005 6.5
12/2005 1
12/2005 6
12/2005 1
12/2005 6
15/2005 0.5
15/2005 1.5
15/2005 1.5
15/2005 0.5
15/2005 1.5
15/2005 0.5
15/2005 1.5
/15/2005 0.5
/15/2005 1.5
/15/2005 0.5
MEIDODE 1 5

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Table 8 Polycyclic Aromatic Hydrocarbons in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Depth (ft. bgs)	Fluoranthene	Fluorene	Indeno(1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
On-Site G	Ponrohe Samplin	D							
CD18	GP18-S-10	12/13/2005	-	0.195	0.0111 U	0.0111 U	0.0179	0.109	0.0884
0100	GP10-S-10	12/13/2005		0.0245	0.0124 U	0.0124 U	0.0124 U	0.0161	0.0203
0000	01200000	12/14/2005		0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U	0.0120 U
0220	CL20-0-1.0	12/14/2005		0.0139 U	0.0139 U	0.0139 U	0.0139 U	0.0139 U	0.0139 U
CD01	GP21-S-65	12/14/2005	6.5	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U
CDOO	CD00-S-10	12/12/2005	-	0.149	0.0119 U	0.0260	0.0119 U	0.0382	0.156
CD30	GP30-S-6.0	12/12/2005	9	0.0467	0.0146 U	0.0146 U	0.0146 U	0.0258	0.0531
0000	CD31-S-10	12/12/2005		0.0253	0.0117 U	0.0117 U	0.0117 U	0.0153	0.0254
10-10	010101010	12/12/2005		0.0517	0.0134 U	0.0134 U	0.0134 U	0,0287	0.0500
OF CHO	Jond Avent Samp	vline							
011-0110	UNA DE	10/15/2005	0.5	0.0196	0.0151 U	0.0151 U	0.0151 U	0.0151 U	0.0151 U
HAH	C.0-1AU	121 1012005	и и и	0.012911	0.0129 U	0.0129 U	0.0129 U	0.0129 U	0.0129 U
HAT	CI-IAH	1211012000	2 4	0.0051	0.0152 U	0.0201	0.0152 U	0.0382	0.0657
HA1	dnn-c'I-IVH	12/10/2021	20	O DAFE	0.017611	0.0176.0	0.0176 U	0.0180	0.0334
HAZ	C.U-2AH	C007/C1/71	C. )		0.0405	0.019511	0.0125.01	0.0125 U	0.0240
HA2	HA2-1.5	GUU2/GL/21	0.1	67cn.n	0.0210.0	D D D D D D D D D D D D D D D D D D D	1100100	0.0826	0 134
HA3	HA3-0.5	12/15/2005	0.5	0.120	0.0133 U	0.0365	0.0010,0	0700.0	00000
HA3	HA3-1.5	12/15/2005	1.5	0.0118 U	0.0118 U	0.0118 U	0.0118 U	0.0118 U	0.0110.0
HAA	HA4-0.5	12/15/2005	0.5	1.30	0.340 U	0.340 U	0.340 U	0.340 U	797
HAN	HA4-15	12/15/2005	1.5	0.0191	0.0159 U	0.0159 U	0.0159 U	0.0159 U	0.0218
EVI1	UAK OF	19/15/2005	0.5	2.38	0.267 U	1.02	0.267 U	0.930	2.15
CHH	C.0-0411	1014610006		0015311	0.0153.0	0.0153 U	0.0153 U	0.0153 U	0.0153 U
HA5	G.I-CAH	CNNZ/CL/ZL	0.1	0.0010.0	0001000				

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Table 9
Metals in Reconnaissance Groundwater (mg/L)
Precision Engineering, Inc.
Seattle, Washington

Location	Sample ID	Date	Dissolved Chromium	Chromium (Hexavalent)	Dissolved Chromium (Trivalent) <sup>a</sup>	Lead
000	CP2-W-17-RECON	6/9/2005	37.1	4.72	32.38	15 U
GP2 CP4	GP4-W-80	6/16/2005	267	236	31	1.
GP4 CP5	GP5-W-18.0	6/16/2005	0.02 U	0.0897	NC	
GPS	GP6-W-18.0	6/16/2005	343	300	43	
GP0	GP7-W-14.0	6/16/2005	0.02 U	0.101	NC	-
GP8	GP8-W-10.0	6/16/2005	355	294	61	-



Table 10 Volatile Organic Compounds in Reconnaissance Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	1,1,1,2-Tetra-	1,1,1-Trichloro- ethane	1,1,2,2-Tetra- chloroethane	1,1,2-Trichloro- ethane	1,1-Dichloro- ethane	1,1-Dichloro- ethene	1,1-Dichloro- propene	1,2,3-Trichloro- benzene
000	CD3 M 17 DECON	RIGIPUDE	511	50	5 U	5 U	5 U	5 U	5 U	5 U
249	NDDDJ-11-M-710			11.6	411	11	10	10	10	10
GP4	GP4-W-8.0	6/16/2005	DL	0	-			4.11	4.11	1114
CDK	GP5-M-18 0	6/16/2005	10	10	10	1.0	10	n I	0	
0.0	0.01-01-010	Longolotio	1100	11.00	1100	20 U	20 U	20 U	20 U	20 U
GP6	GP6-W-18.0	GUUZ/GUUS	20.0	20.02	222		4.1.4	11.5	111	111
207	GP7-M-14 0	6/16/2005	10	10	10	10	nt	n	0	
10		DODODUDIO	11.6	111	10	10	10	10	10	10
GP8	GP8-W-10.0	CUU2/01/0	0-	2						1
GP-13	GP13-W-8.0	12/14/2005	1	-	1	1	1			
GP-15	GP15-W-8.0	12/14/2005	1	1	-	1	1	Į.	1	
2										

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Table 10

## Volatile Organic Compounds in Reconnaissance Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

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Location	Sample ID	Date	1,2,3-Trichloro-	1,2,4-Trichloro- henzene	1,2,4-Trimethyl- benzene	1,2-Dibromo-3- chloropropane	1,2-Dibromo- ethane	1,2-Dichloro- benzene	1,2-Dichloro- ethane	1,2-Dichloro- propane
			proparte	DOINT OF			112	EII	511	50
600	GP2-W-17-RFCON	6/9/2005	50	5 U	50	50	nc	00	2	
10					11 5	11.4	10	10	10	DL
GP4	GP4-W-8.0	6/16/2005	10	10	5	2			11.4	411
	0.05 101 1000	ENCLOSED	111	111	10	10	10	10	10	
GP5	0.81-00-049	0/ 10/2/01	2	2			1100	11 06	- 11.06	20.01
000	CDE W 18 0	SHAPDOF	20 U	20 U	20 U	20 U	20.0	50 0	20.07	2
GFO	0-01-0-0-0	DOD TIOL IO	1			11 5	111	111	10	10
001	GP7-M-14.0	6/16/2005	10	10	10	10	0-	2		
1.0	0.1.1.10				11 1		111	10	10	10
GPR	GP8-W-10.0	6/16/2005	10	10	10	0-	2			
5						1	1	1	1	1
GP-13	GP13-W-8.0	12/14/2005	1	1						1
GP-15	GP15-W-8.0	12/14/2005	1		1	R.	1	1		



Table 10 Volatile Organic Compounds in Reconnaissance Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	1,3,5-Trimethyl- benzene	1,3-Dichloro- benzene	1,3-Dichloro- propane	1,4-Dichloro- benzene	2,2-Dichloro- propane	2-Butanone	2-Chlorotoluene	4-Chlorotoluene
		10001010	11.2	112	511	511	50	729	5 U	5 U
GP2	GP2-W-17-RECON	CUUZIEIO	00	20	2	2		11-1	11.5	111
CDA	CDA MLB 0	6/16/2005	10	10	10	10	10	50	II	-
110	000-00-00	00000000			11.4	11.5	111	511	10	10
GP5	GP5-W-18.0	6/16/2005	10	10	D L	0	0-	2		
000	CDC M 40 C	RIGINUE	1106	20.01	20 U	20 U	20 U	100 U	20 U	20.0
049	0-01-10-010	DU TUIZVUO	200	1				- 11	411	111
CD7	GP7-W-14 0	6/16/2005	10	10	10	10	10	0.0	0	0
10				10.8	4.11	111	111	10.3	10	10
GP8	GP8-W-10.0	G/16/2009	10	0-	0-	2		110		
CD 13	CP13-W-8 0	12/14/2005	•	1	1	1	-	20	•	
0-10	0.0000							2016	1	1
GP-15	GP15-W-8.0	12/14/2005	ţ	1	1	1	-	7.01		

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ocation	Sample ID	Date	4-Isopropyl- toluene	4-Methyl-2- pentanone	Acetone	Benzene	Bromobenzene	Bromodichloro- methane	Bromoform	Bromomethane	Carbon Tetrachloride
000	CD2 ML17 DECON	6/0/2005	5.0	25 U	295	50	5 U	5.0	5 U	5 U	5 U
210		CHEIDOR	111	511	40.5	10	10	10	10	10	1U
GP4	0F4-VV-6.U	0110/2007	2	2			11.5	4.11	111	111	11
GP5	GP5-W-18.0	6/16/2005	10	50	7.2	10	10	n			1100
CDC	CDR_ML18 0	6/16/2005	20 U	100 U	100 U	20 U	20 U	20 U	20 U	20 U	20.02
OLD.	0.01-01-0.10		2			11.8	11.6	111	111	10	10
GP7	GP7-W-14.0	6/16/2005	10	5 U	nc	-		0		114	11.6
GP8	GP8-W-10.0	6/16/2005	10	5 U	75.8	10	10	10	nL	01	2
CD 12	CP13_ML8.0	12/14/2005	1	1	1	1	4		-	1	1
11-10	CONCOLO D	1014APDODE		1	1	1	1	1	ţ	1	t



Location	Sample ID	Date	Chlorobenzene	Chlorobromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2- Dichloroethene	cis-1,3-Dichloro- propene
						10-1	511	511	511
CdD	GP2-W-17-RECON	6/9/2005	50	50	5 U	D C	ne	00	2
4 10		HOUGHAND	111	111	10	10	10	10	10
GP4	GP4-W-8.U	CUU2/01/0	0	2				11.5	111
CDE	CDE WL18 0	6/16/2005	10	10	10	10	10	01	0-
CLO CLO	201-22-010	000410110					11.00	144	20.11
CDE	GP6-W-18 0	6/16/2005	20 U	20 U	20 U	20.0	ZU U	144	200
0.0	0.01 10.00						114	111	10
CD7	0717W-120	6/16/2005	10	10	10	10	01	2	2
110	0.11.10					1114	111	2.26	10
GP8	GP8-W-10.0	6/16/2005	10	10	n.	0-	-		
5		1000111101			1	1	-	6.03	i
GP-13	GP13-W-8.0	GUU2/141/21	1	1				1160	1
GP-15	GP15-W-8.0	12/14/2005	1	-	1	ſ	1	0.2.0	



GP2     GP2-W-17-RECON     6/9/2005     5 U     5 U     5 U     5 U     5 U     5 U     5 U     1 U0       GP4     GP4-W-8.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     2 U     2 U       GP5     GP5-W-18.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     2 U     2 U       GP5     GP5-W-18.0     6/16/2005     2 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 0 U     2 U     4 0 U     2 U     4 0 U     2 U	Location	Sample ID	Date	Dibromo- chloromethane	Dibromo- methane	Dichloro- difluoromethane	Ethylbenzene	Hexachloro- butadiene	Isopropyl- benzene	m,p-Xylene	Methyl tert-butyl ether
GP2     GF2-W-11-Account     USI2000     1U     1U     1U     1U     1U     1U     2U     2U       GP4     GP4-W18.0     6/16/2005     1U     1U     1U     1U     1U     1U     2U     2U       GP5     GP6-W-18.0     6/16/2005     1U     1U     1U     1U     1U     2U     2U       GP6     GP6-W-18.0     6/16/2005     20 U     20 U     20 U     20 U     2U     40 U       GP7     GP7-W-14.0     6/16/2005     1U     1U     1U     1U     1U     2U     2U       GP7     GP7-W-18.0     6/16/2005     1U     1U     1U     1U     1U     2U     2U       GP7     GP8-W-10.0     6/16/2005     1U     1U     1U     1U     1U     2U     2U       GP3     GP13-W-80.0     12/14/2005     1U     1U     1U     1U     2U     2U       GP15     GP13-W-80.0     12/14/2005     -     -     -	000	CD0 M 47 DECON	RIGIOUR	511	50	50	50	5 U	5 U	1 U0	5 U
GP4     GP4-W-8.0     6/16/2005     1U     2U	SHO	ND024-11-M-749	nonvie in	2			4.11	111	111	00	10
GP5     GP5-W-18.0     6/16/2005     1U     1U     1U     1U     1U     2U     2U       GP6     GP6-W-18.0     6/16/2005     20 U     20 U     20 U     20 U     20 U     40 U       GP7     GP7-W-14.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     20 U     20 U     20 U       GP7     GP7-W-14.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     20 U     2 U       GP3     GP3-W-10.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     2 U     2 U       GP13     GP13-W-8.0     12/14/2005     -	GP4	GP4-W-8.0	6/16/2005	10	10	10	10		-	24	
OF3     OF4-With Stress     OF4-With Stress		CDE ML18 D	R/16/2005	11	10	10	10	10	10	2 U	10
GP6     GP6-W-18.0     6/16/2005     20 U	610	0.01-04-010	000000000					1100	1100	NOIL	2011
GP7     GP7-W-14.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     2 U       GP8     GP8-W-10.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     2 U       GP8     GP8-W-10.0     6/16/2005     1 U     1 U     1 U     1 U     1 U     2 U       GP13     GP13-W-8.0     12/14/2005     -	CDG	GP6-M-18 D	6/16/2005	20 U	20 U	20 U	20 U	20.0	20.0	40.0	20.02
GP7     GP7-W-14.0     6/16/2005     1U     1U     1U     1U     1U     1U     2U     2U <td>0.0</td> <td>0.01 0.0 10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>115</td> <td>111</td> <td>116</td> <td>10</td>	0.0	0.01 0.0 10						115	111	116	10
GP8     GP8-W-10.0     6/16/2005     1U     1U     1U     1U     1U     2U       GP13     GP13-W-8.0     12/14/2005     -     <	GP7	GP7-W-14.0	6/16/2005	10	10	10	01	01	-	2	
CP8 CP8-Wr-10.0 6/16/2005 1U 1U 1U 1U 1U   CP-13 CP13-Wr-8.0 12/14/2005 - - - - -   CP-15 CP15-Wr-8.0 12/14/2005 - - - - -	- 5						11.4	111	111	116	10
GP-13 GP13-W-8.0 12/14/2005 - - - -   GP-15 GP15-W-8.0 12/14/2005 - - - -	GP8	GP8-W-10.0	6/16/2005	10	10	n.	n		-	2	
GP-13 Gr 10-W-0.0 12/14/2005	01 00	CD42 W 0 0	10/1/10/05	1	1	1	1	1	)	1	1
GP-15 GP15-W-8.0 12/14/2005	21-13	0-10-0-0	0007141171								1
	GP-15	GP15-W-8.0	12/14/2005	I	1	1	1	1	1		



Seattle, Washington

Location	Sample ID	Date	Methylene chloride	Naphthalene	n-Butyl- benzene	n-Propyl- benzene	o-Xylene	sec-Butyl- benzene	Styrene	tert-Butyl- benzene
	MOOLU LE IN COU	PID PDDE	E11	511	50	50	50	50	5 U	50
GP2	GP2-W-1/-KECON	CUUZIEIO	00	2			11.4	11.6	111	111
CDA	GP4-W-8 0	6/16/2005	10	10	10	101	1 U	n r	-	2
* 5	000000			11 *	111	115	111	10	10	10
GP5	GP5-W-18.0	6/16/2005	1 0		-	-	-			1.00
000	CDC 1/1 10 0	RIALDONS	2011	20 U	20 U	20 U	20 U	20 U	20 U	20 0
949	0-01-01-010		1 21				4.11	111 5	111	111
CD7	GP7-W-14 0	6/16/2005	10	10	10	nt	10	0	2	>
110	0				4.14	11.6	115	111	111	10
GP8	GP8-W-10.0	6/16/2005	10	8/	n-L	n	0-	-	-	
00 40	0010 101 8 0	12/14/2005	1	4	1	1	4	1	I	1
CI-19	0-0-0-0-0	0007121171							4	1
GP-15	GP15-W-8.0	12/14/2005	1	P	1	1	1			

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Location	Sample ID	Date	Tetra- chloroethene	Toluene	trans-1,2- Dichloroethene	trans-1,3-Dichloro- propene	Trichloro- ethene	Trichloro- fluoromethane	Vinyl chloride
	MOOTO TA TA MA CAS	PIOLODOE	E11	511	511	50	5 U	50	5 U
GP2	GP2-W-1/-KEUUN	DISIZUUD	00	20	2		11.5	11.8	11.8
CDA	GP4-W-8 0	6/16/2005	10	10	10	10	DL.	10	0-
+10	000 44 4 10					115	111	1.1	10
GPS	GP5-W-18.0	6/16/2005	10	10	10	01	0	2	
5					1100	1100	1430	20.01	20 0
GPG	GP6-W-18.0	6/16/2005	20 U	20 U	20 0	20 0	001	2	
5							11 5	115	111
CD7	0 2P7-W-14 0	6/16/2005	10	10	10	10	0	-	2
110						4 11	AR R	111	110
GPR	GP8-W-10.0	6/16/2005	10	10	10		0:01	2	
5					101		0.220	1	16.5
CD-13	GP13-W-8 0	12/14/2005	1	1	10.1		0.440		
210					1.00		1100	1	0.2 0
GP-15	GP15-W-8.0	12/14/2005	1	1	0.2.0	1.	0.4.0		



Table 11 Petroleum Hydrocarbon Identification in Reconnaissance Groundwater Precision Engineering, Inc. Seattle, Washington

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Location	Sample ID	Date	Gasoline-Range Organics	Diesel-Range Organics	Oil-Range Organics
CP2	GP2-W-17-RECON	6/9/2005	DET	ND	ND
GP4	GP4-W-8.0	6/16/2005	ND	DET	ND
GP5	GP5-W-18.0	6/16/2005	ND	ND	ND
GPS	GP6-W-18.0	6/16/2005	ND	ND	ND
GP0	GP7-W-14.0	6/16/2005	ND	ND	ND
GPA	GP8-W-10.0	6/16/2005	DET	DET	DET



Table 12 Petroleum Hydrocarbons in Reconnaissance Groundwater (mg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Gasoline-Range Organics	Diesel-Range Organics	Oil-Range Organics
CP2	GP2-W-17-RECON	6/9/2005	0.1 U		
GF2	CP4.W/8.0	6/16/2005		0.325	0.478 U
GP4	0004-00-0.0	6/16/2005	0 155	0.814	0.479 U
GP8	GP8-W-10.0	6/16/2005	0.155	0.014	0.415



Polycyclic Aromatic Hydrocarbons in Reconnaissance Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington Table 13

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Location	Sample ID	Date	2-Chloro- nanhthalene	2-Methyl- naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a) anthracene	Benzo(a) pyrene	Benzo(b+k) fluoranthene
							11.0000	11 101 0	0 101 11	D 954 U
	0011100	SUCCIONS	0 101 11	0 477 11	0.191 U	0.191 U	U.181.0	0.181.0	0.121.0	0 - 00:0
GP4	GF4-W-8.U	011012001	0.121.0	0 11-0				111010	11 VUV V	0.0711
	00110000	PUNCTORIA	0.40411	R FG	0.328	0.194 U	0.194 U	0.194 U	0.134 U	0.31 0
GP8	GP8-W-10.0	CUUZIOI /0	0.134 0	000						

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Polycyclic Aromatic Hydrocarbons in Reconnaissance Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington Table 13

ion	Sample ID	Date	Benzo(ghi) perviene	Chrysène	Dibenzo(a,h) anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
1									11 224 0	0 101 11	0 101 11
	CDA WAR	R/16/2005	0 191 11	0.191 U	0.191 U	0.191 U	0.191 U	0.191.0	U.4// U	U.181.U	0.131.0
t	0.0-11-10	0007010	0.01.0						1.00	E CA	11 101 0
a	GP8-W-10.0	6/16/2005	0.194 U	0.194 U	0.194 U	0.194 U	0.298	0.194 U	20.02	4C'C	0.134 0



Table 14 Polychlorinated Biphenyls in Reconnaissance Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Arocior 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
GP8	GP8-W-10.0	6/16/2005	0.0958 U	0.0958 U	0.0958 U	0.0958 U	0.0958 U	0.0958 U	0.0958 U

1 4



Location	Sample ID	Date	Dissolved Chromium	Chromium (Hexavalent)	Dissolved Chromium (Trivalent) <sup>s</sup>
MW/1	MW1-W-35.0	6/16/2005	0.02 U	0.269	NC
NUMBER OF	MW1-122705	12/27/2005	0.001 U	0.00625 U	NC
_	MW1-041806	4/18/2006	0.00014 U	0.00063 U	NC
MW2	MW2-W-0605	6/17/2005	0.02 U	0.01 U	NC
1010 02	MW2-122805	12/28/2005	0.00879	0.00625 U	0.00879
	MW2-041906	4/19/2006	0.021	0.00063 U	0.021
MW3	MW3-0605	6/7/2005	0.02 U	0.01 U	NC
WILKS	MW3-122905	12/29/2005	0.00215	0.00625 U	0.00215
	MW3-041706	4/17/2006	0.0078	0.00063 U	0.0078
MIMA	MW4-0605	6/9/2005	0.02 U	0.01 U	NC
1014.04	MW/4-0605-Dup	6/9/2005	0.02 U	0.01 U	NC
11.11	MW4-122705	12/27/2005	0.001 U	0.00625 U	NC
	MW/4-041806	4/18/2006	0.0020	0.023	NC
MWS	MW5-122805	12/28/2005	497	450	47
141440	MW5-041906	4/19/2006	32	350	NC
MMA	MW6-122905	12/29/2005	0.0187	0.00625 U	0.0187
WINNS.	MW6-041906	4/19/2006	0.047	0.00063 U	0.047
MW7	MW7-122805	12/28/2005	0.0106	0.00738	0.0106
	MW7-041806	4/18/2006	0.013	0.00063 U	0.013
	MW7-041806-Dup	4/18/2006	0.013	0.00063 U	0.013
MWB	MW8-122805	12/28/2005	0.00755	0.00625 U	0.00755
111000	MWDup-122805	12/28/2005	0.00849	0.00625 U	0.00849
	MW8-041806	4/18/2006	0.021	0.00063 UJ	0.021

## Table 15 Dissolved Chromium in Groundwater (mg/L) Precision Engineering, Inc. Seattle, Washington

## Table 16 Dissolved Metals in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

ocation	Sample ID	Date	Antimony	Arsenic	Beryllium	Cadmium	Copper	Lead
ANAIA	MMM1-122705	12/27/2005	3.00 U	32.3	1.00 U	1.00 U	1.01	1.00 U
I A AIAI	MANAL-DATROF	4/18/2006	1	33	1	ł	0.075 U	0.016 U
CIVINA	MM/7-122805	12/28/2005	3.00 U	5.63	1.00 U	1.00 U	1.17	1.00 U
ZAAIA	MNN2-041906	4/19/2006	1	3.8	1	1	2.5	0.016 U
AMAR	MMMR-122905	12/29/2005	3.00 U	15.3	1.00 U	1.00 U	1.00 U	1.00 U
	MW3-041706	4/17/2006	1	13	1	r	0.075 U	0.016 U
AUNIA .	MNN4-122705	12/27/2005	3.00 U	15.1	1.00 U	1.00 U	1.00 U	1.00 U
	MVV4-041806	4/18/2006	1	15	4	1	0.075 U	0.016 U
AMAIE	MINI5-122805	12/28/2005	3.00 U	4.59	1.00 U	1.00 U	3.67	1.00 U
CANIN	MMM/5_DA1906	4/19/2006	1	4.9	1	•	0.075 U	0.016 U
Con a second		SUNCIDICICE	3 00 11	11.9	1.00 U	1,00 U	4.02	1.00 U
GVVM	COSZI-OVIN	11012000	1	24		1	5.1	0.016 L
1	INIV VO-04 1300	ADIODION IN	3 00 11	6.62	1 00 U	1.00 U	2.12	1.00 U
JANNA	CU0221-1VVM	AIAR/POOR	0.000	71	1	1	2.4	0.016 L
	MMA77-041806-Dun	4/18/2006	9	7.3	1	1	3.3	0.016 L
AAAAB	MIMIR-122805	12/28/2005	3.00 U	6.41	1.00 U	1.00 U	1.00 U	1.00 U
OAAIAI	MV/Dup-122805	12/28/2005	3.00 U	7.85	1.00 U	1.00 U	1.03	1.00 U
	MIV/8-041806	4/18/2006	1	4.8	1		0.075 U	0.016 L

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## Table 16 Dissolved Metals in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
1 MW	MW1-122705	12/27/2005	0.200 U	1.00 U	1.00 U	1.00 U	1.00 U	10.0 U
	MW1-041806	4/18/2006	1	1	1.1 U	1	-	1
MW2	MW2-122805	12/28/2005	0.200 U	2.51	6.28	1.00 U	1.00 U	10.0 U
	MW2-041906	4/19/2006	1	1	10	1	1	1
MW3	MW3-122905	12/29/2005	0.200 U	1.70	1.00 U	1.00 U	1.00 U	10.0 U
	MW3-041706	4/17/2006	1	ţ	1.1 U	-	1	1
MW4	MW4-122705	12/27/2005	0.200 U	1.33	1.00 U	1.00 U	1.00 U	10.0 U
	MW4-041806	4/18/2006	t	4	1.1 U	1	1	1
MW5	MW5-122805	12/28/2005	0.200 U	32.2	1000 U	1.00 U	1.00 U	14.0
	MW5-041906	4/19/2006	1	1	1.1 U	1	1	1
MWG	MW6-122905	12/29/2005	0.200 U	16.3	12.3	1.00 U	1.00 U	10.0 U
	MWR-041906	4/19/2006	1	1	19	4	1	1
MW7	MW7-122805	12/28/2005	0.200 U	11.8	2.77	1.00 U	1.00 U	10.8
	MW7-041806	4/18/2006	1	1	5.0	ŀ	t	1
	MW7-041806-Dup	4/18/2006	1	1	4.6	1	1	1
MWB	MW8-122805	12/28/2005	0.200 U	2.91	4.11	1.00 U	1.00 U	10.0 0
	MWDup-122805	12/28/2005	0.200 U	3.14	4.27	1.00 U	1.00 U	10.0 U
	MW8-041806	4/18/2006	t	1	3.6	1	1	1

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1,2,3-Trichlorobenzene 10 10 1 1 1 I. 10 1 U 1 2 1 i ĩ 1 Í. 1 1 1 1,1-Dichloropropene 10 10 Ĩ ł. 1 10 t 1 10 1 1 t 10 ١ 1 1 I 4 ł Ì 1 1 1 1,1-Dichloroethene 10 10 ł. 1 1 1 1 10 10 1 1 1 1 10 Į. 1 T ł 1 1 t 1 1 1,1-Dichloroethane 10 110 1 1 1 ۱ 10 ŭ Í. ۱ 10 ŧ ſ I. 1 1 1 U 1 1 1 1 1 ł 1,1,2-Trichloroethane 1 U 1 1 1 1 U 1 C 1 1 ۱ 1.0 1 1 1 10 t 1 1 1 1 1 1 1 1 1,1,2,2-Tetrachloroethane 10 4 10 ١ 1 1 10 10 10 I l 1 1 1 1 1 1 4 1 1 ŧ 1 1 1,1,1-Trichloroethane 1 10 10 10 ł 4 10 I. ł. 1 110 1 1 ۱ ì i. t ł 1 1 1 1 1,1,1,2-Tetra-chloroethane 1 n 1 1 ŀ 10 1 U Í. ſ 1 10 10 ١ I 1 ł 1 1 1 1 ١ Ì 1 I 12/28/2005 12/28/2005 04/18/2006 12/28/2005 04/18/2006 04/18/2006 12/28/2005 04/19/2006 12/29/2005 04/19/2006 12/27/2005 04/18/2006 04/17/2006 12/29/2005 12/27/2005 04/18/2006 12/28/2005 04/19/2006 6/17/2005 6/9/2005 6/9/2005 6/16/2005 6/7/2005 Date MW7-041806-Dup MWDUP-122805 MW4-0605-Dup MW8-122805 MW8-041806 MW6-122905 MW6-041906 MW7-122805 MW7-041806 MW5-122805 MW5-041906 MW4-122705 MW4-041806 MW3-041706 MW2-W-0605 MW2-122805 MW2-041906 MW3-122905 MW1-041806 MW1-122705 MW1-W-35.0 MW3-0605 MW4-0605 Sample ID MW8 Location MIVVB MW5 NWM MW2 MW3 MW4 INWN

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Location	Sample ID	Date	1,2,3-Trichloro-	1,2,4-Trichloro- benzene	1,2,4-Trimethyl- benzene	1,2-Dibromo-3- chloropropane	1,2-Dibromo- ethane	1,2-Dichloro- benzene	1,2-Dichloro- ethane	1,2-Dichloro- propane	
PULA	MAN IN 3E 0	R/16/2005	111	10	10	10	10	10	10	10	
INNN					1	1	ł	1	1	1	
	CU1221-LVVI	0007117171				4	1	1	ı	1	
	MW1-041806	04/18/2006	1	1			11.2	411	411	111	
MW2	MW2-W-0605	6/17/2005	10	10	10	10	n			2	
	MW2-122805	12/28/2005	1	1	j	ţ	1	1	1	1	
1	MW2-041906	04/19/2006	1	1	i	L	1	1	t 2,	111	
EWW3	MW3-0605	6/7/2005	10	10	10	10	10	10	10	01	
	MW3-122905	12/29/2005	Ĩ	1	i	1	•	1	i		
	MW3-041706	04/17/2006	1	1	i	I	1	ī	i		
MW4	MW4-0605	6/9/2005	10	10	10	10	10	10	10	11	
	MW4-0605-Dup	6/9/2005	10	10	10	10	10	10	10	n 1	
	MW4-122705	12/27/2005	1	ſ	ŀ	1	i	i	i	ţ	
	MW4-041806	04/18/2006	1	1	1	1	1	1	1	•	
MW5	MW5-122805	12/28/2005	1	1	1	1	1	1	L		
	MW5-041906	04/19/2006	ì	ľ	1	r	1	1	Þ		1
MW6	MW6-122905	12/29/2005	1	;	1	1	1	•	1		-
	MW6-041906	04/19/2006	i	ſ		1	1	1	1		
NWN	MW7-122805	12/28/2005	•	v	k	ł	1	1			
	MW7-041806	04/18/2006	1	4	1	1	1	i	1		_
	MW7-041806-Dup	04/18/2006	1	T	1	þ	r	1	1		
MWB	MW8-122805	12/28/2005	1	1	1	1	L	Ì	1		
	MWDUP-122805	12/28/2005	j	1	1	1	1		1	1	_
	MW8-041806	04/18/2006	4	1	r	1	1	1	1		-



4-Chlorotoluene 1 n 1 n 1 10 t 1 2 ١ 1 10 T t 1 I 1 ĩ 1 Ì, 1 1 2-Chlorotoluene 10 10 r i 1 10 t 1 ۱ 10 1 U 1 1 1 ð ï L ł ٤ 1 1 ŧ 2-Butanone 15.5 10.7 2 U 11 5.43 2 U 5 U 2 U 5 U 2 U 5 U 2 U 5 U 34 ł, ł 1 1 1 1 ۱ 2,2-Dichloropropane 10 10 10 1 T. 1 10 1 ļ, 1 1 ł. 10 1 1 1 I 1 đ 1 1 I ļ 1,4-Dichlorobenzene 1 U 1 10 10 1 10 l t 1 1 ŧ I ١ 1 10 ۱ 1 1 1 t 1 1 ł 1,3-Dichloropropane 10 10 Í. 1 1 1 ţ 10 10 10 1 1 1 1 ţ, 1 1 1 1 1 l 1 1,3-Dichlorobenzene 1 n 10 10 1 1 10 1 1 1 10 ۱ t 1 t ١ 1 1 1 I. 1 1 1 1 1,3,5-Trimethylbenzene 10 10 10 T L 1 1 1 C D 1 1 ŧ ۱ l ł ١ ۱ ۱ 1 1 1 1 04/18/2006 04/18/2006 12/28/2005 12/28/2005 04/18/2006 12/28/2005 12/28/2005 04/19/2006 12/29/2005 04/19/2006 2/27/2005 04/18/2006 04/17/2006 12/28/2005 04/19/2006 12/29/2005 2/27/2005 04/18/2006 6/17/2005 6/16/2005 6/7/2005 6/9/2005 6/9/2005 Date MW7-041806-Dup MWDUP-122805 MW8-122805 MW8-041806 MW4-0605-Dup MW5-041906 MW6-122905 MW6-041906 MW7-122805 MW7-041806 MW4-041806 MW5-122805 MW3-041706 MW4-122705 MVV2-VV-0605 MW3-122905 MW1-122705 MW1-041806 MW2-122805 MW2-041906 MW1-W-35.0 MW4-0605 MW3-0605 Sample ID MW8 MW6 Location MW5 TWW MW3 MW4 MW2 **FWW** 

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1	1 2 1 1	1 1 1 1 1 1	10110110011	10110110111111	1 5 1 1 5 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1
1	1 0 1 1	101 - 101 - 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	15115115511111	15115115511111111
1	1 1 1	1011011	1011111111	1 0 1 1 0 1 1 0 0 1 1 1 1 1 1	15115110511111111
	10	1 1 1 1 1 1	1 0 1 1 0 1 1 0 0 1 1	1 2 1 1 2 1 1 2 2 1 1 1 1 1	1 2 1 1 2 1 1 2 2 1 1 1 1 1 1 1 1 1 1
	1 2 1 1	1 2 1 1 2 1 1	1 2 1 1 2 1 1 2 1 1	1 2 1 1 2 1 1 2 2 1 1 1 1 1	1 2 1 1 2 1 1 2 2 1 1 1 1 1 1 1 1 1 1
	17.1	17.1 17.1 5 U		17.1 17.1 1.1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.
1	1 I Q	5 U 5 U	2 N 2 N 2 N 2 N 2 N 2 N 2 N 2 N 2 N 2 N	1 1 1 1 1 2 C	1 1 1 1 1 1 1 2 C 2 C 2 C 1 1 C 2 C
1 .	2 1 1	5 - 1 0 - 1 1	5 1 1 5 1 1 5 5 1 1	5 1 1 5 1 1 5 5 1 1 1 1 1 1	5 1 1 5 1 1 5 5 1 1 1 1 1 1 1 1 1
04/18/2006	12/28/2005 04/19/2006	cuuziii 10 2002/82/21 2002/82/21 2002/92/21 12/29/2005	CUU2/11/0 12/28/2005 6/7/2005 6/7/2005 6/7/2005 6/9/2005 6/9/2005 12/27/2005 04/18/2006	6/1/12/005 12/28/2005 6/7/2005 6/7/2005 6/7/2005 6/9/2005 6/9/2005 6/9/2005 04/18/2006 04/19/2005 04/19/2005 04/19/2005	6/1/12/005 12/28/2005 6/7/2005 6/7/2005 6/7/2005 6/9/2005 6/9/2005 6/9/2005 04/18/2006 04/19/2006 04/19/2006 04/18/2006 04/18/2006 04/18/2006 04/18/2006
MW1-041806	MW2-W-0605 MW2-122805 MW2-041906	MIVV2-W-U6U5 MIVV2-122805 MIVV2-041906 MIVV3-0605 MIVV3-122905 MIVV3-041706	MIVV2-W-0605 MIVV2-122805 MIVV2-041906 MIVV3-0605 MIVV3-122905 MIVV3-041706 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup	MIVV2-W-U6U5 MIVV2-122805 MIVV3-061906 MIVV3-0605 MIVV3-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV4-0605 MIVV6-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906	MIVV2-W-U6U5 MIVV2-122805 MIVV2-041906 MIVV3-0605 MIVV3-0605 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-041806 MIVV5-041906 MIVV5-122805 MIVV5-041906 MIVV5-041806 MIVV7-041806 MIVV7-041806
MW2		EVVM	MW3 MW4	MW3 MW6 MW6	MW3 MW5 MW6 MW7

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cis-1,3-Dichloropropene 10 10 1 1 1 10 10 1 U 1 1 1 1 1 1 1 1 1 t 1 1 ì Dichloroethene 0.062 U 0.062 U 0.200 U 0.200 U 0.062 U 0.062 U 0.062 U 1.00 U 0.200 U 0.062 U 0.200 U 0.062 U 0.920 0.200 1.03 1.5 cis-1,2-2.42 10 10 110 1 10 10 Chloromethane 10 10 1 1 10 1 U 1 I. I 1 1 1 U ١ 1 1 1 à ۱ 1 1 1 1 1 Chloroform 10 1 10 1 C ī 1 1 L ۱ 10 1 1 1 ſ ţ 10 1 1 Ĵ. 1 l I T Chloroethane 10 10 10 4 t Ì. 1 1 1 1 ł 1 10 10 1 1 1 1 1 1 i I. ï. Chlorobromomethane 110 10 10 1 1 n 10 b 1 ١ 1 ï 1 ١ 1 ţ 1 1 1 1 Ĩ 1 1 Chlorobenzene 1 C 10 10 10 1 C i Ĩ 1 t t ۱ ۱ 1 I 1 ĭ t ۱ 1 ł 4 1 Tetrachloride Carbon 1 U 10 1 1 1 10 10 ١ I 10 T. ۱ I 1 1 1 1 ۱ ł 1 1 ١ 1 12/28/2005 12/28/2005 04/18/2006 12/29/2005 04/18/2006 04/18/2006 12/27/2005 04/18/2006 12/28/2005 04/19/2006 04/19/2006 12/28/2005 12/29/2005 04/17/2006 12/28/2005 04/19/2006 12/27/2005 04/18/2006 6/17/2005 6/7/2005 6/9/2005 6/9/2005 6/16/2005 Date NW7-041806-Dup MWDUP-122805 MW4-0605-Dup MW8-122805 MVVB-041806 MW7-041806 MW4-122705 MW5-122805 MW6-122905 MW6-041906 MW7-122805 MW4-041806 MW5-041906 MW3-122905 MW3-041706 MW2-W-0605 MW1-041806 MW2-122805 MW2-041906 MW1-122705 MW4-0605 MW1-W-35.0 MW3-0605 Sample ID Location MW6 MW8 MW5 TWW MW4 EWIM MW2 I'WW

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Table 17 Volatile Organic Compounds in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

n1			1 1 1	1 1 1 1	1 1 2 1 1 3	1.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1	10 11 11 11 11 11	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						1 1 2 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1				
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MW1-W-35.0	MW1-122705	MW1-122705 MW1-041806	MW1-122705 MW1-041806 MW2-W-0605	MW1-122705 MW1-041806 MW2-W-0605 MW2-122805	MW1-122705 MW1-041806 MW2-W-0605 MW2-122805 MW2-041906	MW1-122705 MW1-041806 MW2-W-0605 MW2-122805 MW2-041906 MW3-0605	MIV1-122705 MIV71-041806 MIV2-VV-0605 MIV2-122805 MIV2-041906 MIV2-041906 MIV3-0505 MIV3-122905	MIV1-122705 MIVV1-041806 MIVV2-VV-0605 MIVV2-122805 MIVV2-041906 MIVV3-0605 MIVV3-122905 MIVV3-0205	MW1-122705 MW1-041806 MW2-W-0605 MW2-122805 MW2-041906 MW3-0605 MW3-122905 MW3-122905 MW3-0605 MW3-0605	MW1-122705 MW1-041806 MW2-W-0605 MWV2-122805 MWV2-041906 MWV3-0505 MWV3-0505 MW3-122905 MWV3-041706 MWV4-0605 MWV4-0605	MIV1-122705 MIVV1-041806 MIVV2-VV-0605 MIVV2-122805 MIVV2-041906 MIVV3-0505 MIVV3-122905 MIVV3-122905 MIVV3-0505 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-122705	MW1-122705 MW1-041806 MW2-W-0605 MW2-122805 MW2-041906 MW3-0605 MW3-122905 MW3-122905 MW3-122905 MW3-122905 MW3-0605-Dup MW4-0605-Dup MW4-122705	MW1-122705 MW7-041806 MW2-W-0605 MWV2-122805 MWV3-0605 MWV3-0505 MWV3-0505 MW3-0605 MWV3-041706 MWV4-0605 MWV4-0605 MWV4-021805 MWV4-021805 MWV4-021805	MIVV1-122705 MIVV1-041806 MIVV2-041806 MIVV2-041906 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV5-041906 MIVV5-041906	MIVV1-122705 MIVV1-041806 MIVV2-VV-0605 MIVV2-041906 MIVV3-0505 MIVV3-0505 MIVV3-122905 MIVV3-0505 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV5-041906 MIVV5-041906	MIVV1-122705 MIVV1-041806 MIVV2-VV-0605 MIVV2-041906 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV4-0605 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-01806 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906	MIVV1-122705 MIVV1-041806 MIVV2-041806 MIVV2-122805 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV4-021705 MIVV4-021805 MIVV4-021805 MIVV5-021906 MIVV5-021906 MIVV5-021906 MIVV5-021906 MIVV5-021906 MIVV5-021906 MIVV5-021906 MIVV5-021906	MIVV1-122705 MIVV2-041806 MIVV2-041806 MIVV2-041906 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV4-0505 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041806	MIVTI-122705 MIVVI-041806 MIVV2-VV-0605 MIVV2-041906 MIVV3-0505 MIVV3-0505 MIVV3-0505 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV5-041906 MIVV5-041906 MIVV5-041806 MIVV7-041806 MIVV7-041806	MIVTI-122705 MIVVI-041806 MIVV2-VV-0605 MIVV2-041906 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV4-0605 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-122705 MIVV4-122705 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041806 MIVV5-041806 MIVV5-041806 MIVV7-041806 MIVV7-041806	MIVV1-122705 MIVV2-041806 MIVV2-041906 MIVV2-041906 MIVV3-0605 MIVV3-0605 MIVV3-0605 MIVV4-0605 MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0605-Dup MIVV4-0205 MIVV4-021806 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041906 MIVV5-041806 MIVV5-041806 MIVV7-041806-Dup MIVV7-041806-Dup MIVV7-041806-Dup
1-NVM			MW2	MW2	MW2	MVV2 MVV3	MW2 MW3	MW/2 MW/3	MVV2 MVV3 MVV4	MVV2 MVV3 MVV4	MVV2 MVV3 MVV4	MVV3 MVV4	MVV2 MVV3 MVV5	MVV2 MVV3 MVV4 MVV5	MVV3 MVV3 MVV5 MVV6	MVV3 MVV4 MVV5 MVV6	MVV2 MVV3 MVV4 MVV6 MVV7	MVV2 MVV3 MVV4 MVV5 MVV5 MVV5	MVV2 MVV3 MVV6 MVV6 MVV6	MVV2 MVV3 MVV4 MVV6 MVV6 MVV6	MVV2 MVV3 MVV6 MVV6 MVV7 MVV8



Table 17 Volatile Organic Compounds in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington ÷

tert-Butylbenzene 10 11 10 1 U 1 10 I Ľ 1 P 1 I. 1 t 1 1 1 1 I 1 Styrene 10 10 ł 10 1 ۱ t 10 10 ŧ ł T ł 1 1 1 1 1 1 1 1 1 1 sec-Butylbenzene 10 1 U 10 10 1 1 1 1 1 U 1 ł 1 1 I 1 t t 1 1 1 1 I 1 o-Xylene 10 1 C t 10 10 10 1 1 Ì. i 1 1 4 1 I. 1 1 1 ŧ 1 1 1 1 n-Propylbenzene 10 10 10 10 1 U t A à 1 ŀ 1 t ۱ I 1 ł ŧ ŀ ī 1 1 I. 1 n-Butylbenzene 10 10 10 10 10 1 1 L 1 1 1 1 1 1 J. 1 1 1 1 1 1 1 ł Naphthalene 10 10 1 U 10 1 1 ١ 10 Ì 1 ١ 1 1 1 1 ţ 1 1 1 ۱ 1 1 Methylene chloride 10 10 10 10 10 Į. ī 1 1 1 1 ţ 1 1 I 1 1 1 1 1 1 I. 1 04/18/2006 04/19/2006 04/18/2006 12/28/2005 12/28/2005 12/29/2005 12/28/2005 04/18/2006 12/28/2005 04/19/2006 12/29/2005 04/17/2006 12/27/2005 04/18/2006 04/19/2006 04/18/2006 12/28/2005 12/27/2005 6/17/2005 6/9/2005 6/9/2005 6/16/2005 6/7/2005 Date MW7-041806-Dup MWDUP-122805 MW4-0605-Dup MW8-122805 MW8-041806 MW7-041806 MW6-041906 MW7-122805 MW4-122705 MVV4-041806 MW5-122805 MW5-041906 MW6-122905 MW3-122905 MW3-041706 MW1-122705 MW1-041806 MW2-W-0605 MW2-122805 MW2-041906 MW1-W-35.0 MW4-0605 MW3-0605 Sample ID. Location MWW8 MW5 MW6 7WW ENVIN MW4 MW2 I'WW1

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Table 17 Volatile Organic Compounds in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

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-	Sample ID	Date	Tetra- chloroethene	Toluene	trans-1,2- Dichloroethene	trans-1,3-Dichtoro- propene	Trichloro- ethene	Trichloro- fluoromethane	Vinyl chloride
1	MW1-W-35.0	6/16/2005	10	10	10	10	10	10	10
	MW1-122705	12/27/2005	1	1	0.200 U	ľ	0.200 U	1	0.200 U
	MW1-041806	04/18/2006	1	1	0.091 U	i	0.055 U	1	0.14 U
1	MW2-W-0605	6/17/2005	10	10	10	10	10	10	10
	MW2-122805	12/28/2005	1	i	0.200 U	Ì	0.200 U	i.	0.200 U
	MW2-041906	04/19/2006	I	1	0.091 U	1	0.055 U	1	0.14 U
1	MW3-0605	6/7/2005	10	10.	10	10	10	10	10
	MW3-122905	12/29/2005	1	1	0.200 U	ì	0.200 U	1	0.200 U
	MW3-041706	04/17/2006	1	1	0.091 U	i	0.055 U	ı	0.14 U
11	MW4-0605	6/9/2005	10	10	10	10	10	10	10
	MW4-0605-Dup	6/9/2005	10	10	10	10	10	10	10
	MW4-122705	12/27/2005	1	ł	0.200 U	ł	0.200 U	ļ	0.200 U
	MVV4-041806	04/18/2006	1	ł	0.091 U	1	0.055 U	,	0.14 U
1	MW5-122805	12/28/2005	Î	1	0.260	1	22.1	ì	0.200 U
	MW6-041906	04/19/2006		ł	0.091 U	i	7.9	ŧ	0.14 U
1	MW6-122905	12/29/2005	1	j	1.00 U	,1	1.00 U	I	1.00 U
	MW6-041906	04/19/2006	1	1	0.091 U	1	0.055 U	ļ	0.14 U
10	MW7-122805	12/28/2005	1	1	0.200 U	ł	0.200 U	ţ	0.200 U
	MW7-041806	04/18/2006	i	į	0.091 U	1	0.055 U	į	0.14 U
<	MM7-041806-Dun	04/18/2006	1	4	0.091 U	1	0.055 U	1	0.14 U
11	MW8-122805	12/28/2005	1	1	0.200 U	1	0.200 U	I	0.560
100	MWDUP-122805	12/28/2005	1	1	0.200 U	ì	0.200 U	١	0.400
	MW8-041806	04/18/2006	1	1	0.091 U	ŕ	0.055 U	1	0.80 J

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# Table 18 Petroleum Hydrocarbon Identification in Groundwater Precision Engineering, Inc. Seattle, Washington

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Location	Sample ID	Date	Gasoline-Range Organics	Diesel-Range Organics	Oil-Range Organics
MW2	MW2-W-0605	6/17/2005	ND	DET	DET



	Table 19
Petroleum	Hydrocarbons in Groundwater (mg/L)
	Precision Engineering, Inc.
	Seattle, Washington

Location	Sample ID	Date	Gasoline-Range Organics	Diesel-Range Organics	Oil-Range Organics
M/A/1	MW/1-122705	12/27/2005		0.248 U	0.495 U
	MW1-041806	4/18/2006		0.26 U	0.52 U
M\A/2	MW2-W-0605	6/17/2005	0.1 U	0.438	0.512
1111112	MW2-122805	12/28/2005	-	1.19	1.04
	MW2-041906	4/19/2006	-	0.41	0.58 U
MW/3	MW3-122905	12/29/2005	-	0.312	0.505 U
MILLO	MW3-041706	4/17/2006	· · · · · · · · · · · · · · · · · · ·	0.28 U	0.57 U
MM/4	MW4-122705	12/27/2005		0.248 U	0.495 U
1919 9-1	MW4-041806	4/18/2006		0.27 U	0.54 U
MM	MW5-122805	12/28/2005	÷	0.831	0.495 U
101010	MW5-041906	4/19/2006		0.26 U	0.51 U
MMA	MW6-122905	12/29/2005	*	2.64	1.32
111110	MW6-041906	4/19/2006	¥	0.76	1.2
M\\\/7	MW7-122805	12/28/2005		0.248 U	0.495 U
1010 01	MW7-041806	4/18/2006	H	0.26 U	0.51 U
	MW7-041806-Dup	4/18/2006		0.26 U	0.51 U
MWB	MW8-122805	12/28/2005	145	1.71	1.00
	MWDup-122805	12/28/2005		1.79	1.21
	MW8-041806	4/18/2006		0.45	0.58 U



Table 20 Polycyclic Aromatic Hydrocarbons in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

		-	_			_	-	-	_	_	_	_	-	-	-	-	_	-	-	-	-	-	٦
Benzo(a) anthracene	0.107	0.029 J	0.192 U	U 06600.0	0.031 J	110010	0.0100	0.0095 U	0.0100 U	0.0092 U	U 06600.0		0.0086 U	0.00990 U	0.0093 U	U 06600.0	D DOE 1	r ccn.n	0,0091 U	0.0100 U	0.0990 U	0.011 U	
Anthracene	0.114 U	L 050.0	0.192 U	U 0660 0	0.035 J	0 400 11	0.100.0	0.0084 U	0.100 U	0.0082 U	n n990 U		0.033 J	0.0990 U	0.039 J	0 0990 11	1 200 0	0.03/ 1	0.029 J	0.100 U	U 0660.0	0.01011	A ALAYA
Acenaphthylene	0.114 U	0.020 J	0 192 11		0 00044 U	110010	0.100 0	0.0042 U	0.100 U	0,019 J	0.000011	0.0000.0	0.020 J	0.0990 U	0.0041 U			0.028 J	0.0041 U	0.100 U	0 0660 U	O DOFO I	0.0000
Acenaphthene	0.114 U	0.0038.J	0 102 II	0 0000 11	0.0330.0		0.100 U	0.0032 U	0.100 U	0.0031 U	1100000	0.0880.0	0.0061 J	U 0660.0	0 0031 U	11 0000 0	0.0990.0	0.011 J	0.0043 J	0.100 U		0 00000	0.0038 0
2-Methyl- naphthalene	0.114 U	0 0086 11	0 404 11	0.104.0	0.0000	0.0000	0.100 U	0.0095 U	0.100 U	0 0092 U	1,0000	0.0990 U	0.017 J	0 0990 U	0.019.1	1 00000	0.0880.0	0.014 J	0.0091 U	0 100 U	0 0000 0	0.0000	0.011 U
1-Methyl- naphthalene	0 11411	0.03011	0.000	1	0.0990 0	D CCU.U	0.100 U	0.034 U	0.100.0	0.033.0	0.0000	0.0990 U	0.030 U	0 0000 11	11 000 0	0.000.0	0.0990.0	0.032 U	0.032 U	0.106	0 400	cu1.u	0.040 U
2-Chloro- naphthalene			1	0.792.0	1	1	Ì	1				ſ	1			1	1	Ĭ	1		r	ł	1
Date	100012010F	0000000000	04/ 18/Z000	6/17/2005	12/28/2005	04/19/2006	12/29/2005	9006/21/00	SUDCITCICICS	12/21/2000	04/10/2000	12/28/2005	9000/01/00	2000/00/00/00	C007/67/71	04/19/2006	12/28/2005	04/18/2006	9000/81/10	10/2001/00/01	CUU2/02/21	12/28/2005	ANAR/2006
Sample ID	TOTOTO STOR	CU1221-LVVIN	MW1-041806	MW2-W-0605	MW2-122805	MW2-041906	MW3-122905	MAND DA1706	10011-00-CANINI	CU1221-44VIM	MIVV4-041800	MW5-122805	MANE DATODE	DOGI HO-CANINI	CORZZI-GANW	MW6-041906	MW7-122805	MNN7-DA1806		MIN/-041800-Dup	CU8221-8WIM	MWDup-122805	SUOLAD DIAIN
Location		LANM		MW2			ANALS.	CAAIAI		MNV4		MANAS	224		MM6		MW7				MWB		

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Table 20 Polycyclic Aromatic Hydrocarbons in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

	1	_	-		-		-	-	-		-	-	- 1	-	-	T	-	-	
Uibenzo(a,h) anthracene	0.0114 U	0.011 U	0.192 U	U 06600.0	0.013 U	0.0100 U	0.013 U	0.0100 U	0.012 U	U 06600.0	0.011 U	U 06600.0	0.012 U	U 06600.0	0.038 J	0.012 U	0.0100 U	0.00990 U	0.015 U
Chrysene	0.132	0.014 J	0.192 U	0.00990 U	0.0098 U	0.0100 U	0.0095 U	0.0100 U	0.0092 U	U 06600.0	0.0086 U	0.00990 U	0.0093 U	0.00990 U	0.013 J	0.0091 U	0,0100 U	U 06600.0	0.011 U
Benzo(ghi) perylene	0.114 U	0.017 U	0.192 U	0.0990 U	0.020 U	0.100 U	0.019 U	0.100 U	0.018 U	U 0660.0	0.017 U	0.0990 U	0,019 U	0.0990 U	0.018 U	0.018 U	0.100 U	0.0990 U	0.023 U
Benzo(b+k) fluoranthene	1	0.030 U	0.962 U	1	0.034 U	1	0.033 U	I	0.032 U	1	0.030 U	1	0.032 U	1	0.031 U	0.031 U	1	ì	0.039 U
Benzo(k) fluoranthene	0.108	i	1	0.00990 U	1	0.0100 U	1	0.0100 U	1	U 000000	1	0.00990 U	1	0.00990 U	1	í	0.0100 U	0.00990 U	1
Benzo(b) fluoranthene	0.104	1	1	U 06600.0	I	0.0100 U	9	0.0100 U	ſ	U 06600.0	1	0.00990 U	i	U 06600.0	į	1	0.0100 U	0.00990 U	1
Benzo(a) pyrene	0.0114 U	0.057 U	0.192 U	U 06600.0	0.066 U	0.0100 U	0.063 U	0.0100 U	0.061 U	0.00990 U	0.057 U	0.00990 U	0.062 U	U 06600.0	0.061 U	0.061 U	0.0100 U	0.00990 U	0.075 U
Date	12/27/2005	04/18/2006	6/17/2005	12/28/2005	04/19/2006	12/29/2005	04/17/2006	12/27/2005	04/18/2006	12/28/2005	04/19/2006	12/29/2005	04/19/2006	12/28/2005	04/18/2006	04/18/2006	12/28/2005	12/28/2005	04/18/2006
Sample ID	MW1-122705	MW1-041806	MW2-W-0605	MW2-122805	MW2-041906	MW3-122905	MW3-041706	MW4-122705	MW4-041806	MW5-122805	MW5-041906	MIMB-122905	MW6-041906	MW7-122805	MW7-041806	MW7-041806-Dup	MW8-122805	MWDun-122805	MW8-041806
Location	MW1		CUNIN			MW3		MW4		MWE		ANVIE		MWI			MVVB	2	

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Table 20 Polycyclic Aromatic Hydrocarbons in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

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Sample ID	Date	Fluoranthene	Fluorene	Indeno(1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene
2705	12/27/2005	0.384	0.114 U	0.0114 U	0.114 U	0.159	0.310
41806	04/18/2006	0.053 J	0.0076 U	0.034 J	0.011 J	0.024 J	0.043 U
N-0605	6/17/2005	0.192 U	0.192 U	0.192 U	0.854	0.192 U	0.192 U
122805	12/28/2005	U 0660.0	0.0990 U	U 06600.0	0.271	0.0990 U	U 0660.0
-041906	04/19/2006	0.032 J	0.0087 U	0.016 U	0.93	0.0052 U	0.014 U
-122905	12/29/2005	0.100 U	0.100 U	0.0100 U	0.100 U	0.100 U	0.100 U
3-041706	04/17/2006	0.0095 U	0.0084 U	0.016 U	0.0063 U	0.0032 U	0.014 U
4-122705	12/27/2005	0.100 U	0.100 U	0.0100 U	0.100 U	0.100 U	0.100 U
4-041806	04/18/2006	0.029 J	0.0082 U	0.015 U	0.011 J	0.0064 U	0.030 U
5-122805	12/28/2005	0.0990 U	0.0990 U	0.00990 U	0.457	U 0660.0	0.0990 U
15-041906	04/19/2006	0.032 J	0.0076 U	0.014 U	0.13	0.014 U	0.032 U
6-122905	12/29/2005	0.0990 U	0.0990 U	U 06600.0	0.0990 U	0.0990 U	0.0990 U
6-041906	04/19/2006	0.033 J	0.0083 U	0.016 U	0.013 J	0.011 U	0.034 U
17-122805	12/28/2005	0.0990 U	0.0990 U	0.00990 U	U 0660.0	U 0660.0	0.0990 U
7-041806	04/18/2006	0.036 J	0.013 J	0.039 J	0.023 J	0.022 J	0.037 U
041806-Dup	04/18/2006	0.0091 U	0.0081 U	0.015 U	0.019 J	0.0081 U	0.013 U
8-122805	12/28/2005	0.100 U	0.100 U	0.0100 U	0.100 U	0.100 U	0.100 U
up-122805	12/28/2005	0.0990 U	U 0660.0	0.00990 U	0.0990 U	U 0660.0	0.0990 U
8-041806	04/18/2006	0.011 U	0.010 U	0.019 U	0.0075 U	0.0038 U	0.016 U

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Table 21
Summary of Field Parameters in Groundwater
Precision Engineering, inc.
Seattle, Washington

Location	Date Collected	pH (Standard Units)	Temperature (°C)	Conductivity (µS/cm)	Turbidity (NTUs)
N/14/4	12/27/2005	8.09	12.0	232	10.2
	4/18/2006	8.42	12.7	219	2.13
N/\A/D	12/28/2005	6.30	14.5	1484	78.2
IVIV VZ	4/19/2006	6.71	15.9	1260	46.4
11/1/2	12/29/2005	6.13	14.4	397	11.9
1010 03	4/17/2006	6.63	13.8	371	1.14
BA\A/A	12/27/2005	7.53	16.3	403	4.16
1010 04	4/18/2006	8,15	15.6	391	2.70
NALA/5	12/28/2005	5.97	16.5	1020	1.46
NVV5	4/19/2006	6.50	15.4	693	1.56
MALE	12/29/2005	6.29	14.9	2620	16.88
NIVO	4/19/2006	6.63	14.4	1691	24.9
NAVA/7	12/28/2005	6.82	14.3	1115	3.00
	4/18/2006	7.28	16.3	996	5.33
MAIR	12/28/2005	6.43	14.5	-	388
NIVYO	4/18/2006	6.84	14.2	920	135.2



# Volatile Organic Compounds in Sub-Slab Vapor (µg/m<sup>3</sup>) Precision Engineering, Inc. Seattle, Washington

1 1

Vinyl Isobutane Butane chloride	19U 5800J 73		2.3 U 5500 J 160	2111 2111	8.4 0 Z000 J 200	NA NA NA	NA NA NA	25011	450 020 0 200		4 7 11 244000 1 350	1.7 U >11000 J 350	1.7 U >11000 J 350
trans-1,2- Dichloroethene	1102	0.000	3.6 U		13 U		NA		100.0		1100	2.6 U	2.6 U
cis-1,2- Dichloroethene	1100	0.0.0	3.6 U		470		NA		1700			2.6 U	2.6 U
Trichloro- ethene	1.01	4.0 0	490		6100		NA		37000			3.5 U	3.5 U
Date		04/18/2006	DAV18/2006	000101100	04/18/2006		04/18/2006		04/18/2006			04/18/2006	04/18/2006
Sample ID		A1-042806	AD DAPAGE	MZ-042000	AS DAPROR	DODATO-DC	AA DAPROG	DODATO-TC	AF-DA2BOB	000710-00		AG-DA7806	A6-042806
Location		A1		AZ	GV	CH I	VV	44	AG	PA I		No.	AG

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Table 23 Volatile Organic Compounds in Air (µg/m<sup>3</sup>) Precision Engineering, Inc. Seattle, Washington

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Location	Sample ID	Date	Trichloro- ethene	cis-1,2- Dichloroethene	trans-1,2- Dichloroethene	1,1- Dichloroethane	1,1- Dichloroethene	Vinyl chloride
141	IA1	06/13/2006	0.2	0.12 U	0.63 U	0.13 U	0.063 U	0.040 U
IA7	IA2	06/13/2006	0.083	0.13 U	0.65 U	0.13 U	0.065 U	0.042 U
143	143	06/13/2006	0.11	0.15 U	0.74 U	0,15 U	0.074 U	0.048 U
IAA	IA4	06/13/2006	0.14	0.14 U	0.69 U	0.14 U	0.069 U	0.045 U
IAS	IA5	06/13/2006	0.16	0.16 U	0.80 U	0.16 U	0.080 U	0.051 U
IAG	IA6	06/13/2006	0.15	0.12 U	0.60 U	0.12 U	0.060 U	0.039 U
IAG	146 Dunlicate	06/13/2006	0.15	0.12 U	0.60 U	0.12 U	0.060 U	0.039 U
IA7	IA7	06/13/2006	0.046	0.13 U	0.65 U	0.13 U	0.065 U	0.042 U
IAB	IA8	06/13/2006	0.15	0.13 U	0.65 U	0.13 U	0.065 U	0.042 U



# Table 24 Exposure Scenarios Precision Engineering, Inc. Seattle, Washington

r Selection or Exclusion	ial workers may have contact building and pavement are	cals in vadose-zone soil may m-site building and enter indoor	ay leach to groundwater.	in the area is not used for	icals in groundwater may on-site building and enter indoor	icals in groundwater may migrate . However, CULs protective of ial workers are more stringent otective of outdoor workers.	undwater does not extend to the ver.	undwater does not extend to the ver.
Reason fo	Future industr with soil if the removed.	Volatile chemi penetrate an c air.	IHSs in soil m	Groundwater drinking.	Volatile chem penetrate an ( air.	Volatile chem to outdoor air indoor industr than those pri	Impacted gro Duwamish Ri	Impacted gro Duwamish Ri
Selected Pathway	Yes	Yes	Yes	N	Yes	N	No	No
Receptors	Oufdoor Industrial Workers	Indoor Industrial Workers	Industrial Workers	Residents and Industrial Workers	Indoor Industrial Workers	Industrial Workers Industrial Workers		Aquatic/Benthic Biota
Exposure Pathway	Ingestion, Inhalation, and Dermal Absorption	Volatilization to Indoor Air	Leaching to Groundwater	Ingestion, Inhalation, and Dermal Absorption	Volatilization to Indoor Air	Volatilization to Outdoor Air	Fish Ingestion	Gill Uptake
Medium	Soil (0 to 15 feet bgs)	Vadose-Zone Soil (0 to15 feet bgs)	Soil	Groundwater	Groundwater	Groundwater	Surface Water	Surface Water

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# Risk Screening Hexavalent Chromium in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

		- 13 gev 1	Depth	Chromium	Chromium
Sample ID	Lab Code	Date	(ft bgs)	(Hexavalent)	(Trivalent) <sup>a</sup>
athed A CIII a facilin	restricted Land	lse		19	2000
athed B CULS for In	nestion only	500		240	NV
ethod B CULS for Ing	estion Only			11,000	NV
ethod C COLS for Ing	Direct Contact			775	390,000
noustrial workers-	Silect Contact	1			n. I
CP1 9 15	128268-01	6/7/2005	1.5	152	53
GP1-5-1.5	128268-02	6/7/2005	6	31.8	115.2
GP1-5-0.0	128318-02	6/9/2005	10	14.4	59.1
CP2 9 1 0	128268-03	6/7/2005	1	523	2157
GP2-3-1.0	128318-01	6/9/2005	10	0.109 U	24.9
GP2-3-10.0	128318-03	6/9/2005	2	27.7	887.3
GP3-5-2.0	128318-04	6/9/2005	6	49.8	1050.2
GP3-5-5.0	128318-05	6/9/2005	14	34.4	906.6
GP3-5-14	128457-01	6/16/2005	1.5	53.4	1176.6
GP4-3-1.0	128457-02	6/16/2005	1.5	0.111 U	18.9
CD5 S 14 0	128457-04	6/16/2005	14	0.115 U	20.1
GPD-0-14.0	128457-05	6/16/2005	1	627	NC
GP0-3-1.0	128457-07	6/16/2005	14.5	0.181	258.819
GP0-5-14.5	128457-08	6/16/2005	2	0.119	23.481
GP7-5-2.0	128457-00	6/16/2005	8	0.113 U	21
GP7-5-0.0	128457-10	6/16/2005	1.5	0.661	21.539
GP8-5-1.0	128457-11	6/17/2005	2	2.97	40.33
GP9-3-2.0	128457-12	6/17/2005	1.5	0.142	21.658
GP10-5-1.5	128457-14	6/17/2005	13.5	0.106 U	24.1
GP10-5-13.5	128457-15	6/17/2005	2	0.573	21.127
GP11-5-2.0	128457-16	6/17/2005	6.5	0.37	16,93
GP11-5-0.0	R61 0339-30	12/13/2005	3	1.1 UJ	24.3
GP12-5-5.0	B5L0339-30	12/13/2005	5	1.0 UJ	25.2
GP12-5-5.0	B5L0339-01	12/14/2005	1	1.4 UJ	26.6
GP13-5-1.0	B51 0418-02	12/14/2005	6	1.3 UJ	46.6
GP13-5-0.0	B51 0339-24	12/13/2005	3	2.0 UJ	24.8
GP14-5-3.0	B51 0339-25	12/13/2005	6	1.2 J	30.2
GP14-5-0.0	B51 0330-32	12/13/2005	3	1.2 UJ	24.7
GP 10-3-3.0	B51 0330-32	12/13/2005	6	1.2 UJ	20.2
GP 10-5-0.0	B51 0330-22	12/13/2005	1	2.1 UJ	30.0
GP10-5-1.0	B51 0330-23	12/13/2005	5	2.1 UJ	26.2
GP10-5-5.0	B51 0330-17	12/13/2005	1	1.7 UJ	254
GP17-3-1.0	B51 0330-18	12/13/2005	6	60 J	1600
GP17-5-0.0	B51 0330-26	12/13/2005	1	2300 J	2130
GP18-5-1.0	B5L0339-20	12/13/2005	1	2.5 UJ	22.0
GP19-S-1.0	B5L0339-19	12/13/2005	1	2.0 UJ	24.8
GP19-5-1.0-Dup	B5L0339-19	12/13/2005	7	2.7 UJ	27.1
GP19-5-7.0	D5L0339-21	12/14/2005	1	1.1UJ	17.6
GP20-S-1.0	DOL0410-00	12/14/2005	6	1.5 UJ	24.5
GP20-S-6.0	B5L0418-00	12/14/2005	1	1.0 UJ	25.6
GP21-S-1.0	B5L0418-03	12/14/2005	65	1300	23.0
	Sample ID    athod A CULs for Un    athod B CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    athod C CULs for Ing    GP1-S-1.5    GP1-S-1.0    GP2-S-10.0    GP3-S-2.0    GP3-S-1.5    GP5-S-1.5    GP5-S-1.5    GP5-S-1.6    GP6-S-1.0    GP6-S-1.0    GP6-S-1.5    GP7-S-2.0    GP10-S-1.5    GP10-S-1.5    GP10-S-1.5    GP10-S-1.5    GP10-S-1.5    GP11-S-2.0    GP11-S-2.0    GP13-S-1.0    GP13-S-1.0    GP13-S-1.0    GP14-S-3.0    GP15-S-3.0    GP15-S-1.0    GP16-S-1.0    GP18-S-1.0	Sample ID  Lab Code    athod A CULs for Unrestricted Land U    athod B CULs for Ingestion only    athod C CULs for Ingestion Only    ndustrial Workers—Direct Contact    Beoprobe Sampling    GP1-S-1.5  128268-01    GP1-S-10.0  128318-02    GP2-S-1.0  128268-03    GP2-S-1.0  128318-03    GP3-S-2.0  128318-04    GP3-S-4.0  128457-01    GP5-S-1.5  128457-01    GP5-S-1.5  128457-02    GP5-S-1.5  128457-04    GP6-S-1.0  128457-05    GP6-S-1.0  128457-07    GP7-S-2.0  128457-08    GP7-S-8.0  128457-10    GP9-S-2.0  128457-11    GP10-S-1.5  128457-12    GP10-S-1.5  128457-14    GP10-S-1.5  128457-14    GP11-S-2.0  128457-14    GP11-S-2.0  128457-15    GP11-S-3.5  128457-16    GP12-S-3.0  B5L0339-30    GP12-S-3.0  B5L0418-02    GP	Sample ID  Lab Code  Date    athod A CULs for Unrestricted Land Use  athod B CULs for Ingestion only  athod B CULs for Ingestion Only    ndustrial Workers—Direct Contact  Geprobe Sampling  6/7/2005    GP1-S-1.5  128268-01  6/7/2005    GP1-S-1.0  128268-02  6/7/2005    GP2-S-1.0  128268-03  6/9/2005    GP2-S-1.0  128318-03  6/9/2005    GP3-S-2.0  128318-04  6/9/2005    GP3-S-1.0  128457-01  6/16/2005    GP3-S-1.5  128457-02  6/16/2005    GP5-S-1.5  128457-04  6/16/2005    GP6-S-1.0  128457-04  6/16/2005    GP6-S-1.0  128457-09  6/16/2005    GP7-S-2.0  128457-10  6/16/2005    GP7-S-2.0  128457-10  6/16/2005    GP1-S-1.5  128457-10  6/16/2005    GP1-S-2.0  128457-10  6/16/2005    GP1-S-3.5  128457-11  6/17/2005    GP10-S-1.5  128457-12  6/17/2005    GP11-S-2.0  128	Sample ID  Lab Code  Date  Depth (ft bgs)    ethod A CULs for Ingestion only	Sample ID  Lab Code  Date  Depth (ft bgs)  Chromium (ft bgs)    sthod A CULs for Ingestion only  19    athod B CULs for Ingestion Only  11,000    mdustrial Workers—Direct Contact  775    Beoprobe Sampling  775    GP1-S-1.5  128268-02  6/7/2005  6  31.8    GP1-S-10.0  128318-02  6/7/2005  1  523    GP2-S-10.0  128318-03  6/7/2005  1  523    GP2-S-10.0  128318-04  6/9/2005  1  324    GP3-S-2.0  128318-05  6/9/2005  14  34.4    GP4-S-1.5  128457-02  6/16/2005  1.5  0.111 U    GP5-S-1.0  128457-02  6/16/2005  1  627    GP6-S-1.0  128457-08  6/16/2005  1  627    GP6-S-1.0  128457-09  6/16/2005  1  627    GP7-S-2.0  128457-10  6/16/2005  2  0.119    GP7-S-3.0  128457-14  6/17/2005  1.5  0.0661



## Risk Screening Hexavalent Chromium in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

continu	Sample ID	Lab Code	Date	Depth	Chromium	Chromium
ocation	Sample is			(π bgs)	(nexavalent)	2000
MTCA M	lethod A CULs for Un	nrestricted Land I	Jse		19	NIV
MTCA M	lethod B CULs for In	gestion only			240	NIV
MTCA M	lethod C CULs for In	gestion Only			775	300,000
CUL for	Industrial Workers-	Direct Contact			1/5	390,000
On-Site	Geoprobe Samplin	g cont.	the second of		0.01	43.0
GP22	GP22-S-1.0	B5L0339-27	12/13/2005	1	2.95	32.1
	GP22-S-10.0	B5L0339-29	12/13/2005	10	1.303	23.3
GP23	GP23-S-7.0	B5L0418-10	12/14/2005	10 5	1.100	070
	GP23-S-10.5	B5L0418-11	12/14/2005	10.5	1.205	30.2
GP24	GP24-S-3.0	B5L0418-12	12/14/2005	3	1.005	26.2
Sample ID    VITCA Method A CULs for U    VITCA Method B CULs for In    VITCA Method C CULs for In    CUL for Industrial Workers-    On-Site Geoprobe Samplin    GP22    GP23    GP24    GP24-S-3.0    GP25-S-1.0    GP26    GP27-S-1.0    GP28    GP26-S-7.0    GP26-S-7.0    GP26    GP27-S-1.0    GP26-S-9.5    GP27    GP28    GP29    GP29-S-1.0    GP28    GP29-S-1.0    GP29    GP29-S-1.0    GP29    GP29-S-1.0    GP30    GP31    GP31-S-6.0    GP31    GP31    GP31-S-6.0    GP32    5L0418-12	12/14/2005	3	1.103	20.2		
11	GP24-S-6,5	B5L0418-14	12/14/2005	6.5	2.4 03	10.3
GP25	GP25-S-1.0	B5L0339-01	12/12/2005	1	1.8 0.1	10.9
2020	GP25-S-7.0	B5L0339-02	12/12/2005		1.703	19.0
GP26	GP26-S-1.0	B5L0339-03	12/12/2005	1	2.203	20.1
1.11	GP26-S-9.5	B5L0339-05	12/12/2005	9.5	2.103	24.0
GP27	GP27-S-1.0	B5L0339-06	12/12/2005	1	2.203	10.6
	GP27-S-13.0	B5L0339-08	12/12/2005	13	2.103	18.0
GP28	GP28-S-1.0	B5L0339-09	12/12/2005	1	2.2 UJ	20.5
	GP28-S-7.0	B5L0339-10	12/12/2005	7	1.8 UJ	22.4
GP29	GP29-S-1.0	B5L0339-11	12/12/2005	1	2.4 UJ	29.0
	GP29-S-6.0	B5L0339-12	12/12/2005	6	2.6 UJ	31.9
GP30	GP30-S-1.0	B5L0339-13	12/12/2005	1	2.1 UJ	27.2
	GP30-S-6.0	B5L0339-14	12/12/2005	6	2.4 UJ	32.7
GP31	GP31-S-1.0	B5L0339-15	12/12/2005	1	2.1 UJ	19.2
21.21	GP31-S-6.0	B5L0339-16	12/12/2005	6	3.0 UJ	23.6
GP32	GP32-S-1.0	B5L0418-08	12/14/2005	1	3500 J	3250
Off-Site	Hand-Auger Samp	oling			1	1 010
HA1	HA1-0.5	B5L0418-17	12/15/2005	0.5	2.9 UJ	34.3
1.42 114	HA1-1.5	B5L0418-18	12/15/2005	1.5	6.5 J	103.5
	HA1-1.5-Dup	B5L0418-18	12/15/2005	1.5	2.8 UJ	84.0
HA2	HA2-0,5	B5L0418-19	12/15/2005	0.5	89 J	111/
10.7	HA2-1.5	B5L0418-20	12/15/2005	1.5	3.2 J	211.8
HA3	HA3-0.5	B5L0418-21	12/15/2005	0.5	2.6 UJ	1590
10.13	HA3-1.5	B5L0418-22	12/15/2005	1.5	2.4 UJ	55.2
HA4	HA4-0.5	B5L0418-23	12/15/2005	0.5	7.2 UJ	8480
10.11	HA4-1.5	B5L0418-24	12/15/2005	1.5	3.0 UJ	280
HA5	HA5-0.5	B5L0418-25	12/15/2005	0.5	5.8 UJ	155
1.4.44	HA5-1.5	B5L0418-26	12/15/2005	1.5	2,9 UJ	32.7
HA6	HA6-0.5	580-2284-4	04/18/2006	0.5	3.33 J	NC
HA7	HA7-0.5	580-2284-6	04/18/2006	0.5	0.22 J	NC
HAR	HA8-0.5	580-2284-8	04/18/2006	0.5	0.26 J	NC
HAO	HA9-0.5	580-2284-13	04/19/2006	0.5	3.4 J	NC
HAIO	HA10.05	580-2284-15	04/19/2006	0.5	0.074 J	NC
HATU	HA10.05	580-2284-17	04/19/2006	0.5	0.45 J	NC

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# Table 26 Risk Screening Metal IHSs in Soil (mg/kg)

# Precision Engineering, Inc.

# Seattle, Washington

Location	Sample ID	Date	Depth (ft bgs)	Arsenic	Cadmium	Copper	Lead
MTCA Mot	hod A CI II s for Lin	restricted Land	Use	20	2	NV	250
MTCA Met	hod B CLILs for Inc	pestion only		0.67	80	3000	NV
MTCA Met	hod C CUI s for Ing	pestion only		88	3,500	130,000	NV
CULL for Inc	Hustrial Workers-	Direct Contact		20*	2,350	53,300	1,000*
Off Site H	and Auger Sampl	ing					1.1.1
UIT-Site Fi	HA1-0.5	12/15/2005	0.5	3.81	0.576 U	32.8	34.6
HAT	HA1-15	12/15/2005	1.5	2.88 J	0.550 U	16.2 J	15.3 J
	HA1-1 5-Dup	12/15/2005	1.5	8.35 J	0.707 U	Copper NV 3000 130,000 53,300 32.8 16.2 J 68.4 J 70.9 28.2 528 16.4 978 48.8 129 39.6 39         	95.3 J
HAD	HA2-0.5	12/15/2005	0.5	3.94	0.984	70,9	81.4
TA2	HA2-1.5	12/15/2005	1.5	2.71	0.613 U	28.2	36.5
1142	HA3.0.5	12/15/2005	0.5	53.9	2.53	528	545
HAS	HA3-0.5	12/15/2005	1.5	6.96	0.585 U	16.4	8.41
110.4	HA4.05	12/15/2005	0.5	44.3	28.7	978	1710
HA4	HA4-0.5	12/15/2005	1.5	5.25	0.819 U	48.8	50.B
LIAE	HA4-1.5	12/15/2005	0.5	35.9	3.13	129	1440
HAD	HA5-1.5	12/15/2005	1.5	12.5	1.09	39.6	209
11440	HA3-1.5	4/19/2006	0.5	9.0	0.48 J	39	220
HAIZ	HA17 S 0 5	1/9/2007	0.5	6.61			278
HA17	HA17-5-0.5	1/9/2007	1.5	5.3			23.5
11440	HA12-5-1.5	1/9/2007	0.5	5.03			61.5
HATS	HA10-5-0.5	1/9/2007	1.5	2.12 U		Copper NV 3000 130,000 53,300 32.8 16.2 J 68.4 J 70.9 28.2 528 16.4 978 48.8 129 39,6 39             	2.12 L
11440	HA10-0-1.5	1/9/2007	0.5	12.7		Copper NV 3000 130,000 53,300 32.8 16.2 J 68.4 J 70.9 28.2 528 16.4 978 48.8 129 39.6 39          -	134
HA19	HA19-5-0.5	1/9/2007	1.5	4.02	4	+	11.3
11400	HA19-0-1.0	1/9/2007	0.5	2.02 U	-	-	27.9
HAZU	HA20-5-0.5	1/9/2007	1.5	1.81 U	++		8,91
LIADA	HA21-S-0.5	1/10/2007	0.5	5.72	12		398
RAZ I	HA21-S-1.5	1/10/2007	1.5	5.83	-		121
4422	HA22-S-0.5	1/10/2007	0.5	53.5		-	986
HAZZ	HA22-S-1.5	1/10/2007	1.5	10.3			32.4
11400	HA23-S-0.5	1/10/2007	0.5	4.44	-		26.9
HA23	HA23-5-15	1/10/2007	1.5	4.91			20.5
110.24	HA24-S-0.5	1/10/2007	0.5	4,9	1000	-	63.9
HA24	HA24-5-0.5	1/10/2007	1.5	5.23			24.3
11405	HA25-5-0.5	1/10/2007	0.5	11.6	4		302
HA25	HA20-0-0.0	1/10/2007	1.5	11.8			15.5



# Risk Screening Volatile Organic Compound IHSs in Soil (µg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Depth (ft bas)	Trichloro-	Vinyl
		restricted Lan	(ILDgs)	30	NA
MICA Me	thod A CULS for Un	estion only	1030	2500	667
MICA Me	thed C CULS for Ing	restion Only		330,000	88,000
MICA Me	thod C CULS for ing	Direct Contact		6780	NA
CUL for In	dustrial workers-	Silect Contact		41.5	NA
CUL for V	apor intrusion			1 100	1
On-Site G	eoprobe Sampling	B/7/2005 1	15	0.839 U	0.839 U
GP1	GP1-5-1.5	6/7/2005	6	1.12 U	1.12 U
1.1	GP1-5-0.0	6/9/2005	10	7.65 U	7.65 U
0.00	GP1-5-10.0	6/7/2005	1	0.96 U	0.96 U
GP2	GP2-5-1.0	6/0/2005	10	8.81 U	8.81 U
	GP2-S-10.0	6/9/2005	2	15.9.U	15.9 U
GP3	GP3-S-2.0	6/9/2005	6	8.96 U	8.96 U
1.1.1	GP3-S-6.0	6/9/2005	14	7.71 U	7.71 U
	GP3-S-14	0/9/2005	15	1030	10.3 U
GP4	GP4-S-1.5	8/16/2005	1.5	7 12 11	7.12 U
GP5	GP5-S-1.5	6/16/2005	8	7.031	7.03 U
1.11	GP5-S-8.0	6/16/2005	14	8111	810
	GP5-S-14.0	6/16/2005	14	40.5	8.5 U
GP6	GP6-S-1.0	6/16/2005	14.5	1160	8.28 U
	GP6-S-14.5	6/16/2005	14.0	7.8111	781U
GP7	GP7-S-2.0	6/16/2005	2	8 84 11	8 84 U
	GP7-S-8.0	6/16/2005	15	0.040	9.86 U
GP8	GP8-S-1.5	6/16/2005	2	7.4211	7.42 U
GP9	GP9-S-2.0	6/17/2005	15	1121	11.2 U
GP10	GP10-5-1.5	6/1//2005	12.5	7 96 11	7.96 U
	GP10-S-13.5	6/17/2005	13.0	87.2	8.37 U
GP11	GP11-S-2.0	0/17/2005	65	281	8.61 U
	GP11-S-6.5	6/1/12005	3	2 39 11	2.39 U
GP12	GP12-S-3.0	12/13/2005	5	2.000	2.27 U
	GP12-S-5.0	12/13/2005	1	9 89 11	9.89 U
GP13	GP13-S-1.0	12/14/2005	6	2 8911	2.89 U
	GP13-S-6.0	12/14/2005	3	4 49	2.44 U
GP14	GP14-S-3.0	12/13/2005	6	2 62 11	262 U
21.00	GP14-S-6.0	12/13/2005	3	2.02.0	2.72 U
GP15	GP15-S-3.0	12/13/2005	5	10511	10.5 U
	GP15-S-6.0	12/13/2005	0	3.63	1.85.11
GP16	GP16-S-1.0	12/13/2005	5	2 12 11	2 12 11
	GP16-S-5.0	12/13/2005	0	2.120	2.0911
GP17	GP17-S-1.0	12/13/2005	2	2.000	2 27 11
	GP17-S-6.0	12/13/2005	0	2.210	23611
GP18	GP18-S-1.0	12/13/2005	1	2 67 11	2.000
GP19	GP19-S-1.0	12/13/2005	1	2.0/0	2.010
	GP19-S-1.0-Dup	12/13/2005	1	2.40 0	2.400
	GP19-S-7.0	12/13/2005	7	2,720	2.720



# Risk Screening Volatile Organic Compound IHSs in Soil (µg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Depth (ft bas)	Trichloro- ethene	Vinyl chloride
NATCA NA	athod A CIIIs for Li	prestricted Lan	JUse	30	NA
MICAM	athod B CUI s for In	nestion only		2500	667
MICAM	athod C CIII s for In	gestion Only		330,000	88,000
OLU for I	adustrial Workers	Direct Contact		6780	NA
CUL IDI I	(oper Intrusion	Diroct Comerce		41.5	NA
CUL IOI	Cooprobe Samplin	a cont			
CP20	GP20-S-10	12/14/2005	1	2.62 U	2.62 U
GP20	GP20-S-6.0	12/14/2005	6	4.52 U	4.52 U
0001	GP21-5-10	12/14/2005	1	2.18 U	2.18 U
GPZI	GP21-5-6.5	12/14/2005	6.5	2.79 U	2.79 U
0000	GP22-S-1.0	12/13/2005	1	2.26 U	2.26 U
GP22	GP22-S-10.0	12/13/2005	10	1.89 U	1.89 U
0002	GP23-S-7.0	12/14/2005	7	1.80 U	1.80 U
GP23	GP23-S-10.5	12/14/2005	10.5	2.27 U	2.27 U
0024	GP24-S-3.0	12/14/2005	3	2.58 U	2.58 U
GP24	GP24-S-3 0-DUD	12/14/2005	3	2.50 U	2.50 U
	GP24-5-6.5	12/14/2005	6.5	2.83 U	2.83 U
CDOS	GP25-S-1.0	12/12/2005	1	2.13 U	2,13 U
GP20	GP25-S-7.0	12/12/2005	7	2.47 U	2.47 U
CDOG	GP26-S-10	12/12/2005	1	2.01 U	2.01 U
GF20	GP26-S-9.5	12/12/2005	9.5	2.65 U	2.65 U
CD27	GP27-S-1.0	12/12/2005	1	2.19 U	2.19 U
0121	GP27-S-13.0	12/12/2005	13	2.05 U	2.05 U
GP28	GP28-S-1.0	12/12/2005	1	1.87 U	1.87 U
0,20	GP28-S-7.0	12/12/2005	7	2.17 U	2.17 U
GP29	GP29-S-1.0	12/12/2005	1	2.47 U	2.47 U
0120	GP29-S-6.0	12/12/2005	6	2.43 U	2.43 U
GP30	GP30-S-1.0	12/12/2005	1	2.39 U	2.39 U
0.00	GP30-S-6.0	12/12/2005	6	3,32 U	3,32 U
GP31	GP31-S-1.0	12/12/2005	1	2.02 U	2.02 U
	GP31-S-6.0	12/12/2005	6	3.41 U	3.41 U
GP32	GP32-S-1.0	12/14/2005	1	2.37 U	2.37 U



# Risk Screening Polycyclic Aromatic Hydrocarbon IHSs in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Depth (ft bgs)	Benzo(a) anthracene*	Benzo(a) pyrene*	Benzo(b) fluoranthene*	Benzo(k) fluoranthene*
NETONNA	thad A Cillis for	Uprestricted La	and Use	NV	0.1	NV	NV
MICA Me	thod A CULS IOF	Unrestricted Ed		0.14	0.14	0.14	0.14
MTCA Me	thod B CULs for	Ingestion only		18	18	18	18
MTCA Me	thod C CULs for	Ingestion only	-	10	NC	NC	NC
CUL for In	dustrial Workers	-Direct Conta	ct	NG	NC	1 10	110
Off-Site H	land-Auger San	npling			Labert II	0.0454.11	0.0151.11
HA1	HA1-0.5	12/15/2005	0.5	0.0151 U	0.0151 U	0.0151 0	0.0100 11
	HA1-1.5	12/15/2005	1.5	0.0129 U	0.0129 U	0.0129 0	0,0129 0
	HA1-1.5-Dup	12/15/2005	1.5	0.0288	0.0500	0.0769	0.0581
HA2	HA2-0.5	12/15/2005	0,5	0.0176 U	0.0176 U	0.0222	0.0205
1.0.34	HA2-1.5	12/15/2005	1.5	0.0125 U	0.0125 U	0.0204	0.0151
HAB	HA3-0.5	12/15/2005	0.5	0.0340	0.0525	0.0982	0.0706
HA3	HA3.15	12/15/2005	1.5	0.0118 U	0.0118 U	0.0118 U	0.0118 U
110.4	HA405	12/15/2005	0.5	0.554	0.694	0.771	0.749
HA4	HA4-0.5	12/15/2005	1.5	0.0159 U	0.0159 U	0.0159 U	0.0159 U
	HA4-1.5	12/15/2005	0.5	0.862	1.45	1.62	1.82
HA5	HA5-0.5 HA5-1.5	12/15/2005	1.5	0.0153 U	0.0153 U	0.0153 U	0.0153 U

\*\*Criteria shown is for benzo(a)pyrene for MTCA cPAH screening post October 20


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## Risk Screening Polycyclic Aromatic Hydrocarbon IHSs in Soil (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Depth (ft bgs)	Chrysene*	Dibenzo(a,h) anthracene*	Indeno(1,2,3-cd) pyrene*	Total cPAHs including TEFs**
MTCA Me	thord A CI II s for	Unrestricted La	and Use	NV	NV	NV	0.1
MTCA Me	thod B CULS for	Ingestion only		0.14	0,14	0.14	0.14
MTCA Me	thod C CUI s for	Ingestion only	_	18	18	18	18
CUL for In	dustrial Workers	-Direct Conta	ct	3420	NC	NC	NC
Off-Site H	and-Auger Sam	pling	1.00				
HA1	HA1-0.5	12/15/2005	0.5	0,0151 U	0.0151 U	0.0151 U	0,011
1100	HA1-1.5	12/15/2005	1.5	0.0129 U	0.0129 U	0.0129 U	0.010
	HA1-1.5-Dup	12/15/2005	1.5	0.0612	0.0152 U	0.0201	0.070
HA2	HA2-0.5	12/15/2005	0.5	0.0276	0.0176 U	0.0176 U	0.016
11112	HA2-1.5	12/15/2005	1.5	0.0179	0.0125 U	0.0125 U	0.012
HAB	HA3-0.5	12/15/2005	0.5	0.0804	0.0133 U	0.0385	0.078
TING	HA3-1.5	12/15/2005	1.5	0.0118 U	0.0118 U	0.0118 U	0.009
HAA	HA4-0.5	12/15/2005	0.5	0.899	0,34 U	0.34 U	0.944
	HA4-1.5	12/15/2005	1.5	0.0159	0.0159 U	0,0159 U	0.012
HA5	HA5-0.5	12/15/2005	0.5	1.54	0.435	1,02	2.041
	HA5-1.5	12/15/2005	1.5	0.0153 U	0.0153 U	0.0153 U	0.012



## Risk Screening Hexavalent Chromium in Groundwater (mg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Chromium (Hexavalent)	Dissolved Chromium (Trivalent) <sup>a</sup>
MATCA MA	thed A Groupdwater (	21115	NV	NV
MICA ME	thed B Groundwater (		0.048	24
MTCA ME	thed C Groundwater	CUIS	0.11	53
MICAME	sthod C Surface-Water	r CIII s	1.20	610
MICAINE	Human Health	0010	NR	NR
Surface V	Natar ARAR-Aquatic	Life-Acute	0.015	1.8
AMOC-	Aquatic Life-Chronic	All A logic	0.01	0.057
Site-Spec	fic Groundwater CUL	for the	0.15	2,800,000,000
Evenuetic	no Worker Direct-Cont	act	>Max	190
Excavatio	a Wall Groundwater	Data		
Monitori	MIN/1 JAL 35 0	6/16/2005	0.269	NC
WW	MAN/1 122705	12/27/2005	0.00625 U	NC
10.00	MAN/1 041806	04/18/2008	0.02 U	NC
1.010	MW7-041606	6/17/2005	0.01 U	NC
MIVV2	MVV2-VV-0605	12/28/2005	0.0062511	0.00879
1.77	MIVV2-122805	04/10/2006	0.0211	0.021
	MVV2-041906	6/7/2005	0.02.0	NC
MW3	MIVV3-0605	6/7/2005	0.0062511	0.00215
	MW3-122905	12/29/2005	0.000200	0.0078
	MW3-041706	04/17/2006	0.020	NC
MW4	MW4-0605	6/9/2005	0.010	NC
	MW4-0605-Dup	6/9/2005	0.010	NC
	MW4-122705	12/27/2005	0.00625 0	NC
	MW4-041806	04/18/2006	0.023	17
MW5	MW5-122805	12/28/2005	450	4/
	MW5-041906	04/19/2006	350	NC 0.0407
MW6	MW6-122905	12/29/2005	0.00625 U	0.0187
	MW6-041906	04/19/2006	0.02 0	0.047
MW7	MW7-122805	12/28/2005	0.00738	0.0106
	MW7-041806	04/18/2006	0.020	0.013
	MW7-041806-Dup	04/18/2006	0.02 U	NC
MW8	MW8-122805	12/28/2005	0.00625 U	0.00755
	MWDUP-122805	12/28/2005	0.02 U	0.00849
	MVV8-041806	04/18/2006	0.02 UJ	0.021
Reconn	aissance Groundwat	er Data		
GP2	GP2-W-17-RECON	6/9/2005	32.38	4.72
GP4	GP4-W-8.0	6/16/2005	31	236
GP5	GP5-W-18.0	6/16/2005	NC	0.0897
GP6	GP6-W-18.0	6/16/2005	43	300
GP7	GP7-W-14.0	6/16/2005	NC	0.101
GP8	GP8-W-10.0	6/16/2005	61	294
GP-13	GP13-W-8.0	12/14/2005	NC	NA
00.45	GP15-W/-8.0	12/14/2005	NC	NA

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## Risk Screening Dissolved Metal IHSs in Groundwater (μg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Arsenic	Copper	Selenium
MTCA Method A	Groundwater CULs		5	NV	NV
MTCA Method B	Groundwater CULs		0.0583	592	80
MTCA Method C	Groundwater CULS		0.0583	1,300	175
MTCA Method C	Surface-Water CULS		2.46	6,660	6,750
MICA Method C	Health	2	0.018	NR	170
AvvQC—Human	AR. Aquatic Life-Acu	te	360	4.6	20
Sunace-Water An	Life_Chronic		190	3.5	5
Site-Specific Grou	undwater CUL for the Pro	otection of	NV	22	NV
Surface vvaler	ar Direct-Contact Ground	water CUL	5.8	5000	NV
Excavation work	Croundwater Data			7	The second
Monitoring weil	MIN/1-W/35.0	6/16/2005	NA	NA	NA
IVIVV1	MIN/1-122705	12/27/2005	32.3	1.01	1.00 U
	MM/1.041808	04/18/2006	33	2.0 U	2.0 U
1.01.4.10	MAR 1000	6/17/2005	NA	NA	NA
WIVV2	MM2-00-000	12/28/2005	5.63	1.17	6.28
	MM2-122000	04/19/2006	3.8	2.5	10
1414/0	MNV2-041500	6/7/2005	NA	NA	NA
MVV3	NIV03-0000	12/29/2005	15.3	1.00 U	1.00 U
	MINO-122903	04/17/2006	13	2.0 U	2.0 U
	MVV3-041700	6/9/2005	NA	NA	NA
MVV4	MIN/4-0005	6/9/2005	NA	NA	NA
	MW4-0605-Dup	12/27/2005	15.1	1.00 U	1.00 U
	WIVV4-122705	04/18/2006	15	2.0 U	2.0 U
	MIVV4-04 1000	12/28/2005	4.59	3.67	1000 L
MVV5	MV05-122005	04/19/2006	49	2.0 U	2.0 U
	MW5-041906	12/20/2005	11.9	4.02	12.3
MVV6	MW6-122905	12/29/2005	24	5.1	19
	MW6-041906	12/28/2005	6.62	2.12	2.77
MW7	MW7-122805	12/20/2000	7.1	2.4	5
	MW7-041806	04/18/2006	NA	NA	NA
	MW7-041806-Dup	12/28/2005	6.41	1.00 U	4.11
MVV8	MVVB-122605	12/20/2005	7.85	1.03	4.27
	MWDUP-122805	04/18/2006	4.8	2.0 U	3.6
	MVV8-041806	04/10/2000	4.0	1 -14 - 2	1
Reconnaissanc	e Groundwater Data	6/0/2005	I NA	NA	NA.
GP2	GP2-W-17-RECON	6/16/2005	NA	NA	NA
GP4	GP4-VV-8.0	6/10/2005	NA	NA	NA
GP5	GP5-VV-18.0	6/10/2005	NA	NA	NA
GP6	GP6-W-18.0	6/16/2005	NA	NA	NA
GP7	GP7-W-14.0	6/16/2005	NA	NA	NA
GP8	GP8-W-10.0	6/16/2005	NA	NA	NA
GP-13	GP13-W-8.0	12/14/2005	NA	NA	NA
GP-15	GP15-W-8.0	12/14/2005	NA	INPA	1 100

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#### Risk Screening Volatile Organic Compound IHSs in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Trichloro-	Vinyl
			enene	0.2
MTCA Me	thod A Groundwater C	JULS	0.100	0.0292
MTCA Me	thod B Groundwater C	JULS	0.109	0.0292
MTCA Me	thod C Groundwater (	OULS	27	0.20
MTCA Me	thod C Surface-Water	CULS	25	0.025
AWQC-H	Human Health	Life Acute	2.5 NR	NR
Surface-V	Vater ARAR-Aquatic	Life—Acute	ND	NR
AWQC-A	Aquatic Life—Chronic		10.8	71.5
CUL for V	apor Intrusion	forthe	10.0	110
Site-Spec Protection	of Surface Water	ior the	1,630	52
Excavatio Groundwa	n Worker Direct-Conta ater CUL	act	130	1100
Monitorin	g Well Groundwater	Data	-	
MW1	MW1-W-35.0	6/16/2005	10	10
CANO C	MW1-122705	12/27/2005	0.200 U	0.200 U
	MW1-041806	04/18/2006	0.055 U	0.14 U
MW2	MW2-W-0605	6/17/2005	10	10
101012	MW2-122805	12/28/2005	0.200 U	0.200 U
	MW2-041906	04/19/2006	0.055 U	0.14 U
M/A/3	MW3-0605	6/7/2005	10	10
101005	M\A/3-122905	12/29/2005	0.200 U	0.200 U
	MNA/3-041706	04/17/2006	0.055 U	0.14 U
MAIA	MV0/4-0805	6/9/2005	10	10
1010 04	MMA 0605 DUD	6/9/2005	10	10
	MA/4 122705	12/27/2005	0.200 U	0.200 U
	MN4 041806	04/18/2006	0.055 U	0.14 U
	NIV4-041000	12/28/2005	22.1	0.200 U
WIVV5	NVV5-122005	04/10/2005	79	0.14 U
1.11.100	NIV05-04 1900	12/20/2005	1.00.11	1.00 U
MVV6	WWW-122905	12/29/2005	0.055.11	0.14 U
	MVV6-041906	10/19/2000	0.0000	0.20011
MW7	MIVV7-122805	12/20/2000	0.255 11	0 14 11
	MVV7-041806	04/18/2008	0.055 0	0.1411
	MW7-041806-Dup	04/18/2006	0.000 U	0.560
MW8	MVV8-122805	12/28/2005	0.200 U	0.000
	MWDUP-122805	12/28/2005	0.200 0	0.400
	MW8-041806	04/18/2006	0.055.0	0.80 3
Reconna	alssance Groundwate	er Data	1	1 611
GP2	GP2-W-17-RECON	6/9/2005	50	50
GP4	GP4-W-8.0	6/16/2005	10	10
GP5	GP5-W-18.0	6/16/2005	10	10
GP6	GP6-W-18.0	6/16/2005	1130	200
GP7	GP7-W-14.0	6/16/2005	10	10
GP8	GP8-W-10.0	6/16/2005	16.8	10
GP-13	GP13-W-8.0	12/14/2005	0.220	16.5
GP-15	GP15-W-8.0	12/14/2005	0.2 U	0.2 U



Table 32 Risk Screening Polycyclic Aromatic Hydrocarbons in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington

Total cPAHs including 0.008 0.045 0.048 0.048 0.008 0,040 0.174 0.007 0.049 0.050 0.007 0.007 TEFs\*\* 0.0038 0.041 AN 0.012 AN AN 0.12 0.74 NR NR NC NC NA 0.1 0.1 U 0.01 U 0.01 U 0.1 U 0.11 U U 6600.0 97,000,000 0.192 U 0.0099 U 0.095 U 0.0099 U 0.0114 U 0.034 J (1,2,3-cd) AN NA NA pyrene\* Indeno 0.0038 0.012 AN 0.12 0.74 NR NR 2.9 N 0.1 U 0.1 U 100,000,000 0.01 U 0.01 U U 6600.0 0.11 U 0.0099 U 0.095 U 0.0114 U Dibenzo(a,h) anthracene\* 0.095 U 0.192 U 0.0099 U 0.11 U AN NA NA 0.0038 0.012 0.21 AN 0.12 0.74 NR NR N 0.0099 U 0.1 U 0.01 U 0.11 U 0.01 U 0.1 U U 6600.0 0.095 U 95,000,000 0.11 U 0.192 U U 9900.0 Chrysene\* 0.014 J 0.0038 MA 0.132 AN AN 0.012 AN 0.12 0.74 910 NR NR N 0.03 U 0.032 U 0.03 U 0.034 U 0.033 U 0.032 U fluoranthene\* 0.962 U Benzo(b+k) NA NA AN AN MA AN AN NA M AN 0.012 0.12 0.74 NR NR NC NC NR R fluoranthene\* 0.01 U NA 0.01 U 0.0099 U U 6600.0 38,000,000 U 6600.0 Benzo(k) NA NA AN 0.0038 NA NA 0.108 NA AN 0.012 AN NA AN 0.74 0.12 NR NR 49 N 0.01 U U 00000 U 0.01 U 0.0099 U 108,000,000 U 6600.0 fluoranthene\* NA AN NA NA MA NA AN 0.104 NA AN AN Benzo(b) 0.0038 0.012 0.12 0.74 5.2 RN NR NV 0.01 U 0.01 U 0.01 U 0.062 U 0.01 U 0.063 U 0.061 U 0.01 U 0.057 U 0.011 U 0.057 U 0.192 U 0.066 U Benzo(a) pyrene\* 0.0038 0.012 0.12 0.74 AN AN NA NC S NR NR AN 0.1 0.01 U 0.1 U 0.11 U 0.1 U 0.01 U 0.095 U 0.0099 U 145,000,000 0.0099 U 0.0099 U anthracene\* 0.192 U 0.031 J 0.029 J Benzo(a) 0.0038 0.107 ¥ NA NA NA 0.012 0.74 0.12 NR 9.1 NR N 04/19/2006 12/29/2005 04/19/2006 12/27/2005 12/28/2005 04/17/2006 04/18/2006 12/27/2005 04/18/2006 12/28/2005 04/19/2006 12/29/2005 6/17/2005 Surface-Water ARAR—Aquatic Life—Acute 6/9/2005 6/16/2005 6/9/2005 6/7/2005 Date Site-Specific Groundwater CUL for the MTCA Method C Surface-Water CULs Monitoring Well Groundwater Data MTCA Method C Groundwater CULs MTCA Method B Groundwater CULs MTCA Method A Groundwater CULs Excavation Worker Direct-Contact AWQC—Aquatic Life—Chronic MIVN4-0605-Dup MW6-122905 Protection of Surface Water MW5-122805 MW5-041906 MW6-041906 MW4-122705 MW4-041806 MW3-041706 MW2-W-0605 MW2-041906 MW3-122905 MW1-W-35.0 MW1-122705 MW1-041806 MW2-122805 MVV4-0605 MW3-0605 Sample ID AWQC—Human Health Groundwater CUL MW5 MW6 Location **MWB** MW4 INWN MWZ

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Polycyclic Aromatic Hydrocarbons in Groundwater (µg/L) Precision Engineering, Inc. Seattle, Washington **Risk Screening** Table 32

	Sample ID	Date	Benzo(a) anthracene*	Benzo(a) pyrene*	Benzo(b) fluoranthene*	Benzo(k) fluoranthene*	Benzo(b+k) fluoranthene*	Chrysene*	Ulbenzo(a,n) anthracene*	(1,2,3-cd) pyrene*	including TEFs**
					NN	NN	NN	NN	NN	NN	0.1
TCA Meth	od A Groundwater	CULS	NN	1.0	AN	0100	0.012	0.012	0.012	0.012	0.012
TCA Meth	od B Groundwater	CULS	0.012	210.0	210.0	21010	0.19	0.12	0.12	0.12	0.12
TCA Meth	od C. Groundwater	CULS	0.12	0.12	0.12	0.12	21.0	0.74	0.74	0.74	0.74
ITCA Meth	od C Surface-Wate	er CULS	0.74	0.74	0.74	U./4	410	0.0038	0.0038	0.0038	0.0038
The office	man Loolth		0.0038	0.0038	0.0038	0.0038	NK	00000		MD	NIP
10-0700	IIIdii Ficalui	al ife Actito	NR	NR	NR	NR	NR	NR	NK	NIC	CIN
WOC. AC	Inatic Life-Chronic	C LIC LIGHT	NR	NR	NR	NR	NR	NR	YN	NIK	VIN
ite-Specifi	c Groundwater CU	L for the	145,000,000	NC	108,000,000	38,000,000	NC	95,000,000	100,000,000	000'000'26	NC
xcavation	Worker Direct-Con	itact	9.1	NC	5,2	49	NC	910	0.21	2.9	NC
Sroundwat	erCUL				11 Parts 1	11 0000 0	NIA	0 0000 11	U 66000	0.0099 U	0.007
MW7	MW7-122805	12/28/2005	0.0099 U	0.01 U	0.0099 U	0.0088 0	0.034 11	0.013 J	0.038 J	L 950.0	0.043
	MW7-041806	04/18/2006	0.035 J	0.061 U	NA	NA	11 120 0	0.1 U	0.1 U	0.1 U	0.048
-	MN7-041806-Dup	04/18/2006	0.1 U	0.061 U	AN		VIV	0.011	0.0111	0.01 U	0.008
MW8	MW8-122805	12/28/2005	0.01 U	0.01 U	0.01 U	0.01 0	NA	D 10:0	0.0099 U	0.0099 U	0.012
	MWDUP-122805	12/28/2005	0.099 U	0.01 U	0,0099 U	NA NA	0.039 U	0.13 U	0.13 U	0.13 U	0.060
	MW8-041806	04/18/2006	0.13 U	n c/n'n		1001					
Reconnais	ssance Groundwa	tter Data		1 100	NIN L	MA	NA	NA	NA	NA	NA
GP2 (	3P2-W-17-RECON	6/9/2005	NA	NA	YN I	VIN	0.954 11	0.191 U	0.191 U	0.191 U	0.173
GP4	GP4-W-8.0	6/16/2005	0.191 U	0.191.0	AN AN	VIN	NA	NA	NA	NA	NA
GP5	GP5-W-18.0	6/16/2005	NA	NA	AN I	VIN	NA	NA	NA	NA	NA
GP6	GP6-W-18.0	6/16/2005	NA	NA	NA	AN .	AN	NA	NA	NA	NA
GP7	GP7-W-14.0	6/16/2005	NA	AN	AN	VIN	0.071	0 194 11	0.194 U	0,194 U	0.176
GP8	GP8-W-10.0	6/16/2005	0.194 U	0.194 U	NA	AN	NA VIA	NA	NA	NA	NA
CD 13	GP13-W-8.0	12/14/2005	NA	NA	NA	NA	ANI .	NN	NA	NA	NA
GP-15	GP15-W-8.0	12/14/2005	NA	NA	NA	NA	AN	WN I	5 MAT		

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## Risk Screening Petroleum Hydrocarbon IHSs in Groundwater (mg/L) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Diesel-Range Organics	Oil-Range Organics
Location			500	500
MTCA Metho	od A Groundwater CULs		NV	NV
MTCA Metho	od B Groundwater CULS		NV.	NV
MTCA Meth	od C Groundwater CULS		NV	NV
MTCA Meth	od C Surface-Water CO	-5	NV	NV
AWQC-Hu	man Health	Acuto	NV	NV
Surface-Wa	ter ARAR-Aquatic Lite-	Acute	NV	NV
AWQC-Aq	uatic Life-Chronic		NV	NV
CUL for Vap Site-Specific	or Intrusion Groundwater CUL for t	he Protection	NV	NV
Excavation	Worker Direct-Contact G	Broundwater	>S	NV
Monitoring	Well Groundwater Dat	a		
MI\A/1	MW1-W-35.0	6/16/2005	NA	NA
(014 4 )	MW1-122705	12/27/2005	0.248 U	0.495 U
	MW1-041806	04/18/2006	0.26 U	0.52 U
MAN	MIN/2-10/-0605	6/17/2005	0.438	0.512
WWV2	MIN/2-122805	12/28/2005	1.19	1.04
	MAR 041006	04/19/2006	0.41	0.58 U
1.01.0.10	NIV/2-04 1900	6/7/2005	NA	NA
MW3	MVV3-0605	12/20/2005	0.312	0.505 U
	MVV3-122905	04/17/2008	0.28 U	0.57 U
	MW3-041706	6/0/2005	NA	NA
MW4	MW4-0605	6/9/2005	NA	NA
	MW4-0605-Dup	6/9/2005	0.24811	0.495 U
	MW4-122705	12/2//2005	0.2711	0.54 U
	MW4-041806	04/18/2006	0.270	0.495 U
MW5	MW5-122805	12/28/2005	0.031	0.51 U
1	MW5-041906	04/19/2006	0.200	1 32
MW6	MW6-122905	12/29/2005	2.64	10
	MW6-041906	04/19/2006	0.76	0.405.11
MW7	MW7-122805	12/28/2005	0.248 U	0.465 0
1141.14	MW7-041806	04/18/2006	0.26 U	0.510
	MW7-041806-Dup	04/18/2006	0.26 U	0,510
MIA/B	MW8-122805	12/28/2005	1.71	1.00
NIL VO	MWDUP-122805	12/28/2005	1.79	1.21
	MW8-041806	04/18/2006	0.45	0.58 U
Pacannal	ssance Groundwater I	Data		1
GP2	GP2-W-17-RECON	6/9/2005	NA	NA
GPA	GP4-W-8.0	6/16/2005	0.325	0.478 U
GP5	GP5-W-18.0	6/16/2005	NA	NA
GP6	GP6-W-18.0	6/16/2005	NA	NA
GP7	GP7-W-14.0	6/16/2005	NA	NA
GP8	GP8-W-10.0	6/16/2005	0.814	0.4790
GP-13	GP13-W-8.0	12/14/2005	NA	NA
00-10	GP15-W/-8.0	12/14/2005	NA	NA



# Risk Screening Volatile Organic Compounds in Sub-Slab Vapor (µg/m<sup>3</sup>) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Trichloro- ethene	Vinyl chloride
CIII for Var	or Intrusion	2000	8150	103,000
A1	A1-042806	04/18/2006	4.0 U	1.9 U
12	A2-042806	04/18/2006	4.9 U	2.3 U
A2	A3-042806	04/18/2006	6100	8.4 U
A4	A4-042806	04/18/2006	NA	NA
A5	A5-042806	04/18/2006	37000	420
46	A6-042806	04/18/2006	3.5 U	1.7 U
Δ7	A7-042806	04/18/2006	3.5 U	1.7 U



## Risk Screening Volatile Organic Compounds in Air (µg/m<sup>3</sup>) Precision Engineering, Inc. Seattle, Washington

Location	Sample ID	Date	Trichloroethene
CUIL for Air			0.22
141	IA1	06/13/2006	0.2
142	IA2	06/13/2006	0.083
143	IA3	06/13/2006	0,11
1A4	IA4	06/13/2006	0.14
145	IA5	06/13/2006	0.16
IAG	IA6	06/13/2006	0.15
IAG	IA6 Duplicate	06/13/2006	0.15
IA7	IA7	06/13/2006	0.046
148	IA8	06/13/2006	0.15



## Table 36 Cumulative Risk for On-Site Soil Precision Engineering, Inc. Seattle, Washington

COPC	Maximum Detected Concentration	Indust	rial Worker Dir	ect-Contact Sc	enario
COPU	C.	CUL	ELCR	CULnc	HQ
	ma/ka	mg/kg	Unitless	mg/kg	Unitless
Herevelent chromium	3.50E+03	2.2E+03	1.6E-05	1,4E+03	2.5E+00
Hexavalent chromium	1.16E+00	6.8E+00	1.7E-06	3.6E+02	3.2E-03
Trichloroethene	1.102.00	NC	1.8E-05	NC	2.5E+00
Cumulative Risk	NC	NO	1.02-00		



## Table 37 Total Metals in Soil from Ditch Removal Confirmation Samples (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample	Depth (ft bgs)	Date Collected	Arsenic	Lead
MTCA Meth	od A CULs for	Unrestricted	Land Use	20	NR
MTCA Meth	od B CULs for	Ingestion only	y	0.67	NR
MTCA Meth	od C CULs for	Ingestion On	ly	88	NR
Site-Specific	CLIL for Indu	strial Workers	-Direct Contact	20	1000ª
B1	B1 B1	1.5	10/24/2007	16.2	11.2
B2	B2	1.5	10/24/2007	13.9	36.7
83	B3	1.5	10/24/2007	10.7	29.7
B4	B4	1.5	10/24/2007	3.79	3.6
85	B5	1.5	10/24/2007	3.07	5.19
B6	B6	1.5	10/24/2007	2.76	3.5
BZ	B7	1.5	10/24/2007	7.21	22.2
B8	B8	1.5	10/24/2007	10	40.4
89	B9	1.5	10/24/2007	8	19,5
B10	B10	1.5	10/24/2007	16.1	37.2
B11	B11	1.5	10/24/2007	8.26	16
B12	B12	1.5	10/24/2007	11.3	108
B13	B13	1.5	10/24/2007	26.3	55.5
P1	P1	0.5	10/24/2007	22	653
P2	P2	0.5	10/24/2007	15.7	200
P3	P3	0.5	10/24/2007	13.3	. 202
P4	P4	0.5	10/24/2007	11.6	103
P5	P5	0.5	10/24/2007	9.54	64.6
P6	P6	0.5	10/24/2007	9.05	108
P7	P7	0.5	10/24/2007	19.9	196
P8	P8	0.5	10/24/2007	13.8	76.8
P9	P9	0.5	10/25/2007	111	2410
P10	P10	0.5	10/25/2007	15.6	365
SS-1	SS1-6	0.5	11/19/2007	2.64	120
SS-2	SS2-6	0.5	11/19/2007	4.82	75.2
SS-3	SS3-6	0.5	11/19/2007	37	668
SS-3	SS3-18	1.5	11/19/2007	6.79	230
SS-4	SS4-6	0.5	11/19/2007	3.58	18.5
SS-5	SS5-6	0.5	11/19/2007	4.43	44
SS-6	SS6-6	0.5	11/19/2007	16.8	838
SS-6	SS6-18	1.5	11/19/2007	23.7	526
C-1	C-1	2	3/27/2008	9.91	470
C-2	C-2	1.5	3/27/2008	21.6	1020
C-3	C-3	1.5	3/27/2008	13.2	213

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Table 38 Polycyclic Aromatic Hydrocarbons in Soil from Ditch Removal Confirmation Samples (mg/kg) Precision Engineering, Inc. Seattle, Washington

ocation	Sample	Depth (ft bgs)	Date Collected	1-Methyl- naphthalene	2-Methyl- naphthalene	Acenaph- thene	Acenaph- thylene	Anthracene	Benzo(a) anthracene
B5	B5	1.5	10/24/2007	0.0130 U	0.0130 U	0.0130 U	0.0130 U	0.0130 U	0.0130 U

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Table 38 Polycyclic Aromatic Hydrocarbons in Soil from Ditch Removal Confirmation Samples (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample	Depth (ft bgs)	Date Collected	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(ghi) perylene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene
B5	B5	1.5	10/24/2007	0.0130 U	0.0130 U	0.0130 U	0.0130 U	0.0130 U	0.0130 U

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Table 38 Polycyclic Aromatic Hydrocarbons in Soil from Ditch Removal Confirmation Samples (mg/kg) Precision Engineering, Inc. Seattle, Washington

Pyrene	0.0130 U
Phenanthrene	0.0130 U
Naphthalene	0.0130 U
Indeno(1,2,3- cd)pyrene	0.0130 U
Fluorene	0.0130 U
Fluoranthene	0.0130 U
Date Collected	10/24/2007
Depth (ft bgs)	1.5
Sample	B5
Location	B5

8 8

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## Table 39 Total Petroleum Hydrocarbons in Soil from Ditch Removal Confirmation Samples (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample	Depth (ft bgs)	Date Collected	Gasoline-Range Hydrocarbons	Diesel	Lube-Oil-Range Hydrocarbons	
B5	B5	1.5	10/24/2007	5.30 U	13.0 U	32.5 U	



## BTEX Compounds in Soil from Ditch Removal Confirmation Samples (mg/kg) Precision Engineering, Inc. Seattle, Washington

Location	Sample	Depth (ft bgs)	Date Collected	Benzene	Ethylbenzene	Toluene	Total Xylenes
B5	B5	1,5	10/24/2007	0.0318 U	0.0530 U	0.0530 U	0.106 U



FIGURES




































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#### APPENDIX A

#### **GROUNDWATER FATE AND TRANSPORT MODELING**





#### To: Mark Adams, Ecology

#### MEMORANDUM

DATE: February 25, 2008

Matthew Hickey and James Peale FROM:

PROJECT: No. 8006.08.04

RE: Groundwater Cleanup Levels for the Protection of Surface Water and Groundwater Fate and Transport Modeling for the Former Precision Engineering Site, VCP ID Number NW 1511

Maul Foster & Alongi, Inc. (MFA) has prepared this memorandum to describe groundwater fate and transport modeling for the Precision Engineering, Inc. (Precision) site located at 1231 S Director Street in Seattle, Washington. This memorandum also addresses a request by the Washington State Department of Ecology (Ecology) to develop groundwater cleanup levels (CULs) for the protection of surface water. Because the modeling shows that indicator hazardous substances (IHSs) present at the site will not reach the Duwamish River, groundwater CULs that exceed surface-water CULs can be established consistent with WAC 173-340-720(6)(c)(i)(E).

MFA used the groundwater model to derive groundwater CULs for site IHSs that, if exceeded at the eastern property boundary, are predicted to result in exceedances of surface-water criteria at the point where groundwater discharges to the Duwamish River. The following discussion includes a description of the groundwater model used, model inputs, assumptions, and results.

#### **Model Description**

MFA performed the groundwater modeling using U.S. Environmental Protection Agency's (USEPA's) BIOCHLOR model (USEPA, 2002). BIOCHLOR is based on the Domenico analytical solute transport model and has the ability to simulate 1-D advection, 3-D dispersion, linear adsorption, and biotransformation or degradation. BIOCHLOR includes three different model types:

- Type I: Solute transport without decay
- Type II: Solute transport with biotransformation or degradation modeled as a sequential firstorder decay process
- Type III: Solute transport with biotransformation or degradation modeled as a sequential first-order decay process with two different reaction zones (i.e., each zone has a different set of rate coefficient values)

All compounds were modeled using the Type I or II models Type II was used for all compounds except metals. Type I was used for metals, which do not decay. Type I and Type II were used for trichloroethene (TCE) and vinyl chloride, to accommodate a request by Ecology, as explained further below.



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#### Model Inputs, Assumptions, and Output

The model required the following data inputs:

- Source concentrations
- Source dimensions (lateral and vertical)
- Groundwater velocity (either entered directly or calculated using gradient, hydraulic conductivity, and porosity)
- Retardation factors (either entered directly or calculated using default partition coefficients and organic carbon data for soil)
- Degradation rates based on half-life data (a half-life x factor of 2 was used for TCE and VC)
- Model domain size and duration

These parameters are summarized on Table A1 and discussed further (along with the assumptions) in the following sections. The output of the model is the concentration at a designated distance downgradient of the source.

#### Compounds Modeled

MFA modeled the fate and transport of the following IHSs:

- Copper
- Trivalent and hexavalent chromium
- Trichloroethene (TCE)
- Vinyl chloride

Diesel- and oil-range organics are also IHSs in site groundwater, but the chemical properties necessary to run the model are not available for diesel or oil. Instead, selected polycyclic aromatic hydrocarbons (PAHs) (which are constituents of diesel- and oil-range organics) that were detected in site groundwater at a concentration above the Ecology or USEPA surface-water criteria were modeled. Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were modeled as surrogates.

Arsenic and selenium, which are IHSs at the site, were not modeled because based on the data collected, Precision does not appear to be a source of these IHSs. The spatial distribution of arsenic concentrations in groundwater is not consistent with what would be expected if the former Precision site was the source. The arsenic detections are representative of naturally occurring background concentrations. For example, the highest concentration of arsenic detected at the site (32.3  $\mu$ g/L) was in a sample from monitoring well MW1, located upgradient of the facility. Arsenic is ubiquitous in groundwater throughout the site at concentrations that appear to be consistent with naturally occurring background levels and there is no indication that Precision is a source of the arsenic in groundwater. Selenium is detected in some of the downgradient

Mark Adams, Ecology February 25, 2008 Page 3

monitoring wells at the site; however, selenium was not detected in soil and is no link between selenium and Precision.

It was not necessary to model benzo(b)fluoranthene and benzo(k)fluoranthene to demonstrate that these constituents would not reach the river reach the Duwamish River as it was already shown that they were not detected in monitoring locations at or near the property boundary nor in borings where IHSs may not be detected in downgradient locations.

#### Source Concentrations, Downgradient Concentrations, and Surface-Water Criteria

The maximum detected concentrations in groundwater samples collected from monitoring wells at the eastern property boundary were used as the source concentration to demonstrate that constituents at the site will not reach the river (see Table A1). Although TCE and vinyl chloride were not detected in property boundary monitoring wells, concentrations from geoprobe groundwater reconnaissance sample GP-13, located approximately 75 feet upgradient of the property boundary were used. Data from GP-13 was used as the boring was in a location where Ecology had expressed concern that IHSs may not show up in downgradient wells.

To calculate the groundwater CUL, an iterative process was used whereby assumed source concentrations were input into the model until the calculated downgradient concentration matched the most conservative applicable surface-water criteria. The groundwater CUL for a given IHS is the source concentration that predicts groundwater concentrations equal to the surface-water criteria (see Table A2). Groundwater CULs for the volatile organic compounds (VOCs) TCE and vinyl chloride were calculated in three ways: using a degradation rate based on reference values (Howard, et. El., 1991), using the same reference value multiplied by a factor of two, and with no degradation occurring (i.e., Type I model).

Table A3 summarizes applicable surface-water criteria. The most conservative (lowest) criteria from Table A3 were used for the model. Water-quality criteria were obtained from the Cleanup Levels and Risk Calculations (CLARC) Web page (Ecology, 2007). Applicable surface-water criteria included Model Toxics Control Act (MTCA) Method B and Method C CULs for surface water, and Ecology and USEPA surface-water criteria for aquatic life and for human health in both freshwater and marine environments. Criteria for both freshwater and marine environments were used based on reports that the base of the Duwamish is saline, while approximately the top 10 feet is freshwater (Duwamish Coalition, 1998). Use of water-quality criteria for the consumption of organisms and water is overly conservative, as water in the Duwamish is brackish and is not used for drinking water.

#### Source Area Dimensions

Source dimensions were based on the areal extent of IHS detections at the site. The extent of the contaminants was estimated to be equal to the distance between a sample location in which the constituent was detected in groundwater and the nearest sample location in which the constituent was not detected. Data from both monitoring wells and reconnaissance borings were considered in estimating the source-area widths.

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The source width for trivalent chromium, and all of the PAHs was 300 feet (based on detections near the north and south property boundaries). The source width for hexavalent chromium was 50 feet (based on detections in GP6 and MW4). Copper source width was 225 feet, based on detections in MW6, MW2, and MW8. The source width for vinyl chloride was 200 feet (based on the detection of vinyl chloride in GP-13 and MW-8). The source width for TCE was 40 feet (based on the detections of TCE in GP6, GP8, and GP-13). It is important to note that hexavalent chromium, TCE, and vinyl chloride were not detected at the property boundary (i.e., applying these concentrations at the property boundary is an overly conservative case).

The source-area thickness for all IHSs was estimated as 15 feet (based on the difference in elevation between the top of the water table and the top of the aquitard).

BIOCHLOR allows the user to specify either a constant concentration source or a variety of source decay scenarios. Using a decay scenario requires an estimate of the mass contained in the original release. MFA conservatively assumed a constant, nondegrading source. This assumption significantly overestimates the amount of mass in the subsurface, considering that TCE use at the property ended in the mid-1980s, that the outside steam-cleaning area was relocated before 1986, that the boiler UST was abandoned in place and filled with a slurry in 1992, that chrome-plating operations ceased in 2005, and the evidence that the organic compounds are degrading (the presence, for example, of the TCE degradation product vinyl chloride).

#### Groundwater Velocity

Groundwater models are typically sensitive to variations in groundwater velocity, which is dependent on the hydraulic conductivity (K) of the water-bearing zone (as well as the porosity [n] and the gradient [i]). A gradient of 0.003 was calculated using site groundwater-elevation data collected from MW6 (located at the property boundary) on April 17, 2006, and an average daily staff-gauge elevation for the Duwamish on the same day (USGS, 2007). A porosity of 0.3 was assumed based on typical estimates for the soil types at the site.

Values of K can range over orders of magnitude. The estimate of K from the document titled Development of a Three-Dimensional Numerical Groundwater Flow Model for the Duwamish River Basin (Duwamish Coalition, 1998) is 0.001 centimeters per second for the area near the former Precision site. MFA modeled the groundwater flow using a K value five times the Duwamish Coalition estimate (i.e. 0.005 centimeters per second). Applying this value to Darcy's law results in a linear velocity of 52 feet per year. The assumed K value is conservative compared to the value used by the Duwamish Coalition (i.e., overestimates groundwater velocity and consequently potential contaminant migration).

#### **Retardation Factor**

The velocity of organic constituents in the dissolved phase is usually less than (i.e., retarded relative to) the groundwater velocity due to sorption effects. Sorption of organic constituents occurs as dissolved-phase organic constituents partition to the organic carbon in soil. The rate of sorption depends on the amount of organic carbon in the soil and the distribution coefficients ( $K_{oc}$  values). The  $K_{oc}$  values for TCE, benzo(a)anthracene, benzo(b)fluoranthene,

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benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were obtained from Ecology's CLARC Web page (Ecology, 2007). The CLARC Web page listed distribution coefficients for volatile organic compounds (VOCs) of 94 L/kg for TCE and 19 L/kg for vinyl chloride, indicating low tendency for sorption (and thus retardation). Distribution coefficients for PAHs were significantly larger (i.e.,  $3.6 \times 10^5$  L/kg for benzo(a)anthracene,  $1.2 \times 10^6$  L/kg for benzo(b)fluoranthene and benzo(k)fluoranthene,  $4.0 \times 10^5$  L/kg for chrysene,  $1.8 \times 10^6$  L/kg for dibenzo(a,h)anthracene, and  $3.5 \times 10^6$  L/kg for indeno(1,2,3-cd)pyrene).

Sorption of dissolved inorganic constituents occurs primarily due to cation- or anion-exchange processes. The amount of solute that is adsorbed to the aquifer matrix is also described by a distribution coefficient ( $K_d$ ). Distribution coefficients for arsenic, copper, trivalent chromium, hexavalent chromium, and selenium were also obtained from the CLARC Web page. The CLARC Web page listed distribution coefficients for metals of 29 L/kg for arsenic, 22 L/kg for copper, 1,000 L/kg for trivalent chromium, 19 L/kg for hexavalent chromium, and 5 L/kg for selenium.

No organic carbon data are available for the former Precision site. MFA used the default value (0.0018) supplied by the BIOCHLOR model and the distribution coefficients to calculate retardation factors. Resulting retardation factors for the metals and VOCs were calculated and are shown on Tables A1 and A2.

Because of the high propensity of PAHs to adhere to soil, (reflected in the high partitioning coefficients for the PAHs), calculated retardation factors for PAHs were also high. Solutions to the advection-dispersion equations using the superposition approach used by BIOCHLOR for solving the Domenico analytical model are known to diverge from solutions obtained by more robust numerical models for contaminants with large retardation factors. MFA confirmed this when attempting to model the PAH contaminants; high retardation factors caused the model to produce unrealistic results. In order to make the model function correctly, while still maintaining a high level of model conservatism, MFA set the retardation factors for all PAHs to a value of 10. This is a highly conservative approach, and resulted in migration of these contaminants being overestimated. Therefore, the CULs for the PAHs developed using these lower retardation factors are much lower than CULs that would have been calculated had the model been able to use the higher retardation factors.

#### **Degradation Rates and Dispersion**

BIOCHLOR allows the application of half-life data for calculating a first-order decay scenario. Literature values for half-lives of the VOCs and PAHs are appropriate to use. At the request of Ecology, MFA modeled a range of degradation rates for both TCE and vinyl chloride. CULs were calculated for all IHS's using the average of literature values for the degradation rates. Additionally, CULS for TCE and VC were calculated based on half lives that are two times longer than the literature values as well as with no degradation. Degradation of TCE at the site has been confirmed by the presence of vinyl chloride (a degradation product); however, to be conservative, the final groundwater CULs for TCE and vinyl chloride are assumed to be those calculated using the half lives increased by a factor of two. Degradation of total petroleum

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hydrocarbon constituents in the subsurface has been widely documented and can be inferred at this site.

Dispersion occurs when groundwater encounters soil grains and the contaminant molecules are deflected or dispersed away from each other. Dispersion occurs in the longitudinal direction (i.e., along the groundwater plume axis in the direction of groundwater flow) and in the transverse planes (i.e., lateral or crossgradient to groundwater flow, in two dimensions). The amount of longitudinal and lateral dispersion is typically considered to be a function of plume length. For the purposes of this model, dispersion was calculated (using the internal BIOCHLOR algorithm) to be 180 feet, based on a hypothetical plume length of 1,800 feet.

#### Model Domain Size and Duration

The model domain was set at 800 feet wide and 3,600 feet long, well in excess of the width of the property and the distance to the Duwamish River. The models were run assuming a 35-year period, which is the estimated approximate length of time that it would take groundwater to travel 1,800 feet (i.e., the distance from the eastern property boundary to the Duwamish River), based on estimated groundwater seepage velocity at the site. Given that the primary sources of the contamination are no longer present, it is unlikely that impacts will continue for this length of time.

It is important to note that the assumptions of constant contaminant sources at maximum detected concentrations assumed at the eastern property edge are very conservative. Mass loading to the system is in fact finite due to the UST decommissioning and soil excavation conducted in the 1980's, and maximum concentrations in several cases were located an additional 50 to 130 feet west of the eastern property edge. The model was also set up to assume maximum concentrations throughout the source area. In reality, this would not be the case due to dispersive effects.

#### Results

Table A1 presents a summary of modeling results indicating that none of the IHSs at the site will reach the Duwamish River at concentrations at or above method detection limits. Figures A1 through A9 show concentration vs. distance with the assumed source area concentration at the eastern property boundary and the corresponding concentration at the river.<sup>1</sup>

Table A2 provides the modeling results to determine site specific CULs for the protection of surface water. Concentration vs. distance graphs showing the most stringent surface water CUL concentration at the Duwamish (i.e, at 1,800 feet, and the site specific CUL at the property boundary (0 feet), are included as Figures A10 through A20.

Table A4 compares the calculated CULs to concentrations of IHSs and PAHs detected in site groundwater samples. On-site groundwater concentrations of hexavalent chromium exceeded their respective CULs. All other IHSs and the modeled PAHs in groundwater are below their

<sup>&</sup>lt;sup>1</sup> Note that the modeled concentrations shown on the graphs are expressed in milligrams per liter. Some modeled concentrations were converted to micrograms per liter (µg/L) in the tables for the ease of comparison, as site data and criteria are presented in µg/L for the constituents modeled.

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respective CULs. Hexavalent chromium concentrations that exceeded CULs were detected in groundwater samples collected from borings and MW5, located within the building footprint, and from one sample collected from MW1, located upgradient of the building. Concentrations of hexavalent chromium in wells located near the eastern property line were not detected above their method reporting limits and did not exceed CULs.

#### Attachments

References Tables A1 through A4 Figures A1 through A20

#### References

- Duwamish Coalition. 1997. Development of a three-dimensional, numerical groundwater flow model for the Duwamish River Basin. Prepared by J. Fabritz, J. Massmann, and D. Booth for City of Seattle Office of Economic Development and King County Office of Budget and Strategic Planning. August.
- Ecology. 2007. Cleanup levels and risk calculations. https://fortress.wa.gov/ecy/ clarc/CLARCHome.aspx (November 12, 2007).
- MFA. 2006. Remedial investigation and risk assessment. Prepared for Stoel Rives, LLP. Maul Foster & Alongi, Inc., Vancouver, Washington. July 17.
- USEPA. 2002. Biochlor. Natural attenuation decision support system. Ver. 2.2. U.S. Environmental Protection Agency. <u>http://www.epa.gov/ada/csmos/models/biochlor.html.</u> March.
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Appendix A Table Notes Precision Engineering, Inc. Seattle, Washington

3old font indicates an exceedance of the CUL.
ARAR = applicable or relevant and appropriate requirement.
AWQC = ambient water quality criteria.
CUL = cleanup level.
J = estimated.
mg/L = milligrams per liter.
MTCA = Washington State Department of Ecology's Model Toxics Control Act.
ug/L = micrograms per liter.
NA = not analyzed.
NC = not calculated.
NR = not researched.
NV = no value.
U = not detected at or above the method reporting limit.
<sup>a</sup> Surface water of the Duwamish is brackish and is not used for drinking.
<sup>b</sup> Based on literature estimates from Development of a Three-Dimensional Numerical Groundwater Flow Model for the Duwamish River Basin; University of Washin
August, 1998.
<sup>c</sup> Based on field data.
<sup>d</sup> Standard assumption.
<ul> <li>Calculated (v=(k*i)/n).</li> </ul>
<sup>1</sup> Due to sorption; calculated (R=1+(rho/n)*Koc*foc).
<sup>8</sup> Actual calculated retardation factor or more conservative.
h Based on distance between sample locations with detections.
<sup>i</sup> Based on screen intervals/recon intervals.
/ Groundwater Chemicals Desk Reference; Montgomery ed.; CRC Press, 1996.
k Concentration at a distance of 1 800 fi from eastern nonearly houndary (distance to Duwemish Biver) was set enviol to the surface weter criteria



### Table A1

# Fate and Transport Model Inputs and Results Showing no Discharge of IHSs to the Duwamish Precision Engineering, Inc.

## Seattle, Washington

Model Parameters	Chromium, Trivalent	Chromium, Hexavalent	Copper	Trichloro- ethene	Vinyl Chloride
Hydraulic Conductivity (k, cm/sec) <sup>b</sup>	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03
Gradient (i) <sup>c</sup>	0.003	0.003	0.003	0.003	0.003
Porosity (n) <sup>d</sup>	0.3	0.3	0.3	0.3	0.3
Groundwater Velocity (v, ft/yr) <sup>e</sup>	52	52	52	52	52
Retardation Factor <sup>1</sup>	5334	102	118	1.90	1.18
Modeled Retardation <sup>g</sup>	10	10	10	1.90	1.18
Simulation Time (yrs)	35	35	35	35	35
Source Concentration (µg/L)	47	7.38	4.02	0.220	16.5
Source Width (ft) <sup>h</sup>	300	50	225	40	200
Source Thickness (ft) <sup>1</sup>	15	15	15	15	15
Modeled Half-life (days)	NN	NN	NN	1751	832
Results					
Detection Limits (µg/L)	10	10	1	0.2	0.2
Concentration at Duwamish (ug/L)	<10	<10	<1	<0.01	<0.1


Fate and Transport Model Inputs and Results Showing no Discharge of IHSs to the Duwamish Table A1

## Precision Engineering, Inc. Seattle, Washington

Model Parameters	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3- cd)pyrene
Hydraulic Conductivity (k, cm/sec) <sup>b</sup>	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03
Gradient (i) <sup>c</sup>	0.003	0.003	0.003	0.003	0.003	0.003
Porosity (n) <sup>d</sup>	0.3	0.3	0.3	0.3	0.3	0.3
Groundwater Velocity (v, ft/yr) <sup>e</sup>	52	52	52	52	52	52
Retardation Factor <sup>5</sup>	3,433	11,809	11,809	3,822	17,176	33,313
Modeled Retardation <sup>g</sup>	- 10	10	10	10	10	10
Simulation Time (yrs)	35	35	35	35	35	35
Source Concentration (µg/L)	0.035	QN	QN	0.013	-0.038	0.039
Source Width (ft) <sup>h</sup>	300	300	300	300	300	300
Source Thickness (ft) <sup>1</sup>	15	15	15	15	15	15
Modeled Half-life (days) <sup>j</sup>	782	026	3,029	1,371	1,301	1,330
Results						
Detection Limits (µg/L)	0.01	0.01	0.01	0.01	0.01	0.01
Concentration at Duwamish (ug/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001



Table A2 Development of Site Specific Groundwater Clean-up Levels Precision Engineering, Inc. Seattle, Washington

Model Parameters	Chromium, Trivalent	Chromium, Hexavalent	Copper	Trichloro- ethene	Vinyl Chloride
Hydraulic Conductivity (k, cm/sec) <sup>b</sup>	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03
Gradient (i) <sup>c</sup>	0.003	0.003	0.003	0.003	0.003
Porosity (n) <sup>d</sup>	0.3	0.3	0.3	0.3	0.3
Groundwater Velocity (v, ft/yr) <sup>e</sup>	52	52	52	52	52
Retardation Factor	5334	102	118	1.9	1.18
Modeled Retardation <sup>g</sup>	10	10	10	1.9	1.18
Simulation Time (yrs)	35	35	35	35	35
Source Width (ft) <sup>h</sup>	300	50	225	40	200
Source Thickness (ft)	15	15	15	15	15
Half-life (days) <sup>j</sup>	NN	NN	NN	876	416
Concentration of groundwater discharge to surface water = Surface Water Criteria value (µg/L) <sup>k</sup>	74	11	3.1	1.5	0.025
Results (Source Area Concentration)					
Type I	3,600,000,000,000	160	22	188	18.70
Type II	NC	NC	NC	128,800	2,640
Type II with Half-life x factor of 2 for TCE and VC (µg/L)	NC	NC	NC	1,630	52



Table A2 Development of Site Specific Groundwater Clean-up Levels Precision Engineering, Inc. Seattle, Washington

Model Parameters	Benzo(a) anthracene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3- cd)pyrene
Hydraulic Conductivity (k, cm/sec) <sup>b</sup>	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03	5.00E-03
Gradient (i) <sup>c</sup>	0.003	0.003	0.003	0.003	0.003	0.003
Porosity (n) <sup>d</sup>	0.3	0.3	0.3	0.3	0.3	0.3
Groundwater Velocity (v, ft/yr) <sup>e</sup>	52	52	52	52	52	52
Retardation Factor <sup>5</sup>	3,433	11,809	11,809	3,822	17,176	33,313
Modeled Retardation <sup>g</sup>	10	10	10	10	10	10
Simulation Time (yrs)	35	35	35	35	35	35
Source Width (ft) <sup>h</sup>	300	300	300	300	300	300
Source Thickness (ft) <sup>i</sup>	15	15	15	15	15	15
Half-life (days)	782	026	3,029	1,371	1,301	1,330
Concentration of groundwater discharge to surface water = Surface Water Criteria value (µg/L) <sup>k</sup>	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038
Results (Source Area Concentration)						
Type I	NC	NC	NC	NC	NC	NC
Type II	200,000,000	165,000,000	55,000,000	130,000,000	135,000,000	132,000,000
Type II with Half-life x factor of 2 for TCE and VC (µg/L)	NC	NC	NC	NC	NC	NC



Table A3 Applicable Surface-Water Criteria Precision Engineering, Inc. Seattle, Washington

Surface-Water Criteria	Hexavalent Chromium (mg/L)	Dissolved Trivalent Chromium <sup>a</sup> (mg/L)	Copper (µg/L)	Trichloro- ethene (µg/L)	Vinyl chloride (µg/L)	Benzo(a) anthracene (µg/L)	Benzo(b) fluoranthene (µg/L)
MTCA Method B Surface Water CULs, carcinogen or non-carcinogen	0.490	240	2700	1.5	3.7	0.0300	0.0300
MTCA Method C Surface Water CULs, carcinogen or non-carcinogen	1.20	610	6,700	37	92	0.74	0.74
AWQC—Human Health	NR	NR	1,300	2.5	0.025	0.0038	0.0038
Surface Water ARAR—Aquatic Life—Freshwater/Acute	0.15	1.8.	4.6	NR	NR	NR	NR
AWQC-Aquatic Life-Chronic	0.011	0.074	3.1	NR	NR	NR	NR
*Lowest CUL bolded							



Table A3 Applicable Surface-Water Criteria Precision Engineering, Inc. Seattle, Washington

Surface-Water Criteria	Benzo(k) fluoranthene (µg/L)	Benzo(b+k) fluoranthene (µg/L)	Chrysene (µg/L)	Dibenzo(a,h) anthracene (µg/L)	Indeno(1,2,3- cd) pyrene (µg/L)	Diesel-Range Organics (mg/L)	Oil-Range Organics (mg/L)
MTCA Method B Surface Water CULs, carcinogen or non-carcinogen	0.0300	0.0300	0.0300	0.0300	0.0300	NN	NN
MTCA Method C Surface Water CULs, carcinogen or non-carcinogen	0.74	0.74	0.74	0.74	0.74	NN	NN
AWQCHuman Health	0.0038	NR	0.0038	0.0038	0.0038	NN	NN
Surface Water ARAR—Aquatic Life—Freshwater/Acute	NR	NR	NR	NR	NR	NN	NN
AWQC-Aquatic Life-Chronic	NR	NR	NR	NR	NR	NN	NN
*Lowest CUL bolded							

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Oil-Range Organics 0.505 U 0.495 U 0.495 U 0.52 U 0.58 U 0.57 U 0.495 U 0.51 U 0.495 U 0.51 U 0.51 U 0.58 U 0.512 0.54 U 1.04 mg/L 1.00 1.32 1.21 N A AN AN NA 1.2 Diesel-Range Organics 0.248 U 0.248 U 0.248 U 0.26 U 0.26 U 0.27 U 0.26 U 0.312 0.28 U 0.26 U 0.831 0.438 1.19 2.64 0.76 1.79 0.41 1.71 0.45 mg/L NA AN NA N AN 0.200 U 0.200 U 0.200 U 0.200 U chloride 0.200 U 0.200 U 0.14 U 0.80 J Vinyl 0.560 0.400 1U 10 10 10 10 hg/L 10 10 10 10 1 U 10 10 10 23 0.200 U 0.200 U 0.200 U 0.200 U 0.200 U Trichloroethene 0.200 U 0.200 U 1,630 10 10 110 10 10 1U 10 10 10 10 10 hg/L 10 10 22.1 10 7.9 Selenium 1.00 U 1.00 U 1.00 U 1000 U 2.0 U 2.0 U 2.0 U 2.0 U 12.3 6.28 4.11 4.27 2.77 hg/L 25 NA AN 10 NA AN NA 19 NA 3.6 5 Copper 1.00 U 1.00 U 2.0 U 2.0 U 2.0 U 2.0 U 1.00 U 2.0 U 1.03 1.17 4.02 2.12 hg/L 1.01 2.5 NA 3.67 2.4 5.1 AN AN AN NA NA 22 (Hexavalent) Chromium 0.00625 U 0.00625 U 0.00625 U 0.00625 U 0.00625 U 0.00625 U 0.00738 0.02 U 0.02 U 0.02 U 0.01 U 0.01 U 0.02 U 0.01 U 0.02U 0.02 U 0.02 U 0.02 UJ 0.01 U 0.023 0.269 0.15 mg/L 450 350 Dissolved Chromium 2,800,000,000 (Trivalent) 0.00215 0.00755 0.00879 0.00849 0.0106 0.021 0.0078 0.0187 0.013 0.047 0.021 NC mg/L NNN NC NCNC NC NC 47 Monitoring Well Groundwater Data Site-Specific Groundwater CUL for 12/27/2005 04/18/2006 12/28/2005 04/19/2006 12/29/2005 12/27/2005 04/18/2006 12/28/2005 12/29/2005 04/19/2006 12/28/2005 04/18/2006 04/18/2006 12/28/2005 12/28/2005 04/17/2006 04/19/2006 04/18/2006 6/16/2005 6/17/2005 6/9/2005 6/9/2005 6/7/2005 the Protection of Surface Water Date Location MW2 MW3 MW4 8MM MWB MW8 MW1 TWW

R:\8006.08 Stoel Rives LLP\Report\04\_Final RI RA Report 7.21.08\Appendices\Appendix A - BioChlor Modeling\ Page 1 of 4 App A T-Surf Water CUL and ScreenA4 screen



Chromium Chromium Copper Selenium Trichloro- Vinyl Diesel-Range Oil-Ra (Hexavalent) (Hexavalent) copper selenium ethene chloride Organics Organ	ער שלער hdyL hgyL bg/L שלער שלער שלער שלער שלער	00,000 0.15 22 25 1,630 52 NV NV		38 4.72 NA NA 5U 5U NA NA	1 236 NA NA 1U 1U 0.325 0.4781	C 0.0897 NA NA 1.U 1.U NA NA	3 300 NA NA 1,130 20 U NA NA	C 0.101 NA NA 1U 1U NA NA	1 294 NA NA 16.8 1U 0.814 0.4791	C NA NA NA 0.220 16.5 NA NA	
Date CTrival	/bm	ater CUL for 2,800,00 ce Water 2,800,00	undwater Data	6/9/2005 32.3	6/16/2005 31	6/16/2005 NC	6/16/2005 43	6/16/2005 NC	6/16/2005 61	12/14/2005 NC	



Indeno(1,2,3-cd) 000'000'26 U 06600.0 U 06600.0 0.00990 U U 06600.0 U 06600.0 0.0114 U 0.0100 U 0.0100 U L 950.0 0.0100 U 0.11 U 0.10 U 0.095 U 0.10 U 0.034 J 0.192 U 0.11 U 0.13 U pyrene 0.10 U hg/L AN NA NA AN 100,000,001 Dibenzo(a,h) anthracene U 06600.0 U 06600.0 0.0100 U 0.0100 U U 06600.0 U 06600.0 0.00990 U 0.038 J 0.0114 U 0.0100 U 0.095 U 0.192 U 0.11 U 0.10 U 0.095 U 0.10 U 0.11 U 0.10 U 0.13U NA AN NA hg/L AN 95,000,000 0.00990 U Chrysene U 06600.0 0.00990 U 0.00990 U 0.0100 U 0.0100 U 0.0100 U U 06600.0 0.013 J 0.014 J 0.11 U 0.095 U 0.192 U 0.11 U 0.10 U 0.10 U 0.10 U 0.13 U 0.132 hg/L AN AN NA NA **Buoranthene** Benzo(b+k) 0.031 U 0.030 U 0.039 U 0.033 U 0.032 U 0.034 U 0.032 U 0.031 U 0.030 U 0.962 U NA hg/L NA AN AN AN NA NA AN AN AN NA NA N AN luoranthene 38,000,000 U 06600.0 U 06600.0 U 06600.0 U 06600.0 0.00990 U 0.0100 U 0.0100 U 0.0100 U Benzo(k) 0.108 hg/L NA NA NA MA MA AN AN NA AN MA NA AN A AN 108,000,000 luoranthene U 06600.0 0.00990 U U 06600.0 U 000000 0.00990 U 0.0100 U 0.0100 U 0.0100 U Benzo(b) 0.104 AN AN NA NA NA NA NA AN NA AN AN NA NA NA 1/Bri 145,000,000 anthracene 0.00990 U 0.0100 U U 06600.0 U 06600.0 0.00990 U 0.0100 U U 0660.0 Benzo(a) 0.0100 U 0.095 U 0.10 U 0.035 J 0.029 J 0.192 U 0.031 J 0.11 U 0.10 U 0.10 U 0.13 U 0.107 hg/L NA NA NA AN Monitoring Well Groundwater Data Site-Specific Groundwater CUL for 2/27/2005 12/29/2005 12/28/2005 04/18/2006 12/28/2005 12/28/2005 04/18/2006 12/28/2005 04/19/2006 2/29/2005 04/17/2006 2/27/2005 04/18/2006 12/28/2005 04/19/2006 04/19/2006 04/18/2006 04/18/2006 6/16/2005 6/17/2005 6/7/2005 6/9/2005 6/9/2005 the Protection of Surface Water Date Location MW3 MW4 MW5 MW/6 MW2 MWB MW1 7WW

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		Benzo(a)	Derroth					
cation	Date	anthracene	fluoranthene	Benzo(K) fluoranthene	Benzo(b+k) fluoranthene	Chrysene	Dibenzo(a,h) anthracene	Indeno(1,2,3-cd) pyrene
		hg/L	hg/L	hg/L	ua/L	ng/l	110/1	110/1
pecific Grou otection of S	undwater CUL for Surface Water	145,000,000	108,000,000	38,000,000	NN	95,000,000	100,000,000	97,000,000
naissance	Groundwater Data							
SP2	6/9/2005	NA	NA	NA	NA	NA	NA	NIA
5P4	6/16/2005	0.191 U	0.954 U	NA	NA	0 101 11	0 101 11	11 404 0
3P5	6/16/2005	NA	NA	NA	NA	NA	NIA U	0.131.0
P6	6/16/2005	NA	NA	NA	NA	VIN	VIN	AN
P7	6/16/2005	NA	NA	NA	NA	NA	VIN	AN
P8	6/16/2005	0.194 U	0.97 U	NA	NA	0 104 11	0 104 11	U 101 U
0-13	12/14/2005	NA	NA	NA	NA	NA	NA NA	U.134 U NA
0-15	12/14/2005	NA	NA	NA	NA	NA	NA	VN

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Figure A1 Fate and Transport Modeling Trivalent Chromium Precision Engineering, Inc. Seattle, Washington



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Figure A2 Fate and Transport Modeling Hexavalent Chromium Precision Engineering, Inc. Seattle, Washington



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Figure A3 Fate and Transport Modeling Copper Precision Engineering, Inc. Seattle, Washington



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Figure A4 Fate and Transport Modeling Trichloroethene Precision Engineering, Inc. Seattle, Washington



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Figure A5 Fate and Transport Modeling Vinyl Chloride Precision Engineering, Inc. Seattle, Washington



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Figure A6 Fate and Transport Modeling Benzo(a)anthracene Precision Engineering, Inc. Seattle, Washington



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Figure A7 Fate and Transport Modeling Chrysene Precision Engineering, Inc. Seattle, Washington



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Figure A8 Fate and Transport Modeling Dibenzo(a,h)anthracene Precision Engineering, Inc. Seattle, Washington



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Figure A9 Fate and Transport Modeling Indeno(1,2,3,-cd)pyrene Precision Engineering, Inc. Seattle, Washington



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Fate and Transport Modeling for Site Specific CULs Precision Engineering, Inc. Hexavalent Chromium Seattle, Washington Figure A11



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Figure A13 Fate and Transport Modeling for Site Specific CULs TCE Precision Engineering, Inc.



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R:18006.08 Stoel Rives LLP\Report\04\_Final RI RA Report 7.21.08\Appendices\Appendix A - BioChlor Modeling\ App A Figure A10 through A20\A15 benzo(a)anth App A Figure A10 through A20VA15 benzo(a)anth





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## APPENDIX B

## **CROSS SECTION**





Preulaton Engineering, Ine. Santia, Washington

Pullet 2 - 4







Independent Remedial Action Report Procision Engineering, Inc. Seamle, Washington Page 2 - 10



## APPENDIX C

# BORING LOGS AND WELL DEVELOPMENT FORMS



#### Well Development Form



Project No. 8006.08.04 Date 12/21/2005 Site Location: Seattle, WA Well: MW-5 Name: Initial DTB: 19.60 Final DTB Precision Engineering 19.66 **Development Method:** P-pump/Bailer Initial DTW: 6.00 **Final DTW** 7.51 Pore Volume: Total Water Removed 24.75 gallons 2.22 gallons Water Contained 2" Yes Casing Diameter: Estimated Specific Capacity Meter No. Cum. Vol EC Time Removed Sand/Silt pH (uhos) Temp DO Eh Comments Pump on at 7:28; stop pump and surge 660.00 7:43 2.25 7.14 1,471 18.7 w/bailer. 6.73 7:54 4.50 396.00 1,487 19.2 Water is electric yellow/orange. 8:07 6.75 147.50 6.56 1,388 19.2 8:17 9.00 1,346 77.30 6.12 19.1 8:32 11.25 47.40 5.96 1,369 19.0 8;46 13.89 5.89 1,337 13.50 19.2 1,329 9:02 15.75 271.00 5.84 19.1 Stopped pump and surged w/bailer. 9:11 18.00 61.80 5.79 1,322 19.2 9:22 20.25 21.50 5.76 1,316 19.1 9:33 22.50 5.67 5.74 1,317 19.1 9:46 24.75 3.32 5.71 1,314 19.0

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### Well Development Form



Project No. Site Location: Name:		8006.08.04 Seattle, WA Precision Engineering			Date 12/16 & 21/2005 Well: MW-6				
					Initial DTB:	19.85		Final DTB 19.86	
Developme	ent Method:	P-pump/Bailer			Initial DTW: 5.09		0.40	Final DTW dry	
Water Con	r Removed	41.5 gallons			Casing Diameter		2.40 gallons		
Estimated Specific Capacity					Meter No.				
Time	Cum. Vol Removed	Sand/Silt	pН	EC. (µhos)	Temp	DO	Eh	Comments	
12:37	5.0	116.9	7.07	3,290	. 17.6			12/16/05. Conductivity won't calibrate. Orangish yellow color.	
12:46	10.0	81.7	6.24	2,960	17.9			Surged right after 10.0 gal w/bailer.	
12:58	12,5	228.0	6.34	2,900	17.3			Well went dry after approximately 14 gal. Pump back on at 13:58. Clear w/yellowish tint. Surged w/bailer.	
14:02	15.0	121.9	6.49	1,913	17.2	-			
14:21	17.5	117.2	6.55	1,775	16.7				
14:55	20.0	49.5	6.52	1,722	15,5				
15:15	22.5	28.1	6.53	1,701	15.0				
13:24	25.0	127.1	6.78	1,866	16.6			12/21/05. Surged with bailer.	
13:33	27.5	332.0	6.50	1,820	17.4				
13:41	30.0	122.3	6.46	1,751	17.6				
13:51	32.5	103.1	6.35	1,749	17.6	й.		Yellow/orange in color.	
14:03	35.0	60.7	6.36	1,767	17.3		-		
14:20	37.5	91.2	6.51	1,741	17.1			Well went dry.	
15:05	40.0	47.1	6.55	1,800	17.0			Well went dry.	
15:30	41.5	117.0	6.52	1,750	17.1			Well went dry.	
		1.0.0.01			· · · · · · · · · · · · · · · · · · ·				
	1.5.1								
	1								
1									
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## Well Development Form



Project No Site Locati	on:	8006.08.04 Seattle, WA			Date 1 Well: M	2/19 & 21 /IW-7	/2005	1. 8. 1.
Name:		Precision En	gineering		Initial DTB:	30.00		Final DTB 31.3
Development Method: P-pump,				iler	Initial DTW:	6.10		Final DTW dry
Total Wate Water Con Estimated	r Removed tained Specific Ca	5 Y pacity	4.0 gallons /es	5	Pore Volume: Casing Diame Meter No.	eter:	3.9 gal 2"	lons
Time	Cum. Vol Removed	Sand/Silt	pН	EC (μhos)	Temp	DO	Eh	Comments
11:19	8.0	358.0	7.75	2,080	15.5			12/19/05. Surged w/bailer before pumping.
11:49	12.0	644.0	7.47	1,970	16.9			
12:32	16.0	428.0	7.28	1,980	16.9			
13:06	20.0	342.0	7.16	2,060	16.4			Switch to a bailer.
13:32	24.0	411.0	7.15	1,980	16.3			
14:00	28.0	130.2	7.04	2,000	16.4			
14:25	32.0	87.3	7.02	2,000	16.4			·
14:40	36.0	73.6	6.97	1,970	16.5			
15:00	40.0	50.1	6.96	1,970	16.4			
15:10	42.0	54.7	6.95	2,000	16,4			
10:33	43.0	474.0	6.78	1,555	16.5			12/21/05. DTB = 31.15 DTW = 5.49
10:45	44.0	173.2	6.82	1,199	16.0			Surge w/bailer.
10:52	45.0	171.2	6.76	1,194	16.7			
10:57	46.0	219.0	6.72	1,193	16.5			
11:08	48.0	98.6	6.74	1,190	16.2			
11:27	50.0	29.6	6.74	1,186	16.1		-	
11:43	52.0	15.05	6.75	1,176	16.1			
12:04	54.0	5.69	6.79	1,165	16.3			Clear w/slight yellow tint.

Page 1 of 1



## Well Development Form



Project No. Site Locatio	on:	8006.08.04 Seattle, WA	aineerina		Date Well: I	12/19 & 20 MW-8 18 10	/2005	Final DTR 19.55	
Developme Total Wate Water Con Estimated	ent Method: r Removed tained Specific Cap	Frecision Er F 2 pacity	P-pump/Bai 9.0 gallons /es	ler	Initial DTB: Pore Volume: Casing Diame Meter No.	3.90 eter:	2.3 gall 2"	Final DTW dry ons	
Time	Cum. Vol Removed	Sand/Silt	рН	EC (μhos)	Temp	DO	Eh	Comments	
14:38	4.5	>1,000	7.02	2,040	16.7		1.0	Well went dry after one pore volume.	
15:12	7.0	>1,000	6.93	1,970	16.5	-		Let recharge.	
15:58	9.3	171.0	6.49	2,130	15.4				
7:36	11.6	689.0	7.23	2,260	16.0		_	12/20/05. Surge w/bailer. Sheen in purge water. Purge w/bailer.	
8:33	13.9	726.0	7.16	2,220	15.5				
10:17	16.2	303.0	7.25	2,240	13.6			Switched back to p-pump.	
11:04	18.5	429.0	6.79	2,100	15.5				
12:17	20.8	308.0	7.11	2,060	13.6	1			
13:30	23.1	115.6	6.58	2,010	15.4				
14:34	25.4	83.7	6.57	1,970	15.3			1	
15:12	26.5	63.4	6.52	1,960	15.2				
15:39	27.7	60.7	6.55	1,930	14.9			Yellow tint with sheen.	
15:51	28.4	44.3	6.52	1,950	14.9			the second second second second second second second second second second second second second second second se	
16:05	29.0	27.7	6.53	1,974	14.8				

Page 1 of 1















	Foster &	Alongi, I	Inc.	Project N	lumber	Well Number	Sheet		
-	tana di mana			0053.0	1.03	GP-11	1 of 1		
Project Name     Precision Engineer       Project Location     1231 S. Director S       Start/End Date     6/17/05 to 6/17/05       Driller/Equipment     Boart Longyear/G       Geologist/Engineer     A. Hughes       Sample Method     Direct Push				ring treet, Seattle, WA eoprobe	9 <i>8108</i>	TOC Elevation (reet) Surface Elevation (fee Northing Easting Hole Depth Outer Hole Diam	TOC Elevation (feet)		
(S)	Well		s Sam	ple Data	e0	Soil Description			
(feet, BG	Details	Interval Percent Recover	Collectio Method	Name (Type)	Blows/6 Litholog Column				
1 2 3 4 5 6 7	1	95% - 100% - 100%	GP GP GP	GP11-S-2.0 GP11-S-6.5		<ul> <li>0 to 0.4 feet: CONCRETE.</li> <li>0.4 to 4.0 feet: SILTY SAND with GRAV brown; 30% fines, nonplastic; 55% s gravel, fine to coarse, subangular to</li> <li>4.0 to 7.0 feet: SANDY SILT (ML); dark reddish brown mottling; 70% fines, p trace fine, subrounded gravel; damp</li> <li>@ 6.5 feet: Moist to wet.</li> <li>Refusal at 7.0 feet bgs.</li> </ul>	EL (SM); dark yellowish sand, fine to coarse; 15% angular; firm; dry. yellowish brown with nonplastic; 30% sand, fin o to moist.		
	8								
		6							

0053.01\GP1-GP11.GP1.8/75/07





































GBLWC WYGINTWARROJECTSID053.01/GP1-GP11.GPJ 8/25/07



Project Name Project Location Staff-End Date     Proclation Engineering 1313/05 to 137.005     TOC Elevation (feet) Surface Elevation (feet) Northing       Drille/Equipment     Cascade Drilling/Geoprobe     Easting Easting       Cascade Drilling/Geoprobe     Easting       Sample Method     Direct Push     0.00 a 0.0 feet. COM/CRETE.       Drille/Equipment     Sample Cata     Sall Description       Barged     Defails     Barged     Sample Cata       Barged     Barged     Sample Cata     Sall Description       Barged     Barged     Barged     Sall Description       Image: Sample Cata     Barged     Sall Description       Barged     Barged     Barged     Barged       Image: Sample Cata     Barged     Barged<	Vlaul I	Foster &	Alor	ngi, I	Inc,		Project N	Ge	er	Borehole Log/Well Co	Sheet
Group         Weit         Sample Data         Sail Description           1	Project Name     Precision Engine       Project Location     1231 S. Director S       Start/End Date     12/13/05 to 12/13/       Driller/Equipment     Cascade Drilling/       Geologist/Engineer     M. Gibson       Sample Method     Direct Push			eering Stree /05 /Geoj	8006.0 I I, Seattle, Wa probe	18.04 ashir	ngton 9810	GP12 1 of 1 TOC Elevation (feet) Surface Elevation (feet) Northing Easting Hole Depth B.0-fee Outer Hole Diam 3 1/4-h			
1     1     50%     GP       1     1     50%     GP       2     1     1     1       2     1     1     1       2     1     1     1       3     1     1     1       4     1     1     1       5     1     1     1       5     1     1     1       6     1     1     1       7     1     1     1       8     1     1     1       8     1     1     1       9     1     1     1       9     1     1     1       1     1     1     1       2     1     1     1       3     1     1     1       4     1     1     1       5     1     1     1       6     1     1     1       7     1     1     1       8     1     1     1       8     1     1     1       9     1     1     1       1     1     1     1       1     1     1     1 <t< th=""><th>Depth (feet, BGS)</th><th>Well Details</th><th>Interval</th><th>Percent Recovery</th><th>Collection Method Co</th><th>Number du</th><th>Data Name (Type)</th><th>Blows/6"</th><th>Lithalogic Column</th><th>Soil Descriț</th><th>ofion</th></t<>	Depth (feet, BGS)	Well Details	Interval	Percent Recovery	Collection Method Co	Number du	Data Name (Type)	Blows/6"	Lithalogic Column	Soil Descriț	ofion
	1 00 00 00 00 00 00 00 00 00 00			50%	GP		GP12-S-3.0 GP12-S-5.0			0 to 0.5 feet: CONCRETE. 0.5 to 8.0 feet: GRAVELLY SAN nonplastic; 60% sand, fine to medium, angular to subround @ 4.0 feet: Increase in coursene medium. @ 5.0 feet: Wet. Tofal Depth: 8.0 feet bgs.	D with SILT (SW); 15% fines, medium; 25% gravels, fine to ded; dry.



Vaul Foste	r & Al	ongi	i, lı	nc.	1	Project N	lumb	er	Well Number GP13		Sheet 1 of 1
Project Name Project Locatio Start/End Date Driller/Equipm Geologist/Eng, Sample Metho	recisio 231 S. 2/14/05 ascad I. Gibs irect P	on El Dire 5 to : e Dr on Push	ngine ctor \$ 12/14/ Illing/	ering Stree 105 'Geoj	8006.0 I I, Seattle, Wa probe	ashir	ogton 9810	GP13 1 of 1 TOC Elevation (feet) 8 Surface Elevation (feet) Northing Easting Hole Depth 10.0-feet Outer Hole Diam 3 1/4-inch			
is We	1		2	s Sal	nple	Data		,g	Soil Descri	ption	
Depth (feet, BG	lls	Percent	Recover	Collectio	Number	Name (Type)	Blows/6	Litholog Column			
10.0.01.	1	75	%	GP	-				0 to 0.5 feet: CONCRETE.		T.
0000000           1         0000000           0000000         0000000           0000000         0000000           0000000         0000000           0000000         0000000           0000000         0000000           00000000         0000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           00000000         00000000           000000000         00000000           0000000000000000         000000000000000000000000000000000000	019019090909090909090909090909090909090	<b>–</b> 75	5%	GP GW		GP13-S-1.0 GP13-S-6.0 GP13-W-8.0			0.5 to 3.5 feet: SILTY SAND (SI nonplastic; 70% sand, fine, o 3.5 to 4.5 feet: SILT with SAND plasticity; 15% sand, fine; m 4.5 to 8.0 feet: GRAVELLY SIL brown; 70% fines, low to me 20% gravels, fine to medium @ 6.0 feet: Wet.	M); dark brot lense; damp (ML); dark l oist. T with SANE dium plastic n; moist.	wn; 30% fines, brown; 85% fines, low (ML); dark graylsh ity; 10% sand, fine;
10 00000000	000	1 MILLING									
TO BAGAGAG	ad						-		Total Depth: 10.0 feet bgs		
						**					
NOTES: 1) Abi	andon bon	ehole w	vith 3/	/B-inch	bont	onite chips hyd	rated	with potable	water. 2) GP = geoprobe.	_	



Maul Foster & Alongi, Inc.				Project N 8006.0	Vumber 08.04	Well Number GP14	Sheet 1 of 1	
Project Name Precision Enginee Project Location 1231 S. Director St Start/End Date 12/13/05 to 12/13/0 Driller/Equipment Cascade Drilling/G Geologist/Engineer M. Gibson Sample Method Direct Push				ing eet, Seattle, W coprobe	ashington 9810	TOC Elevation (feet) Surface Elevation (feet) Northing Easting Hole Depth 8.0- Outer Hole Diam 3 1/		
Deptin (feet, BGS)	Weli Details	Interval Percent Recovery	Collection Method S	Name (Type)	Blows/6" Lithologic Column	Soil Desc	ription	
1 2 3 4		100%	GP GP	GP14-S-3.0		0 to 0.5 feet: CONCRETE. 0.5 to 1.0 feet: SILTY SAND w fines, nonplastic; 60% sand subangular, dry. 1.0 to 7.0 feet: SANDY SILT w 70% fines, nonplastic; 20% medium, subangular, dry.	ith GRAVEL (SM); brown; 30% I, fine; 10% gravels, fine to medi ith GRAVEL (ML); yellowish bro sand, fine; 10% gravels, fine to	
5 6 7 8		- 100%	GP	GP14-S-6.0		7.0 to 8.0 feet: SILTY SAND w brown; 30% fines, nonplast gravels, fine to medium; we Total Depth: 8.0 feet bgs.	ith GRAVEL (SM); light yellowisi lic; 60% sand, fine to course; 10 st.	
0	1 20 20 20 20 20 1				<u> </u>	Total Depth: 8.0 feet bgs.	-	
			:					
2010								
0115-01-01-01-01-01-01-01-01-01-01-01-01-01-								
IL LOOCA LO INGONO							~	
NOTE	E <b>S:</b> 1) Abandon	borehole with 3	/8-inch be	ntonile chips hyd	rated with potable	water. 2) GP = geoprobe.		




WYGINTIGINTWAPROJECTS9006.08\GP12-GP3Z.GPJ 8/25/07



Project Name Project Location 1231 S. Director Street, Seattle, Washington 98108     TOC Elevation (feet) Surface Deviation (feet) Street Street, Seattle, Washington 98108       Drillar Equipment Sample Method     Director Street, Seattle, Washington 98108     Surface Elevation (feet) Street Street, Seattle, Washington 98108       Top Muthod     Director Street, Seattle, Washington 98108     Surface Elevation (feet) Street Street, Seattle, Washington 98108       Top Muthod     Direct Pash     Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method     Tops Sample Data       Top Sample Method </th <th>laul</th> <th>Foster &amp;</th> <th>Alongi,</th> <th>Inc.</th> <th></th> <th>Project Nu 8006.08</th> <th>mber .04</th> <th>gio</th> <th>Well Number GP16</th> <th></th> <th>Sheet 1 of 1</th>	laul	Foster &	Alongi,	Inc.		Project Nu 8006.08	mber .04	gio	Well Number GP16		Sheet 1 of 1
Well     Sample Data     Source       1     Source     100%     OP       1     Source     100%     OP       2     Source     0.5 to 8.0 feet: CONCRETE.       3     Source     0.5 to 8.0 feet: SUTY SAND with GRAVEL (SM); gray with iron staining; 20% fines, nonplestic; 65% sand, fine; 15% gravels, fine to medium, angular to subrounded; damp.       3     Source     0.5 to 8.0 feet: Color change to yellowish brown; dry.       4     Source     0.5 to 8.0 feet: Dry.       5     Source     0.5 to 8.0 feet: Dry.       6     Source     0.5 feet: Color change to yellowish brown; dry.       6     Source     0.5 feet: Dry.       6     Source     0.5 feet: Dry.       6     Source     0.5 feet: Color change to yellowish brown; dry.       7     Source     0.5 feet: Dry.       8     Source     0.5 feet: Color change to yellowish brown.       9     Source     0.5 feet: Color change to yellowish brown.       9     Source     0.5 feet: Color change to yellowish brown.       9     Source     0.5 feet: Color change to	Proj Proj Star Drille Geo San	ect Name ect Location t/End Date er/Equipment logist/Engineer pple Method	Precision 1231 S. Dir 12/13/05 to Cascade D M. Gibson Direct Pus	Engine rector : 12/13, prilling/ h	eering Street, S /05 /Geopro	Seattle, Was	hingtor	n 9810	TOC Elevation (feet) Surface Elevation (feet) Northing Easting Hole Depth 10.5-feet Outer Hole Diam 3 1/4-incl		
Operation       Test Handbard         1 <th>6</th> <th>Well</th> <th></th> <th>~ Sa</th> <th>mple Da</th> <th>ta</th> <th></th> <th>2</th> <th>Soil Descrip</th> <th>tion</th> <th></th>	6	Well		~ Sa	mple Da	ta		2	Soil Descrip	tion	
1       1	Uepth (feet, BGS	Details	Interval Percent Recovery	Collection	Number	nme (Type)	Blows/6"	Calumn			
1       decision         1       decision         2       decision         2       decision         3       decision         4       decision         4       decision         4       decision         5       decision         6       decision         6       decision         7       decision         7       decision         8       decision         8       decision         9       decision         9       decision         9       decision         9       decision         10       decision         11       decision         12       decision         13       decision         14       decision         15       decision         16       decision         17       decision         18       decision         19       decision         10       decision         10       decision         10       decision         10       decision         10       dec		11.05 01.05	100%	GP			61.6	- 1'a' !	0 to 0.5 feet: CONCRETE.		
4       600 0000000000000000000000000000000000	1 2 3	2 1 1 1 1 1 1 1 1 1 1 1 1 1			Gi	P16-S-1.0			0.5 to 8.0 feet: SILTY SAND with staining; 20% fines, nonplastic fine to medium, angular to sul @ 3.0 feet: Color change to yello	GRAVEL (S ; 65% sand, prounded; da wish brown:	M); gray with iron fine; 15% gravels, mp. drv.
6       Boold State         7       Boold State         7       Boold State         8       Boold State         8       Boold State         9       Boold State         10       Boold State <tr< td=""><td>4 5</td><td><u><u><u>p</u></u> <u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u></u></u></td><td>- 100%</td><td>GP</td><td>G</td><td>P16-S-5,0</td><td></td><td></td><td>@ 4.0 feet: Water in the top of th</td><td>e sample,</td><td></td></tr<>	4 5	<u><u><u>p</u></u> <u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u>p</u><u></u></u>	- 100%	GP	G	P16-S-5,0			@ 4.0 feet: Water in the top of th	e sample,	
7       Ströngsröge dröngsröge strönge ströngsröge ströngsröge	6	00000000000000000000000000000000000000							@ 6.0 fest: Dry.	į.	
8       Durd Of Dige         9       Dige of Dige </td <td>7</td> <td></td> <td>- 100%</td> <td>GP</td> <td></td> <td></td> <td></td> <td></td> <td>@ 7.0 feel: Wet.</td> <td></td> <td></td>	7		- 100%	GP					@ 7.0 feel: Wet.		
10       9.5 feet: Color change to yellowish brown.         10       5050000000000000000000000000000000000	9								8.0 to 10.5 feet: SANDY SILT will fines, nonplastic, stiff, 20% se medium, subrounded; dry.	h GRAVEL ( Ind, fine; 109	ML); light gray; 70 6 gravels, fine to
Total Depth: 10.5 feet bgs. Hit refusal.	10	000000000 00000000 00000000 000000000 0000							@ 9.5 feet: Color change to yello	wish brown.	÷
		0000000000		<u> </u>			<u>l'el</u>	1.12	Total Depth: 10.5 feet bgs. Hit re	fusal.	
	NOTE	ES: 1) Abandon i	borehole with	3/8-inch	h bentonit	e chips hydrai	ted with (	potable	water. 2) GP = geoprobe.		



Vlau	I Foster &	Alongi, I	nc.	Project Nurr	aber	Well Number GP17	Sheet 1 of 1
Proj Proj Stal Drill Get San	iect Name iect Location t/End Date er/Equipment ologist/Engineer ople Method	Precision E 1231 S. Dir 12/13/05 to Cascade D M. Gibson Direct Pusi	Engineer ector Stu 12/13/05 rilling/G	ing reet, Seattle, Wesh i eoprobe	ington 98108	TOC Elevation (feet Surface Elevation (f Northing Easting Hole Depth Outer Hole Diam	) 9et) 8.0-feet 3 1/4-inci
Depth feet, BGS)	Well Details	Interval Percent Recovery	Collection Method S	ole Data Name (Type)	Lithologic Column	Soil Description	
1 2 3 4 5 6 7 8		100%	GP GP	GP17-S-1.0 GP17-S-6.0		<ul> <li>D to 0.5 feet: CONCRETE.</li> <li>D to 0.5 feet: SANDY SILT with GR. fines, nonplastic; 20% sand, fine; angular to subrounded; damp.</li> <li>6.0 feet: Color change to gray; weating to be an angular to subrounded; damp.</li> <li>To to 8.0 feet: SANDY SILT (ML); ye staining; 70% fines, nonplastic; 30 damp.</li> <li>Total Depth: 8.0 feet bgs.</li> </ul>	AVEL(ML); dark brown; 70 10% gravels, fine to mediu 10wish brown with iron 1% sand, fine to medium;
	ES: 1) Abandon	parahole with i	a/8-inch h	antonile chins hydrate	d with polable w	aler. 2) GP = geoprobe.	



	1.5	A.1			Barbart	G	eologia	Borehole Log/Well C	Construction
nau	I Foster &	Along	i, in	C.	Project . 8006,	08.04	ber	GP18	1 of 1
Pro Pro Sta Drill Geo Sar	ject Name ject Location rt/End Date ler/Equipment blogist/Engineer nple Method	Precision 1231 S. 12/13/04 Cascad M. Gibs Direct F	on En Direc 5 to 1: ie Dril ion Push	gineer tor Str 2/13/05 ling/Ge	ing reet, Seattle, W 5 eoprobe	lashii	ngton 981	TOC Elevatio 08 Surface Elev Northing Easting Hole Depth Outer Hole D	on (feet) ation (feet) 4.0-feet Nam 3 1/4-inch
Depth (feet, BGS)	Well Details	Interval Percent	Recovery	Samp Method	ble Data Name (Type)	Blows/6*	Lithologic Column	Soil Desc	ription
_	1.0.01.01	10	0% 0	3P		1	1.1.1.1.	0 to 0.5 feet: CONCRETE.	
1 2 3	1	- 10	0% (	3P	GP18-S-1.0			0.5 to 4.0 feet: SILTY SAND w fines, nonplastic; 70% sand medium; odor, damp. @ 2.0 feet: Color change to de @ 2.5 feet: Color change to ye	ith GRAVEL (SM); light gray; 20% d, fine, dense; 10% gravels, fine to ark brown; dry. ellowish brown.

NOTES: 1) Abandon borehole with 3/8-inch bentonile chips hydrated with potable water. 2) GP = geoprobe.

GBLWC WAGINTIGINTWIPROJECTS9006.08/GP12-GP32.GPJ 8/25/07

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Mau	l Foster &	Alongi,	Inc.	Project /	Number	Well Number GP19	Sheet 1 of 1
Pro Pro Sta Dril Geo Sar	ject Name ject Location rt/End Date ler/Equipment blogist/Engineer nple Method	Precision I 1231 S. Dir 12/13/05 to Cascade D M. Gibson Direct Pus	Engine rector 12/13 brilling h	ering Street, Seattle, W /05 'Geoprobe	ashington 9810	TOC Elevation Surface Elevation Northing Easting Hole Depth Outer Hole D	n (feet) ation (feet) 9.5-feet iam 3 1/4-inc
Depth Teet, BGS)	Well Details	nterval Percent Recovery	Collection Method Co	mple Data	Biaws/6" Lithologic Column	Soil Desc.	ription
1 2 3 4 5		100%	GP GP	GP19-S-1.0 GPDUP-S-1.	p	<ul> <li>0 to 0.5 feet: CONCRETE.</li> <li>0.5 to 2.0 feet: SILTY SAND w. mottling; 30% fines, nonplatine to medium, angular to s</li> <li>2.0 to 8.0 feet: SANDY SILT (N plasticity, stiff; 40% sand, finesticity, stiff; 40% sand, fines</li></ul>	ith GRAVEL (SM); gray with brown stic; 60% sand, fine; 10% gravels, subrounded; damp. AL); dark brown; 60% fines, low ne; damp to moist. to medium.
almtaalmataalmat	(10)     (10)	- 100%	GP	GP19-S-7.0		@ 7.0 feet: Wet. 8.0 to 9.5 feet: SILTY SAND w 30% fines, nonplastic; 60% medium; dry. Total Depth: 9.5 feet bgs.	ith GRAVEL (SM); yellowish brow sand, fine; 10% gravels, fine to
EC DIMUNUMER I COL 22,000 W WANT							







Media     Project Name     Project Name     Project Name     OPCI     Elevation     Index       Project Name     Project Name     Project Name     Project Name     For Clevation Engineering     TOC Elevation (feel)     1 of 1       Project Name     Project Name     Project Name     Project Name     For Clevation (feel)     Northing       Startford Date     Caseade Dring     Startford Date     Startford Date<	Maul Easter	P Alar		-	_	Desired	Ge	ologic	Borehole Log/Well Const	Sheet
Project Name         Proceion Engineering         TOC Elevation (feel)           Project Loading         737 5.0 Mindfaufprose         Santa Elevation (feel)           Project Loading         Causcade DrillingGeographic         Barting           Causcade DrillingGeographic         Causcade DrillingGeographic         Barting           Causcade DrillingGeographic         Direct Pueb         Causcade DrillingGeographic         Barting           Causcade DrillingGeographic         Santa Elevation (feel)         Santa Elevation (feel)         Santa Elevation (feel)           Causcade DrillingGeographic         Mindli         Santa Elevation (feel)         Barting           Causcade DrillingGeographic         Mindli         Barting         Santa Elevation (feel)           Causcade DrillingGeographic         Mindli         Barting         Santa Elevation (feel)           Causcade DrillingGeographic         Santa Elevation (feel)         Santa Elevation (feel)           Causcade DrillingGeographic         Barting (feel)         Barting (feel)           Causcade DrillingGeographic         Data         Santa Elevation (feel)           Causcade DrillingGeographic         Santa Elevation (feel)         Santa Elevation (feel)           Causcade DrillingGeographic         Santa Elevation (feel)         Santa Elevation (feel)           Causcade DrillingGe	naul Foster	& Alon	gı, II	nc.		Project N 8006.0	umbe 8.04	r	GP21	1 of 1
Grad     Media     Sample Data     Sample Data       B     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B       I     B     B     B     B     B     B     B       I     B     B     B     B     B     B     B     B       I     B     B     B     B     B     B     B     B       I     B     B     B     B     B     B     B       I     B     B	Project Name Project Locatio, Start/End Date Driller/Equipme Geologist/Engli Sample Method	Precis n 1231 5 12/14/ nf Casca neer M. Git d Direct	sion El S. Dire 05 to ade Dr bson t Push	ngine ector ( 12/14/ illing/	ering Stree /05 /Geoj	t, Seattle, Wa orobe	nshing	gton 98108	TOC Elevation (feet) Surface Elevation (fe Northing Easting Hole Depth Outer Hole Diam	99f) 8,0-feet 3 1/4-incl
and year     Dotatis     Result of the second secon	(S) Wel		È.	s Sa	mple	Data	I.		Soil Description	
1     50%     6P       2     50%     6P       3     50%     6P       4     50%     6P       5     60%       5     60%       6     50%       6     50%       6     60%       7     50%       6     50%       6     60%       7     50%       6     50%       6     50%       7     50%       6     50%       6     50%       7     50%       6     50%       8     60%       7     50%       6     50%       7     50%       7     50%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%       8     60%	(feet, B)	2 Interval	Percent	Collecti Method	Numbe	Namə (Турв)	Blows/R	Columr		ŵ
	1         1		50%	GP GP		GP21-S-1.0			0 to 0,5 feet: CONCRETE. 0.5 to 4.0 feet: SILTY SAND with GRA brown; 20% fines, nonplastic; 70% fine, subangular; dry to damp. (2.0 feet: Color change to gray; dan 4.0 to 8.0 feet: SILTY SAND (SM); da low to medium plasticity; 65% sand (2.0 feet: Wet. Total Depth: 8.0 feet bgs.	AVEL (SM); light yellowish sand, fine; 10% gravels, np. nc blackish brown; 35% fine d, fine; moist.
								÷	4 4	
NOTES: 1) Abandon borehole with 3/8-inch bentonile chips hydrated with potable weller. 2) GP = geoprobe.	NOTES: 1) Aba	ndon borehole	e with 3.	/8-inch	bent	onile chips hyd	ated w	vith potable v	vefer. 2) GP ≈ geoprobe.	



laul	Foster &	Alongi, I	nc.	Project Numb	ber	Well Number		Sheet
Proje Proje Stan Drille Geol Sam	ect Name ect Location t/End Date er/Equipment logist/Engineer aple Method	Precision E 1231 S. Dir 12/13/05 to Cascade D M. Gibson Direct Pusi	Enginee ector S 12/13/0 rilling/0	suus.us.04 ring treet, Seattle, Washin 5 Geoprobe	ngton 9810	TOC Elevi TOC Elevi Surface E Northing Easting Hole Dept Outer Hole	l ation (feet) levation (feet) h e Diam	12.0-fee 3 1/4-inc
(SE	Well	.5.	s Sam	pie Data	9	Soil De	escription	0.0°
Jepth feet, Bl	Detans	nterval <sup>D</sup> ement	Collecti	Name (Type) Name (Type)	Column			
		100%	GP		1	0 to 0.5 feet: CONCRETE.		
1 2 3				GP22-S-1.0		0,5 to 12.0 feet: SILTY SAN fines, nonplastic; 70% se angular to subrounded; o	ID with GRAVEL and, fine; 10% g dry.	. (SM); brown; 20% ravels, fine to mediu
4		- 100%	GP			@ 3.0 feet: Color change to	yellowish browi	n.
5				GP22-S-5.0		@ 5.0 feel; Color change to	gray; increase	in density.
6 7	57575757575 19575757575 2797757575 29975757575 29975757575 29975757575 299757575 295757575 295757575 29575757575 29575757575 29575757575 2957575757575 29575757575 2957575757575 29575757575 2957575757575 29575757575 29575757575 29575757575 29575757575 295757575 295757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 29575757575 2957575757575 29575757575 29575757575757575 2957575757575757575 2957575757575757575757575757575757575757	- 100%	GP					
8 9	60000000 00000000 00000000 00000000 00000	- 100%	GP					
10	00000000000000000000000000000000000000	- 100%	GP	GF22-S-10.0		@ 10.0 feet: Color change l	to brown; wet.	
14						@ 11.0 feet: Color change I	la yellowish brov	vn; dry.
NOTE	S: 1) Abandon l	borehole with 3	VB-Inch L	entonite chips hydrafad	with potable	water. 2) GP = geoprobe.		











Viaul Fost	er & A	longi, l	nc.	Project Nu 8006.08	mber .04	Well Number GP25	Sheet 1 of 1
Project Nam Project Loca Start/End Da Driller/Equip Geologist/En Sample Meth	e tian te ment igineer nod	Precision I 1231 S. Dir 12/12/05 to Cascade D M. Gibson Direct Pus	Enginee rector S 12/12/0 rilling/0 h	ering treet, Seattle, Was 25 Geoprobe	shington 981	TOC Elevation (f Surface Elevation Northing Easting Hole Depth Outer Hole Diam	eet) n (feet) 10.0-feet 3 1/4-inch
eet, BGS) eet, BGS) ad S	/ell tails	iterval ercent ecovery	ollection lethod S	Name (Typs)	lows/6" ühologic olumn	Soil Descripti	on
		5 0.00	OS	2	OL D	A to 0.5 foot: ASPHALT	
<ul> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li> <li>1</li></ul>		- 100%	GP	GP25-S-1.0		0.5 to 7.0 feet: SAND with GRAVE 85% sand, fine, dense; 15% gr subrounded; dry.	:L (SW); light gray; trace fines; avels, fine to medium, angular
6 5000000 5000000 5000000 500000000		- 100%	GP	GP25-S-7.0		7.0 to 10.0 feet: SANDY SILT (ML) 30% sand, fine to medium; wet	; brownish gray; 70% fines;
10 82828	gol Sna				<u> Aug(</u> 1.	.] Total Dəpth: 10.0 feet bgs.	
				10 <sup>7</sup>			
NOTES: 1) AL	pandon bo	vrahole with 3	/8-Inch b	entonite chips hydral	ed with potable	water, 2) GP = geoprobe.	







Maul Foster	& Alongi	, Inc.	<u> </u>	Project N	Geologic	Borehol	e Log/Wel Vell Number GP27	Construc	Sheet
Project Name Project Location Start/End Date Driller/Equipment Geologist/Engine Sample Method	Precisio 1231 S. 12/12/05 Cascade er M. Gibso Direct P	n Engin Director to 12/1 Drilling on ush	eering Stree 2/05 g/Geop	t, Seattle, Wi	ashington 9810	8	TOC Elev Surface E Northing Easting Hole Dept Outer Hol	ation (feet) levation (feet) th e Diam	13.5-feet 3 1/4-inch
Well Details	nterval <sup>2</sup> ercent	Collection Method to	ample Imperation	Data Nama (Type)	Blows/6" Lithologic Column		Soil D	escription	
1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1           1         1         1         1         1	- 100 - 100 - 100	% GP % GP % GP		GP27-S-1.0 GP27-S-6.5		0 to 0.5 feet 0.5 to 13.5 f 85% sar subroun 0 6.0 feet: yellow, 0 8.0 feet:	ASPHALT. eet: SAND with nd, fine, dense; ded; dry. Color change to Decrease in co	GRAVEL (SW); 15% gravels, find o slight pinkish ca	light gray; trace fines; a to medium, angular to plor with spots of s, fine.
12 00000000 000000000 0000000000 00000000	- 100	% GP		GP27-S-13.0	0				
								-1	







Mau	I Foster &	Alongi, li	nc.	G Project Num 8006.08.0	eologic	Borehole Log/Well ( Well Number GP29	Constructio	Sheet 1 of 1
Pro Pro Sta Drill Geo Sar	ject Name ject Location nt/End Date ler/Equipment ologist/Engineer nple Method	Precision E 1231 S. Dire 12/12/05 to Cascade Dr M. Gibson Direct Push	ngineeri ector Stre 12/12/05 ílling/Ge	ng eet, Seattle, Wash oprobe	ington 9810	TOC Elevation TOC Elevation Surface Elev Northing Easting Hole Depth Outer Hole D	on (feet) ration (feet) Diam	8.0-feet 3 1/4-inch
Depth (feet, BGS)	Well Details	Interval Percent Recovery	Collection Method Sy Number Idu	le Data Name (Type)	Lithologic Column	Soil Desc	pription	
1 2 3 4 5 6 7 8		100%	GP	GP29-S-1.0 GP29-S-6.0		0 to 0.5 feet: ASPHALT. 0.5 to 2.0 feet: GRAVELLY SA 5% fines, nonplastic; 70% medium; damp. 2.0 to 6.5 feet: SILTY SAND ( nonplastic; 70% sand, fine, fines, medium plasticity; 30 gravels, fine; Irace organic Total Depth: 8.0 feet bgs.	AND with SILT (S sand, fine; 25% SM); dark brown ; damp. vith GRAVEL (M. 0% sand, fine to s and woody del	W); greenish gray, gravels, fine to ; 30% fines, ; brown; 60% medium; 10% orls; wet.
NĢTE	ES: 1) Abendon b	aorehole with 3/	B-Inch bon	lonite chips hydrated	with potable i	water. 2) GP = geoprobe.		



Proje Proje Start Drille Geol Sam	ect Name ect Location VEnd Date	Precision I 1231 S. Dir	Engine	erinn	8006.0	08.04		GP30	1 of 1
-	er/⊨quipment logist/Engineer ple Method	Stree /05 /Geop	t, Seattle, Wi probe	ashir	gton 9810	TOC Elevation (feet) Surface Elevation (feet) Northing Easting Hole Depth Outer Hole Diam	8,0-feet 3 1/4-inci		
Jepth teet, BGS	Well Details	nierval <sup>2</sup> ercent Recovery	Collection Method Co	unber du	Data Name (Type)	3lows/6"	lithologic Column	Soil Description	
1 2 3 4 5 6	1. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2.	100%	GP	<	GP30-S-1.0 GP30-S-6.0			0 to 0.5 feet: ASPHALT. 0.5 to 8.0 feet: SILTY SAND (SM); greenish gra nonplastic; 70% sand, fine; trace gravels, fin @ 3.5 feet: Color change to dark brown; some	y; 30% fines, e; damp. organics.
8	0000000 50090000 0000000000000000000000							Total Depth: 8.0 feet bgs.	







5 (1) (1) (1) (1)				Ge	eologic	<b>Borehole Log/Well Const</b>	ruction
Maul Foster 8	Alongi, I	nc.	Project   8006.0	Vumb 08.04	ier	Well Number GP32	Sheet 1 of 1
Project Name Project Location Start/End Date Driller/Equipment Geologist/Engine Sample Method	Precision I 1231 S. Dir 12/14/05 to Cascade D or M. Gibson Direct Pus	Engine rector 5 12/14/ rilling/ h	ering Street, Seattle, W 05 Geoprobe	ashir	ngton 9810.	TOC Elevation (feet) Surface Elevation (fe Northing Easting Hole Depth Outer Hole Diam	et) 3.0-feet 3 1/4-inch
Well Details Well	Interval Percent Recovery	Collection Method S	nple Data	Blows/6"	Lithologic Column	Soil Description	-
2 2 20 20 20 20 20 20 20 20 20 20 20 20	100%		GP32-5-1.0			0 to 0.5 feet: CONCRETE. 0.5 to 3.0 feet: SILTY SAND with GRA 20 % fines, nonplastic; 70% sand, fine to medium; odor, damp, @ 1.0 feet: Color change to yellowish	VEL (SM); orangish brown; fine, dense; 10% graveis, brown; dry.

1.

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NOTES: 1) Abandon borehole with 3/8-inch bentonite chips hydrated with potable water. 2) GP = geoprobe.

i.


Mau	Foster &	Alon	ul Foster & Alongi, Inc. Project Number 8005.08.04						Well Number	Sheet	
Pro, Pro, Stat Drill Geo Sar	ject Name ject Location nt/End Date ler/Equipment ologist/Engineer nple Method	Preci 1231 12/15 Casc Meric Split	ision E S. Dir 5/05 to ade D feth G Spool	Engine ector 12/15, rilling/ ibson	8006.08.04 ering Street, Seattle, WA 98108 05 Hollow Stem Auger				MW5     1 of 2       TOC Elevation (feet)       Surface Elevation (feet)       Northing       Easting       Hole Depth       20.5-fe       Outer Hole Diam		
Deptin (feet, BGS)	Weli Details	Interval	Percent Recovery	Collection Method Co	Number du	Data Name (Type)	Blows/6*	Lithologic Column	Soll Description		
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19			10% 25% 25%	ss ss ss			50/2" 50/4" 50/4"		<ul> <li>0 to 10.0 feet: See boring log for GP19.</li> <li>10.0 to 20.5 feet: SANDY SILT with GRAV fines, low plasticity; 20% sand, fine to r fine to medium; wet.</li> <li>@ 15.0 feet: Large Gravel, subrounded.</li> <li>@ 17.5 feet: Large Gravel approximately damp.</li> </ul>	'EL; grayish brown; 70% nedium; 10% grave;s, 3-inches in diameter;	

Nau	Foster &	Alongi, Inc.		Project	Numbe	r	Well Number	Sheet
nau	i oster ut	Alongi, mo.		8006.	08.04		MW5	2 of 2
Depth (feet, BGS)	Weli Details	Interval Percent Recovery Collection Method <u>co</u>	Number and	9 Data Name (Type)	Blows/6"	Lithologic Column	Soil Description	
-	and the	100% SS		1	50/6"		@ 20.0 feet: Dry.	1
	×///XX///A	a la companya da ser a companya da ser a companya da ser a companya da ser a companya da ser a companya da ser					Total Depth: 20.5 feet bgs.	
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		and the second second	-					

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Mau	l Foster &	Alongi, I	nc.	Project 1 8006.0	Ge Numbe 08.04		Well Number MW6		Sheet 1 of 2
Pro Pro Sta Drill Geo Sar	ject Name ject Location rt/End Date ler/Equipment ologist/Engineer nple Method	Precision E 1231 S. Dir 12/15/05 to Cascade D Merideth G Split Spool	Engineer ector St 12/15/0 rilling/H ibson	ring reet, Seattle, W 5 ollow Stem Aug	A 981 ger		TOC Elevation (feet)Surface Elevation (feet)NorthingEastingHole DepthQuter Hole Diam10.25-in		
Depth (feet, BGS)	Well Details	Interval Percent Recovery	Collection Method S	Die Data Name (Type)	Blows/6"	Lithologic Column	Soil I	Description	
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20		56% 100% 100% 100% 100% 100%	SS SS SS SS SS		19 50/6" 11 12 13 10 11 10 11 10 11 15 24 20 19 12	0 to 0. 2.5 to grad 3.0 to pla 6.0 to 8.0 to sp or 0 10. @ 10. @ 12. @ 15. @ 16.	5 feet: ASPHALT. 3.0 feet: SANDY Gi een and black; 40% edlum; damp. 6.0 feet: SILTY SAN astic; 65% sand, fine 20.0 feet: SILT with hots of black; 90% fin ganics; wet. 0 feet: Color change 5 feet: Increase in s 0 feet: Color change 5 feet: Trace woody	RAVEL (GW); dark b sand, fine to medium ND (SM); dark gray; dense; moist. DEBRIS. SAND (ML); Tight gr ses, low plasticity; 10 e to pinkish grayish b stiffness.	rown with lenses of n; 60% gravel, fine t 35% fines, non ayish brown with % sand, fine; trace brown.

Aau	I Foster 8	Alo	ngi, l	nc.		Projec.	Num	ber 4		Well Number MW6			Sheet 2 of 2	
(feet, BGS)	Well - Details	Interval	Percent Recovery	Collection Method Co	Number du	Data Name (Type	Blows/6"	Lithologic Column		Soil	Description			
		1	100%	SS		L		0000	20.0 to 20. brown; 65% gi diamet Total Depti	75 feet: SILTY 20% fines, med ravels, fine to m e; wet. h: 20.75 feet bg	GRAVEL wi dium plastici edium, appi gs.	th SAND (0 ty; 15% sai oximately :	GM); grayish nd, fine to co 8-inches in	burse
				÷			14							
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Vlau	l Foster &	Alongi,	Inc.		Project I 8006.0	Vumb	er	Well Number Sheet MW7 1 of 2
Proj Proj Stal Drill Gec San	iect Name iect Location rt/End Date let/Equipment blogist/Enginee nple Method	eering Stree 5/05 g/Holld	g ot, Seattle, W ow Stem Aug	A 98' qer	IOB	TOC Elevation (feet)Surface Elevation (feet)NorthingEastingHole Depth35.5-feetOuter Hole Diam10.25-inct		
Depth (feet, BGS)	Well Details	Interval Percent Recoverv	Collection Method Co	Number add	Data Name (Type)	Blows/6*	Lithologic Column	Soil Description
	000 000 000 000				1		Lin Victoria	0 to 0.5 feet: ASPHALT.
1 2							- /	
3 4		67%	ss.			4 5 5		<ul> <li>2.5 to 3.5 feet: GRAVELLY SAND (SW); dark brown; trace fines; 70% sand, fine to course; 30% gravels, fine; dry to damp.</li> <li>3.5 to 5.0 feet: SILTY SAND (SM); dark gravish brown; 30% fines low plasticity; 70% sand, fine; damp.</li> </ul>
5		1009	% SS			3 6 5		5.0 to 7.5 feet: SANDY SILT with GRAVEL (ML); light grayish brown; 70% fines, non plastic; 20% sand, fine; 10% gravels, fine to medium; trace organics; damp to moist.
7		100%	% SS	÷		1		7.5 to 13.5 feet: SANDY SILT (ML); light gravish brown; 70% fine
9			X			4		@ 8.5 feet: Wet.
1		1009	6 SS			3 4 4		n ann an an Ara
2					× 1			@ 11.5 feet; Woody debris.
3		100%	6 SS			5 6 7		@ 12.5 feet: Color change to light pinkish grayish brown, increas in fines, some clay.
4		1009	6 SS			3		13,5 to 16,0 feet: SAND with SILT (SP-SM); dark brown; 15% fines, non plastic; 85% sand, fine; trace shells; wet.
6.						33		16.0 to 18.0 feet: SILT with SAND (ML); grayish brown; 85% fine low to medium plasticity; 15% sand, fine; trace shells; wet.
9		67%	5 55			8 10 26		18.0 to 28.8 feet: GRAVELLY SAND with SILT (SW); greenish gray; 10% fines, non plastic; 50% sand, fine to course; 40% gravels, fine to medium, some approximately 3-inches in diameter, subrounded; dry to damp.

- 64	. Faster 0				_		Ge	ologic	Borehole Log/Well Construction
au	roster &	Alor	ıgı,	inc.	1	Project   8006,	08.04	er	MW7 Sheet
it, BGS)	Well Details	nval	cent	lection thod (S	mple unpe	Data	"9/8M	ologic umn	Soil Description
(fee		Inte	Pen Rec	Col	Nur	Name (Type)	Blo	SE	· · · · · · · · · · · · · · · · · · ·
-	000 000		50%	SS	-		50/6*	0.9.0	
1						1		•.B°.	
, i								р. 9 Г. О. Г.	
								°. • (). •	
		¥1	50%	SS			50/6'	0.0.	@ 22.5 feet: Increase in sand, decrease in fines; dry to damp
		24						° 0 C	
	000 000 000 000	1						0. () )	
	000 000	-	50%				50/5	0.0	
		1	30%	00			50/5	v () v	@ 25.5 feet: Color change to yellowish brown with iron staining
								o. D.	increase in fines to 15%; dry.
								0.0.0	
		10	50%	SS			50/5"		
								, O D	
		M.						r (bit)	28.8 to 29.0 feet: SAND with SILT (SP-SM); dark gray ; 15%
			- 1					• B •	29.0 to 32.5 feet: SAND with GRAVEL (SW); dark gray; trace
		1	90%	SS		1.1	50/6"	р. р. С. В.	fines; 85% sənd, medium; 15% gravels, fine, subangular t subrounded; wet.
			11	177				° 0. O	
	4/184/18	W							
			de tra				1	0.0	
			90%	SS	8		17 50/6"		32.5 to 33.5 feet: SAND (SP); dark gray; 100% sand, medium trace gravels; wet.
		(†		Li				÷	33.5 to 35.5 feet: GRAVELLY SAND with SILT (SW); dark bro
								• Q.•	10% fines; 60% sand, fine; 30% gravels; ary.
		-	100%	SS			50/6"	D O C	and the second second second second second second second second second second second second second second second
	DAILDAR	- Eng			-			0	Total Depth: 35.5 feet bgs.
									Contraction of the second second second second second second second second second second second second second s
	-								
_	10 a a				<u> </u>		_		
TE	<b>S:</b> 1.) SS = 2.5-	inch x 1	t.5-foot	long s	teel sp	olit spoon samp	olar. 2	) bgs = bel	ow ground surface.
				1				÷	

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I Foster &	Alongi,	Inc.	Project 8006.	Ge Numb .08.04	eologic	Borehole Log/Well Cons Well Number MW8	Struction Sheet 1 of 2
ject Name ject Location rt/End Date ler/Equipment blogist/Engineer mple Method	Precision 1231 S. D 12/15/05 1 Cascade Merideth Split Spo	Engine irector : o 12/15/ Drilling/ Gibson on	ering Street, Seattie, V 05 Hollow Stem Au	VA 98 ger	108	TOC Elevation (fee Surface Elevation Northing Easting Hole Depth Outer Hole Diam	ət) (feet) 20.2-feet 10.25-incl
Well Details	Interval Percent Recovery	Collection Method S	nple Data		Lithologic Column	Soil Description	7
					M. Est	0 to 0.5 feet: ASPHALT.	
202         202           203         204           204         204           205         204           204         204	75%	SS		14 23 13		2.5 to 3.5 feet: SAND with GRAVEL, 85% sand, fine; 15% gravels, fine 3.5 to 5.0 feet: SAND with SILT (SP 30% fines, non plastic; 70% sand with beads of white material in th	greenish gray; trace fines; e to medium; dry. -SM); gray with spots of black I, fine; trace hard substance e center, strong odor, damp i
Date         Date           Date <td>100%</td> <td>5 55</td> <td></td> <td>2 6 9</td> <td></td> <td>moist. 5.0 to 8.0 feet: SANDY SILT (ML); d of greenish gray; 70% fines, non @ 6.0 feet: Color change to dark bro</td> <td>ark blackish brown with lense plastic; 30% sand; moist. wn.</td>	100%	5 55		2 6 9		moist. 5.0 to 8.0 feet: SANDY SILT (ML); d of greenish gray; 70% fines, non @ 6.0 feet: Color change to dark bro	ark blackish brown with lense plastic; 30% sand; moist. wn.
200 000 1001 000 200 000 100 000	100%	· 55		5 8 8		8.0 to 11.0 feet: SILT with SAND (M. fines, medium plasticity; 15% ser	L); light grayish brown; 85% nd, fine; trace organics; wet.
	100%	SS		7 8 14		11 D to 15 0 feet: SILT. (ML): gravish	brown: 95% fines low
	67%	ss	8	17 50/6'	•	plasticity; 5% sand, fine; wet.	
	67%	SS		22 50/6"	000	15.0 to 17.5 feet: GRAVELLY SAND dark brownish gray; 10% fines; 6 gravels, fine to medium; wet.	with SILT NODULES(SW); 0% sand, medium; 30%
	34%	<b>S</b> S		50/3"		17.5 to 20.2 feet: GRAVEL with SIL1 brownish gray; 10% fines; low pla medium; 80% gravels, medium to	and SAND (GW-GM); dark sticity; 10% sand, fine to course; wet.
	I POSTEF &	I POSTEF & Alongi,         Ject Name       Precision         Ject Location       1231 S. D.         triEnd Date       12/15/05 f.         Cascade       Merideth         Dolailis       Revideth         Revideth       Revideth         Revideth       Revideth         Revideth       Revideth         Revideth       Revideth         Revideth       Revideth         Revideth       Revidh         Revidet	I POSTEP & Alongi, Inc.         lect Name lect Location tt/End Date er/Equipment blogist/Engineer mple Method       Precision Engine 1231 S. Director S 12/15/05 to 12/15/ Cascade Drilling/ Merideth Gibson Split Spoon         Well Details       Image: Cascade Drilling/ Merideth Gibson Split Spoon         Well Details       Image: Cascade Drilling/ Merideth Gibson Split Spoon         Manage: Cascade Drilling/ Merideth Gibson Split Spoon       Sat Data Split Spoon         Manage: Cascade Drilling/ Merideth Gibson Split Spoon       Sat Data Split Spoon         Manage: Cascade Drilling/ Merideth Gibson Split Spoon       Sat Data Split Spoon         Manage: Cascade Drilling/ Merideth Gibson Split Split Split Spoon       Sat Data Split Split	Proster & Alongi, Inc.     Project 8008.       lect Name lect Location tyEnd Date ler/Equipment ple Method Details     Precision Engineering 1231 S. Director Street, Seattle, M 12/15/05 to 12/15/05 Cascade Drilling/Hollow Stem Au Merideth Gibson       Well Details     Image: Sample Data Image: Sample Dat	I Poster & Alongi, Inc.       Project Numi 8006.08.04         lect Name       Precision Engineering         lect Location       1231 S. Director Street, Seattle, WA 98         ft/End Date       12/15/05 to 12/15/05         farfEquipment       Cascade Drilling/Hollow Stem Auger         loogist/Engineering       Split Spoon         Well       Vocosing         Details       Vocosing         Vell       Vocosing         Details       Vocosing         Split Spoon       Name (Type)         Split Spoon       Split Spoon         Vell       Vocosing         Details       Vocosing         Split Spoon       Split Spoon         Split Spoon       Split Spoon         Split Spoon       Split Spoon         Split Spoon       Split Spoon         Split	I Postel Valmber 3006.08.04       lect Name lect Location rtEnd Date el/Equipment obgist/Engineer pile Method Datalis     Precision Engineering 1231 S. Director Street, Seattle, WA 98108 12/5/05 to 1215/05 to 2215/05 to 2215/05	IT OSTEP & ALONGI, INC.     Project Number Solo 8.6.4     Well Number MWB       lear Name (ext Location france Elevation 121505 to 121505 articput Bisson repet Meridat Disson split Spoon     TOC Elevation flag Surface Elevation 121505 to 121505 articput Bisson Soli Description       Mediat Disson split Spoon     Sample Data Soli Description Soli Descri Statupon Soli Description Soli Description Soli Description Soli

Maul	Foster &	Alongi, Inc.	Project /	Number	Well Number	Jonstruction	Sheet
Depth (feet, BGS)	Well Details	Interval Percent Recovery Collection Method C	Sample Data	Blows/6" blows/6" Lithologic	Soil Desc	ription	2 of 2
Ŀ	VIIA	100% SS	<u> </u>	50/2"	Total Depth: 20.2 feet bas.	,	
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# APPENDIX D

# LABORATORY ANALYTICAL REPORTS



# ANALYTICAL REPORT

SEVERN

TRENT

STL

Job Number: 580-2284-1

Job Description: Precision Metals

For: Maul Foster & Alongi Inc 7223 NE Hazel Dell Ave Suite B Vancouver, WA 98665

Attention: Alan Huges

Alan

Heather Curbow Project Mgmt. Assistant hcurbow@stl-inc.om 05/15/2006 Revision: 1

Project Manager: Tom Coyner

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Severn Trent Laboratories, Inc. STL Seattle 5755 8th Street East, Tacoma, WA 98424 Tel (253) 922-2310 Fax (253) 922-5047 www.stl-inc.com





Client: Maul Foster & Alongi Inc Date: 05/15/2006

6010B-Hexavalent chromium Analysis Batch: 580-6211 Samples 580-2284-1, -2, -3, -10, -11, -12, -22

Samples 580-2284-1and 580-2284-22 were prepped for chromium IV analysis 1 hour and 33 minutes past the 24 hold time, the samples are flagged with "H". Samples 580-2284-2, -3, -10, -11, -12 were prepped within the required 24hr hold time and the "H" flags were omitted due to ontime lab prep.

#### login

Other Deficiency

Sample Times were changed on the COC, on the bottles and in login for the following samples per Aaron Jimbrosnick 4/21/06.

Sample ID: HA7-0.5 from 1405 to 1805 HA7-1.5 from 1420 to 1820

> HA8-0.5 from 1330 to 1730 HA8-1.5 from 1345 to 1845

Affected Items Sample: 580-2284-8 Sample: 580-2284-6



### METHOD SUMMARY

#### Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

Descrip	tion	Lab Location	Method	Preparation Method
Matrix:	Solid			
Inductive	ly Coupled Plasma - Atomic Emission Spectrometry	STL-SEA	SW846 6010E	3
	Acid Digestion of Sediments, Sludges, and Soils	STL-SEA		SW846 3050B
	Chromium, Hexavalent (Coprecipitation,	STL-SEA		SW846 7195
Percent N	Moisture	STL-SEA	EPA PercentN	Noisture
Matrix:	Water			
Volatile C	Organic Compounds by GC/MS	STL-SEA	SW846 8260E	3
	Purge-and-Trap	STL-SEA	Profession and a second	SW846 5030B
Semivola Monitorin	tile Organic Compounds by GC/MS (Selective Ion a)	STL-SEA	SW846 82700	>
	Separatory Funnel Liquid-Liquid Extraction	STL-SEA		SW846 3510C
Semi-Vola	atile Petroleum Products by NWTPH-Dx	STL-SEA	NWTPH NWT	PH-Dx
	Separatory Funnel Liquid-Liquid Extraction	STL-SEA		SW846 3510C
Inductive	ly Coupled Plasma - Atomic Emission Spectrometry	STL-SEA	SW846 6010E	3
	Chromium, Hexavalent (Coprecipitation,	STL-SEA		SW846 7195
	Sample Filtration performed in the Field	STL-SEA		FIELD_FLTRD
Inductive	ly Coupled Plasma - Mass Spectrometry	STL-SEA	SW846 6020	
	Sample Filtration performed in the Field	STL-SEA		FIELD_FLTRD

#### LAB REFERENCES:

STL-SEA = STL-Seattle

#### METHOD REFERENCES:

EPA - US Environmental Protection Agency

SW846 - "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.



## SAMPLE SUMMARY

### Client: Maul Foster & Alongi Inc

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-2284-1	MW7-041806	Water	04/18/2006 1430	04/19/2006 1400
580-2284-2	MW4-041806	Water	04/18/2006 1750	04/19/2006 1400
580-2284-3	MW1-041806	Water	04/18/2006 1830	04/19/2006 1400
580-2284-4	HA6-0.5	Solid	04/18/2006 1930	04/19/2006 1400
580-2284-6	HA7-0.5	Solid	04/18/2006 1805	04/19/2006 1400
580-2284-8	HA8-0.5	Solid	04/18/2006 1730	04/19/2006 1400
580-2284-10	MW2-041906	Water	04/19/2006 0815	04/19/2006 1400
580-2284-11	MW6-041906	Water	04/19/2006 1015	04/19/2006 1400
580-2284-12	MW5-041906	Water	04/19/2006 1230	04/19/2006 1400
580-2284-13	HA9-0.5	Solid	04/19/2006 0820	04/19/2006 1400
580-2284-15	HA10.05	Solid	04/19/2006 0950	04/19/2006 1400
580-2284-17	HA11-0.5	Solid	04/19/2006 1030	04/19/2006 1400
580-2284-19	HA1205	Solid	04/19/2006 1130	04/19/2006 1400
580-2284-21	TRIP BLANK	Water	04/19/2006 0000	04/19/2006 1400
580-2284-22	MW- DUP-041806	Water	04/18/2006 1430	04/19/2006 1400



Job Number: 580-2284-1

### Client: Maul Foster & Alongi Inc

Client Sample ID: MW7-041806

Lab Sample ID: Client Matrix:	580-2284-1 Water		t t	Date Sampled: Date Received:	04/18/2006 04/19/2006	1430 1400	
	8260B	Volatile Organic Compounds by	GC/MS		- 1		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8260B 5030B 1.0 04/25/2006 2242 04/25/2006 2242	Analysis Batch: 580-6218	Instru Lab F Initial Final	iment ID: ITS File ID: X2 Weight/Volume Weight/Volume	540 4029.D :: 5 mL : 5 mL		
Analyte		Result (ug/L)	Qualifier	MDL	RL		
Vinyl chloride trans-1,2-Dichloro cis-1,2-Dichloroeth Trichloroethene	ethene nene	ND ND ND ND		0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0		
Surrogate		%Rec		Accepta	ance Limits		
Fluorobenzene (S Toluene-d8 Ethylbenzene-d10 4-Bromofluoroben	urr) ) zene (Surr)	103 101 108 91		80 - 120 80 - 120 80 - 120 80 - 120			

Client: Maul Foster & Alongi Inc

Client Sample ID	): MW4-041806					
Lab Sample ID: Client Matrix:	580-2284-2 Water			Date Sampled: ( Date Received: (	04/18/2006 1750 04/19/2006 1400	
	8260B	Volatile Organic Compounds by	GC/MS			
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8260B 5030B 1.0 04/25/2006 2216 04/25/2006 2216	Analysis Batch: 580-6218	Ins Lai Init Fin	strument ID: ITS4 b File ID: X240 tial Weight/Volume: nal Weight/Volume:	28.D 5 mL 5 mL	
Analyte		Result (ug/L)	Qualifier	MDL	RL	
Vinyl chloride trans-1,2-Dichloro cis-1,2-Dichloroeth Trichloroethene	ethene nene	ND ND ND ND		0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0 1.0	
Surrogate		%Rec		' Acceptan	ce Limits	
Fluorobenzene (S Toluene-d8 Ethylbenzene-d10 4-Bromofluoroben Trifluorotoluene (S	urr) ) zene (Surr) Surr)	100 105 110 95 119	80 - 120 80 - 120 80 - 120 80 - 120 80 - 120 80 - 120			

## Client: Maul Foster & Alongi Inc

Client Sample ID: MW1-041806

580-2284-3 Water			Date Sampled: Date Received:	04/18/2006 04/19/2006	1830 1400
8260B	Volatile Organic Compounds by	GC/MS			
8260B 5030B 1.0 05/01/2006 1606 05/01/2006 1606	Analysis Batch: 580-6377	Inst Lab Initia Fina	rument ID: ITS File ID: X2- al Weight/Volume I Weight/Volume	540 4098.D :: 5 mL : 5 mL	
	Result (ug/L)	Qualifier	MDL	RL	
ene	ND ND ND ND		0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0	
	%Rec	Acceptance Limits			
urr) zene (Surr)	97 104 103 107		80 - 1: 80 - 1: 80 - 1: 80 - 1:	20 20 20 20	
	580-2284-3 Water 8260B 5030B 1.0 05/01/2006 1606 05/01/2006 1606 05/01/2006 1606	580-2284-3 Water           8260B Volatile Organic Compounds by           8260B         Analysis Batch: 580-6377           5030B         1.0           05/01/2006         1606           05/01/2006         1606           05/01/2006         1606           withene         ND           ene         ND           withene         ND           withene         ND           withene         ND           ene         ND           withene         ND           withene         ND           withene         ND           ene         ND           withene         ND           ene         ND           withene         ND	580-2284-3 Water           8260B Volatile Organic Compounds by GC/MS           8260B         Analysis Batch: 580-6377         Instr           5030B         Lab         Initia           1.0         Initia         Initia           05/01/2006         1606         Fina           05/01/2006         1606         Fina           ND           ND           ND           ND           %Rec           (ug/L)         Qualifier           ND           %Rec           (ur)         97           104           103           103	S80-2284-3 Water         Date Sampled: Date Received:           B260B Volatile Organic Compounds by GC/MS           8260B         Analysis Batch: 580-6377         Instrument ID:         ITS Lab File ID:         X2           5030B, 1.0         Initial Weight/Volume         Initial Weight/Volume         Initial Weight/Volume           05/01/2006 1606         Result (ug/L)         Qualifier         MDL           MD         0.14         0.091           ene         ND         0.062           ND         0.055         %Rec           WRec         Accepta           104         80 - 1           103         80 - 1           104         80 - 1           107         80 - 1	S80-2284-3 Water         Date Sampled:         04/18/2006 Date Received:         04/18/2006 04/19/2008           B260B Volatile Organic Compounds by GC/MS         Instrument ID:         ITS40         Lab File ID:         X24098.D         Initial Weight/Volume:         5 mL           5030B.         1.0         Initial Weight/Volume:         5 mL         5 mL           05/01/2006 1606         Result (ug/L)         Qualifier         MDL         RL           05/01/2006 1606         ND         0.14         1.0           05/01/2006 1606         ND         0.14         1.0           0s/01/2006 1606         ND         0.091         1.0           0thene         ND         0.041         1.0           0.002         1.0         0.062         1.0           wttene         ND         0.062         1.0           wttene         ND         0.062         1.0           wttene         ND         0.0655         1.0           wttene         ND         0.055         1.0           wttene         ND         0.055         1.0           wttene         ND         0.0255         1.0           wttene         104         80 - 120         100

Client: Maul Foster & Alongi Inc

Client Sample II	D: MW2-041906				
Lab Sample ID: Client Matrix:	580-2284-10 Water			Date Sampled: Date Received:	04/19/2006 0815 04/19/2006 1400
	8260B	Volatile Organic Compounds by	GC/MS		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8260B 5030B 1.0 04/25/2006 2125 04/25/2006 2125	Analysis Batch: 580-6218	Instr Lab Initia Fina	ument ID: ITS File ID: X24 I Weight/Volume I Weight/Volume:	840 4026.D : 5 mL : 5 mL
Analyte		Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride trans-1,2-Dichlorc cis-1,2-Dichloroet Trichloroethene	bethene hene	ND ND ND ND		0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0
Surrogate		%Rec		Accepta	ance Limits
Fluorobenzene (S Toluene-d8 Ethylbenzene-d10 4-Bromofluorober Trifluorotoluene (S	Surr) ) nzene (Surr) Surr)	101 100 110 100 119		80 - 12 80 - 12 80 - 12 80 - 12 80 - 12 80 - 12	20 20 20 20 20 20

Job Number: 580-2284-1

### Client: Maul Foster & Alongi Inc

Client Sample ID: MW6-041906

Lab Sample ID: Client Matrix:	580-2284-11 Water		Date Sam Date Rece	oled: 04/19/2006 1015 vived: 04/19/2006 1400
	82	60B Volatile Organic Compounds by	GC/MS	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8260B 5030B 1.0 05/01/2006 1633 05/01/2006 1633	Analysis Batch: 580-6377	Instrument ID: Lab File ID: Initial Weight/V Final Weight/V	ITS40 X24099.D olume: 5 mL olume: 5 mL
Analyte		Result (ug/L)	Qualifier MDL	RL
Vinyl chloride trans-1,2-Dichloro cis-1,2-Dichloroet Trichloroethene	bethene hene	ND ND ND ND	0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0
Surrogate		%Rec	Acceptance Limits	
Fluorobenzene (S Toluene-d8 Ethylbenzene-d10	Surr) D	104 103 100	80 - 120 80 - 120 80 - 120	
4-Bromofluorober Trifluorotoluene (	nzene (Surr) Surr)	105 108	80 - 120 80 - 120	

### Client: Maul Foster & Alongi Inc

Client Sample ID	: MW5-041906				and the second second
Lab Sample ID: Client Matrix:	580-2284-12 Water			Date Sampled: Date Received:	04/19/2006 1230 04/19/2006 1400
	8260B	Volatile Organic Compounds by	GC/MS		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8260B 5030B 1.0 04/25/2006 2034 04/25/2006 2034	Analysis Batch: 580-6218	In: La Ini Fir	strument ID: ITS4 b File ID: X240 itial Weight/Volume: nal Weight/Volume:	0 024.D 5 mL 5 mL
Analyte		Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride trans-1,2-Dichloro cis-1,2-Dichloroeth Trichloroethene	ethene hene	ND ND 1.1 7.9		0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0
Surrogate		%Rec		Acceptan	ce Limits
Fluorobenzene (S Toluene-d8 Ethylbenzene-d10 4-Bromofluoroben Trifluorotoluene (S	urr) zene (Surr) Surr)	99 97 103 94 115	80 - 120 7 80 - 120 33 80 - 120 4 80 - 120 5 80 - 120		

Job Number: 580-2284-1

### Client: Maul Foster & Alongi Inc

#### Client Sample ID: TRIP BLANK

Lab Sample ID: Client Matrix:	580-2284-21 Water		Date Sampleo Date Receive	d: 04/19/2006 0000 d: 04/19/2006 1400
Caracterization of the second s	8260B	Volatile Organic Compounds by GC	/MS	APPEND A
Method:	8260B	Analysis Batch: 580-6218	Instrument ID:	ITS40

Preparation: Dilution: Date Analyzed: Date Prepared:	5030B 1.0 04/25/2006 2009 04/25/2006 2009		Lab Initia Fina	023.D 5 mL 5 mL	
Analyte		Result (ug/L)	Qualifier	MDL	RL
Vinyl chloride		ND		0.14	1.0
trans-1,2-Dichloro	bethene	ND		0.091	1.0
cis-1,2-Dichloroet	hene	ND		0.062	1.0
Trichloroethene		ND		0.055	1.0
Surrogate		%Rec		Acceptar	nce Limits
Fluorobenzene (S	Surr)	99		80 - 12	0
Toluene-d8		101		80 - 12	D
Ethylbenzene-d10	D	100		80 - 12	D
4-Bromofluorober	nzene (Surr)	101		80 - 12	D
Trifluorotoluene (	Surr)	113		80 - 12	0

Client: Maul Foster & Alongi Inc

Client Sample ID	: MW- DUP-041806				
Lab Sample ID: Client Matrix:	580-2284-22 Water			Date Sampled: Date Received:	04/18/2006 1430 04/19/2006 1400
	8260B \	/olatile Organic Compounds by	GC/MS		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8260B 5030B 1.0 04/25/2006 1943 04/25/2006 1943	Analysis Batch: 580-6218		Instrument ID: IT: Lab File ID: X2 Initial Weight/Volume Final Weight/Volume	S40 24022.D e: 5 mL e: 5 mL
Analyte		Result (ug/L)	Qualifie	r MDL	RL
Vinyl chloride trans-1,2-Dichloro cis-1,2-Dichloroeti Trichloroethene	ethene hene	ND ND ND ND		0.14 0.091 0.062 0.055	1.0 1.0 1.0 1.0
Surrogate		%Rec		Accept	ance Limits
Fluorobenzene (Surr) Toluene-d8 Ethylbenzene-d10 4-Bromofluorobenzene (Surr) Trifluorotoluene (Surr)		98 101 106 93 112		80 - 1 80 - 1 80 - 1 80 - 1 80 - 1 80 - 1	20 20 20 20 20 20

Client: Maul Foster & Alongi Inc

Client Sample ID	): MW7-041806				
Lab Sample ID: Client Matrix:	580-2284-1 Water			Date Sampled: Date Received:	04/18/2006 1430 04/19/2006 1400
	8270C Semivolatile Or	ganic Compounds by GC/MS (S	elective lon	Monitoring)	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8270C 3510C 1.0 04/20/2006 1503 04/20/2006 0842	Analysis Batch: 580-6034 Prep Batch: 580-5990	In La In Fi Inj	strument ID: 597 ab File ID: HP( itial Weight/Volume: nal Weight/Volume: jection Volume:	'3N D1649.D : 985 mL 10 mL
Analyte		Result (ug/L)	Qualifier	MDL	RL
Naphthalene		0.023	J	0.0061	0.10
2-Methylnaphthale	ene	0.014	J	0.0091	0.13
1-Methylnaphthale	ene	ND		0.032	0.10
Acenaphthylene		0.028	J	0.0041	0.10
Acenaphthene		0.011	J	0.0030	0.10
Fluorene		0.013	J	0.0081	0.10
Phenanthrene		0.022	JB	0.0030	0.10
Anthracene		0.037	J	0.0081	0.10
Fluoranthene		0.036	J	0.0091	0.10
Pyrene		0.037	JB	0.013	0.10
Benzo[a]anthrace	ne	0.035	J	0.0091	0.10
Chrysene		0.013	J	0.0091	0.10
Benzofluoranthen	e	ND		0.031	0.20
Benzo[a]pyrene		ND		0.061	0.20
ndeno[1,2,3-cd]p	yrene	0.039	J	0.015	0.10
Dibenz(a,h)anthra	cene	0.038	J	0.012	0.10
Benzo[g,h,i]peryle	ne	ND		0.018	0.10
Surrogate		%Rec		Accepta	nce Limits
Nitrobenzene-d5		83		34 - 14	6
2-Fluorobiphenyl		90		35 - 14	3
Terphenyl-d14		89		35 - 16	6

Client: Maul Foster & Alongi Inc

Client Sample ID	: MW4-041806				
Lab Sample ID: Client Matrix:	580-2284-2 Water			Date Sampled: Date Received:	04/18/2006 1750 04/19/2006 1400
	8270C Semivolatile Org	ganic Compounds by GC/MS (S	elective Ion N	lonitoring)	
Method:	8270C	Analysis Batch: 580-6034	Instr	ument ID: 59	73N
Preparation:	3510C	Prep Batch: 580-5990	Lab	File ID: HP	01650.D
Dilution:	1.0	and the second second second second	Initia	al Weight/Volume	: 980 mL
Date Analyzed:	04/20/2006 1526		Fina	Weight/Volume	: 10 mL
Date Prepared:	04/20/2006 0842		Injec	ction Volume:	
Analyte		Result (ug/L)	Qualifier	MDL	RL
Vaphthalene		0.011	J	0.0061	0.10
2-Methylnaphthale	ne	ND		0.0092	0.13
1-Methylnaphthale	ene	ND		0.033	0.10
Acenaphthylene		0.019	J	0.0041	0.10
Acenaphthene		ND		0.0031	0.10
Fluorene		ND		0.0082	0.10
Phenanthrene		0.0064	JB	0.0031	0.10
Anthracene		ND		0.0082	0.10
Fluoranthene		0.029	J	0.0092	0.10
<sup>D</sup> yrene		0.030	JB	0.013	0.10
Benzo[a]anthracer	ne	ND		0.0092	0.10
Chrysene		ND		0.0092	0.10
Benzofluoranthene	9	ND		0.032	0.20
Benzo[a]pyrene		ND		0.061	0.20
ndeno[1,2,3-cd]py	rene	ND		0.015	0.10
Dibenz(a,h)anthra	cene	ND		0.012	0.10
3enzo[g,h,i]peryler	ne	ND		0.018	0.10
Surrogate		%Rec	Acceptance Limits		ince Limits
Nitrobenzene-d5		90		34 - 14	46
2-Fluorobiphenyl		101		35 - 14	43
erphenyl-d14		100		35 - 16	36

#### Client: Maul Foster & Alongi Inc

Client Sample ID: MW1-041806

Job Number: 580-2284-1

82	70C Semivolatile Organic Compounds	s by GC/MS (Selective Ion Monitoring)			
Client Matrix:	Water	Date Received:	04/19/2006	1400	
Lab Sample ID:	580-2284-3	Date Sampled:	04/18/2006	1830	
onent oampie ib.	10/07/1-0-41000				

#### Method: 8270C Analysis Batch: 580-6034 Instrument ID: 5973N Preparation: 3510C Prep Batch: 580-5990 Lab File ID: HP01651.D Dilution: 1.0 Initial Weight/Volume: 1050 mL Date Analyzed: 04/20/2006 1549 Final Weight/Volume: 10 mL Date Prepared: 04/20/2006 0842 Injection Volume:

Analyte	Result (ug/L)	Qualifier	MDL	RL
Naphthalene	0,011	J	0.0057	0.095
2-Methylnaphthalene	ND		0.0086	0.12
1-Methylnaphthalene	ND		0.030	0.095
Acenaphthylene	0.020	J	0.0038	0.095
Acenaphthene	0.0038	J	0.0029	0.095
Fluorene	ND		0.0076	0.095
Phenanthrene	0.024	JB	0.0029	0.095
Anthracene	0.030	J	0.0076	0.095
Fluoranthene	0.053	- J	0.0086	0.095
Pyrene	0.043	JB	0.012	0.095
Benzo[a]anthracene	0.029	J	0.0086	0.095
Chrysene	0.014	J	0.0086	0.095
Benzofluoranthene	ND		0.030	0.19
Benzo[a]pyrene	ND		0.057	0.19
Indeno[1,2,3-cd]pyrene	0.034	J	0.014	0.095
Dibenz(a,h)anthracene	ND		0.011	0.095
Benzo[g,h,i]perylene	ND		0.017	0.095
Surrogate	%Rec		Accepta	ince Limits
Nitrobenzene-d5	81		34 - 14	16
2-Fluorobiphenyl	90		35 - 14	43
Terphenyl-d14	91		35 - 16	36

Client: Maul Foster & Alongi Inc

Client Sample ID:	: MW2-041906				
Lab Sample ID: Client Matrix:	580-2284-10 Water			Date Sampled: Date Received:	04/19/2006 0815 04/19/2006 1400
	8270C Semivolatile Org	ganic Compounds by GC/MS (S	elective lon N	lonitoring)	
Method:	8270C	Analysis Batch: 580-6034	Inst	rument ID: 5973	BN
Preparation:	3510C	Prep Batch: 580-5990	Lab	File ID: HPO	1652.D
Dilution:	1.0		Initia	al Weight/Volume:	915 mL
Date Analyzed:	04/20/2006 1612		Fina	I Weight/Volume:	10 mL
Date Prepared:	04/20/2006 0842		Injed	ction Volume:	
Analyte	•	Result (ug/L)	Qualifier	MDL	RL
Naphthalene		0.93		0.0066	0.11
2-Methylnaphthaler	ne	ND		0.0098	0.14
1-Methylnaphthaler	ne	ND		0.035	0.11
Acenaphthylene		ND		0.0044	0.11
Acenaphthene		0.015	J	0.0033	0.11
Fluorene		ND		0.0087	0.11
Phenanthrene		0.0052	JB	0.0033	0.11
Anthracene		0.035	J	0.0087	0.11
-luoranthene		0.032	J	0.0098	0.11
<sup>o</sup> yrene		ND		0.014	0.11
Benzo[a]anthracen	e	0.031	J	0.0098	0.11
Chrysene		ND		0.0098	0.11
Benzofluoranthene		ND		0.034	0.22
Benzo[a]pyrene		ND		0.066	0.22
ndeno[1,2,3-cd]pyr	rene	ND		0.016	0.11
Dibenz(a,h)anthrac	ene	ND	0.013 0.11		0.11
Benzo[g,h,i]perylen	e	ND		0.020	0.11
Surrogate		%Rec		Acceptan	ce Limits
Nitrobenzene-d5		86		34 - 146	)
2-Fluorobiphenyl		91		35 - 143	
Ferphenyl-d14		89		35 - 166	i

Job Number: 580-2284-1

Client: Maul Foster & Alongi Inc

Client Sample ID: MW6-041906

83	270C Semivolatile Organic Compounds	by GC/MS (Selective Ion Monitoring)		
Client Matrix:	Water	Date Received:	04/19/2006	1400
Lab Sample ID:	580-2284-11	Date Sampled:	04/19/2006	1015
- Areas - and the first				

#### 5973N 8270C Analysis Batch: 580-6034 Instrument ID: Method: Prep Batch: 580-5990 Lab File ID: HP01653.D Preparation: 3510C 965 mL Dilution: 1.0 Initial Weight/Volume: 04/20/2006 1635 Final Weight/Volume: 10 mL Date Analyzed: Injection Volume: Date Prepared: 04/20/2006 0842

Analyte	Result (ug/L)	Qualifier	MDL	RL
Naphthalene	0.013	J	0.0062	0.10
2-Methylnaphthalene	0.012	J	0.0093	0.13
1-Methylnaphthalene	ND		0.033	0.10
Acenaphthylene	ND		0.0041	0.10
Acenaphthene	ND		0.0031	0.10
Fluorene	ND		0.0083	0.10
Phenanthrene	0.011	JB	0.0031	0.10
Anthracene	0.039	J	0.0083	0.10
Fluoranthene	0.033	J	0.0093	0.10
Pyrene	0.034	JB	0.013	0.10
Benzolalanthracene	ND		0.0093	0.10
Chrysene	ND		0.0093	0.10
Benzofluoranthene	ND		0.032	0.21
Benzo[a]pyrene	ND		0.062	0.21
Indeno[1,2,3-cd]pyrene	ND		0.016	0.1D
Dibenz(a,h)anthracene	ND		0.012	0.1D
Benzo[g,h,i]perylene	ND		0.019	0.10
Surrogate	%Rec	Acceptance Limits		ince Limits
Nitrobenzene-d5	77		34 - 14	46
2-Fluorobiphenyl	79		35 - 14	43
Terphenyl-d14	76		35 - 11	66

Client: Maul Foster & Alongi Inc

Client Sample ID	: MW5-041906				
Lab Sample ID: Client Matrix:	580-2284-12 Water			Date Sampled: 0 Date Received: 0	4/19/2006 1230 4/19/2006 1400
	8270C Semivolatile Org	ganic Compounds by GC/MS (S	elective lon	Monitoring)	
Method: Preparation:	8270C 3510C	Analysis Batch: 580-6034 Prep Batch: 580-5990	lns La	strument ID: 5973h b File ID: HP01	N 654.D
Dilution:	1.0		Ini	tial Weight/Volume:	1050 mL
Date Analyzed:	04/20/2006 1658		Fir	nal Weight/Volume:	10 mL
Date Prepared:	04/20/2006 0842		Inj	ection Volume:	
Analyte		Result (ug/L)	Qualifier	MDL	RL
Naphthalene		0.13		0.0057	0.095
2-Methylnaphthale	ine	0.017	J	0.0086	0.12
I-Methylnaphthale	ine	ND		0.030	0.095
Acenaphthylene		0.020	J	0.0038	0.095
Acenaphthene		0.0061	J	0.0029	0.095
Fluorene		ND		0.0076	0.095
Phenanthrene		0.014	JB	0.0029	0,095
Anthracene		0.033	J	0.0076	0.095
Fluoranthene		0.032	J	0.0086	0.095
Pyrene		0.032	JB	0.012	0.095
Benzo[a]anthracer	ne	ND		0.0086	0.095
Chrysene		ND		0.0086	0.095
Benzofluoranthene		ND		0.030	0.19
Benzo[a]pyrene		ND		0.057	0.19
ndeno[1,2,3-cd]py	rene	ND		0.014	0.095
Dibenz(a,h)anthrac	cene	ND		0.011	0.095
Benzo[g,h,i]peryler	he	ND		0.017	0.095
Surrogate		%Rec	1	Acceptanc	e Limits
Vitrobenzene-d5		81		34 - 146	
2-Fluorobiphenyl		88		35 - 143	
Cerphenyl-d14		88		35 - 166	

Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

0.10

0.10

0.20

0.20

0.10

0.10

0.10

Acceptance Limits

34 - 146

35 - 143

35 - 166

0.0091

0.0091

0.031

0.061

0.015

0.012

0.018

Client	Sample	ID:	MW-	DUP-041806

Client Sample ID:	WW-DUP-041806				
Lab Sample ID: Client Matrix:	580-2284-22 Water			Date Sampled: Date Received:	04/18/2006 1430 04/19/2006 1400
	8270C Semivolatile Orga	anic Compounds by GC/MS (S	elective Ion M	onitoring)	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	8270C 3510C 1.0 04/20/2006 1720 04/20/2006 0842	Analysis Batch: 580-6034 Prep Batch: 580-5990	Instru Lab I Initia Final Injec	ument ID: 5973 File ID: HPO I Weight/Volume: I Weight/Volume: tion Volume:	8N 1655.D 985 mL 10 mL
Analyte		Result (ug/L)	Qualifier	MDL	RL
Naphthalene 2-Methylnaphthale 1-Methylnaphthale Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene	ne ne	0.019 ND ND 0.0043 ND 0.0081 0.029 ND	J J B J	0.0061 0.0091 0.032 0.0041 0.0030 0.0081 0.0030 0.0081 0.0091	0.10 0.13 0.10 0.10 0.10 0.10 0.10 0.10
Pyrene		ND		0.013	0.10

ND

ND

ND

ND

ND

ND

ND

%Rec

91

99

96

Benzo[a]anthracene

Benzofluoranthene

Indeno[1,2,3-cd]pyrene

Dibenz(a,h)anthracene

Benzo[g,h,i]perylene

Nitrobenzene-d5

2-Fluorobiphenyl

Terphenyl-d14

Benzo[a]pyrene

Chrysene

Surrogate

Client: Maul Foster & Alongi Inc

Client Sample ID:	MW7-041806			
Lab Sample ID: Client Matrix:	580-2284-1 Water		Date Sampled: Date Received:	04/18/2006 1430 04/19/2006 1400
	NWTPH-Dx Se	mi-Volatile Petroleum Products	s by NWTPH-Dx	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	NWTPH-Dx 3510C 1.0 04/20/2006 1601 04/20/2006 1118	Analysis Batch: 580-6025 Prep Batch: 580-6001	Instrument ID: HF Lab File ID: FA Initial Weight/Volume Final Weight/Volume Injection Volume: Column ID: F	26890 .26391.D :: 975 mL :: 5 mL ?RIMARY
Analyte		Result (mg/L)	Qualifier	RL
Motor Oil (>C24-C36) #2 Diesel (C10-C24)		ND ND		0.51 0.26
Surrogate	a manager and the subsequence of the second	%Rec	Acceptance Limits	
o-Terphenyl		102	50 - 1	50

### Client: Maul Foster & Alongi Inc

#### Client Sample ID: MW4-041806

Lab Sample ID:	580-2284-2
Client Matrix:	Water

### Job Number: 580-2284-1

Date Sampled: 04/18/2006 1750 Date Received: 04/19/2006 1400

#### NWTPH-Dx Semi-Volatile Petroleum Products by NWTPH-Dx

Method: Preparation:	NWTPH-Dx	Analysis Batch: 580-6025 Brep Batch: 580-6001	Instrument ID:	HP.6890
Dilution:	10	Thep Bateri. 000-0001	Initial Weight/Vo	lume: 925 ml
Date Analyzed:	04/20/2006 1621		Final Weight/Vol	ume: 5 mL
Date Prepared:	04/20/2006 1118		Injection Volume Column ID:	: PRIMARY
Analyte		Result (mg/L)	Qualifier	RL
Motor Oil (>C24-0	236)	ND	a an an an ann an an ann ann an an ann an a	0.54
#2 Diesel (C10-0	C24)	ND		0.27
Surrogate		%Rec	Ac	ceptance Limits
o-Terphenyl		113	5	0 - 150

Client: Maul Foster & Alongi Inc

Client Sample ID:	MW1-041806				
Lab Sample ID: Client Matrix:	580-2284-3 Water		Date Sampled: 04/18/2006 1830 Date Received: 04/19/2006 1400		
	NWTPH-Dx Se	mi-Volatile Petroleum Products	by NWTPH-Dx		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	NWTPH-Dx 3510C 1.0 04/20/2006 1642 04/20/2006 1118	Analysis Batch: 580-6025 Prep Batch: 580-6001	Instrument ID: HP6890 Lab File ID: FA26393.D Initial Weight/Volume: 965 mL Final Weight/Volume: 5 mL Injection Volume: Column ID: PRIMARY		
Analyte		Result (mg/L)	Qualifier RL		
Motor Oil (>C24-C36) #2 Diesel (C10-C24)		ND ND	0.52 0.26		
Surrogate		%Rec	Acceptance Limits		
o-Terphenyl		115	50 - 150		
### Client: Maul Foster & Alongi Inc

Client Sample ID: MW2-041906

Lab Sample ID: 580-2284-10 Client Matrix: Water Job Number: 580-2284-1

 Date Sampled:
 04/19/2006
 0815

 Date Received:
 04/19/2006
 1400

#### NWTPH-Dx Semi-Volatile Petroleum Products by NWTPH-Dx

o-Terphenyl		123	50 - 1	50
Surrogate		%Rec	Accepta	ance Limits
#2 Diesel (C10-0	024)	0.41		0.29
Motor Oil (>C24-0	236)	ND		0.58
Analyte		Result (mg/L)	Qualifier	RL
bate r reparea.	04/20/2000 1110		Column ID: P	RIMARY
Date Prenared	04/20/2006 1118		Injection Volume:	
Date Analyzed:	04/20/2006 1702		Final Weight/Volume	5 mL
Dilution:	1.0		Initial Weight/Volume	: 865 mL
Preparation:	3510C	Prep Batch: 580-6001	Lab File ID: FA	26394.D
Method:	NWTPH-Dx	Analysis Batch: 580-6025	Instrument ID: HP	6890

Client: Maul Fo	oster & Alongi Inc		Job Number: 580-2284-1		
Client Sample ID	: MW6-041906				
Lab Sample ID: Client Matrix:	580-2284-11 Water		Date Sampled: 04/19/2006 1015 Date Received: 04/19/2006 1400		
	NWTPH-Dx Se	mi-Volatile Petroleum Products	by NWTPH-Dx		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	NWTPH-Dx 3510C 1.0 04/20/2006 1723 04/20/2006 1118	Analysis Batch: 580-6025 Prep Batch: 580-6001	Instrument ID: HP6890 Lab File ID: FA26395.D Initial Weight/Volume: 915 mL Final Weight/Volume: 5 mL Injection Volume: Column ID: PRIMARY		
Analyte		Result (mg/L)	Qualifier RL		
Motor Oil (>C24-C #2 Diesel (C10-C	36) 24)	1.2 0.76	0.55 0.27		
Surrogate	%Rec Acceptance Limits		Acceptance Limits		
o-Terphenyl		67	50 - 150		

Client: Maul Foster & Alongi Inc

Client Sample ID: MW5-041906

ab Sample ID	580-2284-12	Date Sampled:	04/19/2006 1230
Client Matrix:	Water	Date Received:	04/19/2006 1400

Method:	NWTPH-Dx	Analysis Batch: 580-6025	Instrument ID:	HP6890
Preparation: 3510C		Prep Batch: 580-6001 Lab File ID: FA263		FA26396.D
Dilution: 1.0		and the state of the state of the state of the state of	Initial Weight/V	olume: 980 mL
Date Analyzed:	04/20/2006 1743		Final Weight/V	olume: 5 mL
Date Prepared:	04/20/2006 1118		Injection Volun	ne:
			Column ID;	PRIMARY
Analyte		Result (mg/L)	Qualifier	RL
Motor Oil (>C24-0	C36)	ND		0.51
#2 Diesel (C10-C24)		ND	0.26	
Surrogate		%Rec	Acceptance Limits	
o-Terphenyl		116	MILLER IN CONTRACTOR OF A SUCCESSION	50 - 150

Client: Maul Foster & Alongi Inc

Client Sample ID:	MW- DUP-041806			
Lab Sample ID: Client Matrix:	580-2284-22 Water		Date Sampled: 04/18/2006 1430 Date Received: 04/19/2006 1400	
I and a second sec	NWTPH-Dx Sem	i-Volatile Petroleum Products	by NWTPH-Dx	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	NWTPH-Dx 3510C 1.0 04/20/2006 1804 04/20/2006 1118	Analysis Batch: 580-6025 Prep Batch: 580-6001	Instrument ID: HP6890 Lab File ID: FA26397.D Initial Weight/Volume: 975 mL Final Weight/Volume: 5 mL Injection Volume: Column ID: PRIMARY	
Analyte		Result (mg/L)	Qualifier RL	
Motor Oil (>C24-C36) #2 Diesel (C10-C24)		ND ND	0.51 0.26	
Surrogate		%Rec	Acceptance Limits	
o-Terphenyl		118	50 - 150	

Client: Maul Foster & Alongi Inc

Client Sample I	D: MW7-041806		1	
Lab Sample ID: Client Matrix:	580-2284-1 Water		Date Sampled: Date Received:	04/18/2006 1430 04/19/2006 1400
	6010B Inductive	ely Coupled Plasma - Atomic Emi	ssion Spectrometry-Dissolved	đ
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/26/2006 1226 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 D' N/A 10 mL 10 mL
Analyte		Result (mg/L)	Qualifier	RL
Hexavalent chromium		ND	Н	0.020
2000 - 2000 - 1, - 2019 - 201	6020 Ind	uctively Coupled Plasma - Mass S	Spectrometry-Dissolved	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1105 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Sciex Elan 6100 N/A 50 mL 50 mL
Analyte		Result (mg/L)	Qualifier	RL
Arsenic Lead Chromium Copper Selenium		0.0071 ND 0.013 0.0024 0.0050		0.0020 0.0020 0.0020 0.0020 0.0020

Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

Client Sample ID: MW4-041806

Lab Sample ID: Client Matrix:	580-2284-2 Water		Date Sampled: Date Received:	04/18/2006 1750 04/19/2006 1400
	6010B Inductive	ely Coupled Plasma - Atomic Emi	ssion Spectrometry-Dissolved	1
Method:6010BAnalysis Batch: 580-6211InstrumenPreparation:7195Prep Batch: 580-5974Lab File IEDilution:1.0Initial WeigDate Analyzed:04/26/2006 1244Final WeigDate Prepared:04/19/2006 1603Final Weig		Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 DV N/A 10 mL 10 mL	
Analyte		Result (mg/L)	Qualifier	RL
Hexavalent chro	mium	0.023		0.020
	6020 Indi	uctively Coupled Plasma - Mass S	Spectrometry-Dissolved	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1110 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume;	PE Sciex Elan 6100 N/A 50 mL 50 mL
Analyte		Result (mg/L)	Qualifier	RL
Arsenic Lead Chromium Copper Selenium		0.015 ND 0.0020 ND ND		0.0020 0.0020 0.0020 0.0020 0.0020 0.0020

Client: Maul Foster & Alongi Inc.

Client Sample ID: MW1-041806

Lab Sample ID: Client Matrix:	580-2284-3 Water		Date Sampled: Date Received:	04/18/2006 1830 04/19/2006 1400	
	6010B Induc	tively Coupled Plasma - Atomic Emi	ssion Spectrometry-Dissolve	d	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/26/2006 1246 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 D N/A 10 mL 10 mL	
Analyte		Result (mg/L)	Qualifier	RL	
Hexavalent chromium		ND		0.020	
	6020	nductively Coupled Plasma - Mass S	Spectrometry-Dissolved		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1115 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Sciex Elan 610 N/A 50 mL 50 mL	
Analyte		Result (mg/L)	Qualifier	RL	
Arsenic Lead Chromium Copper Selenium		0.033 ND ND ND ND		0.0020 0.0020 0.0020 0.0020 0.0020 0.0020	

## Client: Maul Foster & Alongi Inc

## Job Number: 580-2284-1

### Client Sample ID: HA6-0.5

Lab Sample ID: Client Matrix:	580-2284-4 Solid	% Moisture:	19.5	Da	te Sampled: te Received:	04/18/2006 04/19/2006	1930 1400
	60105	B Inductively Co	upled Plasma - Atomic	c Emission Spec	trometry		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/28/2006 2112 04/28/2006 0930	Analys Prep B	sis Batch: 580-6339 Batch: 580-6303	Instrum Lab File Initial W Final W	ent ID: e ID: Veight/Volume: /eight/Volume:	PE Optin N/A 5.2167 50 mL	na 3200 DV g
Analyte	DryWt	Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL	
Hexavalent chro	mium		2.8		0.0025	0.24	

## Client: Maul Foster & Alongi Inc

Client	Sample	ID:	HA7-0.5

Lab Sample ID: Client Matrix:	580-2284-6 Solid	% Moisture:	14.9	Da Da	te Sampled: te Received:	04/18/2006 04/19/2006	1805 1400
	60108	3 Inductively Co	upled Plasma - Atomic	Emission Spec	trometry		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/28/2006 2131 04/28/2006 0930	Analy Prep I	sis Batch: 580-6339 3atch: 580-6303	Instrum Lab File Initial V Final W	ent ID: e ID: /eight/Volume: /eight/Volume:	PE Optin N/A 5.0782 50 mL	na 3200 DV g
Analyte	DryWt	Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL	
Hexavalent chro	mium	1000-000 (1000-000) (1000-000) (1000-000-000)	0.22	J	0.0025	0.23	

## Client: Maul Foster & Alongi Inc

Client S	ample	ID:	HA8-0.5
Onone O	ampie	1000	11-10 010

Lab Sample ID: Client Matrix:	580-2284-8 Solid	% Moisture:	15.6	Da Da	ite Sampled: ite Received:	04/18/2006 04/19/2006	1730 1400
	60108	3 Inductively Co	oupled Plasma - Atomic	c Emission Spec	strometry		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/28/2006 2134 04/28/2006 0930	Analy: Prep f	sis Batch: 580-6339 3atch: 580-6303	Instrum Lab File Initial V Final W	ent ID: e ID: Veight/Volume: /eight/Volume:	PE Optim N/A 5.1002 y 50 mL	na 3200 DV g
Analyte	DryWt	Corrected: Y	Result (mg/Kg)	Qualifier MDL		RL	
Hexavalent chro	mium	ayılmı i dişer şetiri içir inderatoru talışmış	0.26	na ponstar in 2010 di 1920 di 1920 di 1930 di 1930 di 1930 di 1930 di 1930 di 1930 di 1930 di 1930 di 1930 di 1	0.0025	0.23	

Client: Maul Foster & Alongi Inc

Client Sample I	D: MW2-041906				
Lab Sample ID: Client Matrix:	580-2284-10 Water		Date Sampled: Date Received:	04/19/2006 0815 04/19/2006 1400	
	6010B Induc	tively Coupled Plasma - Atomic Emis	ssion Spectrometry-Dissolved	t i	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/26/2006 1248 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 DV N/A 10 mL 10 mL	
Analyte		Result (mg/L)	Qualifier	RL	
Hexavalent chro	mium	ND		0.020	
n	6020	nductively Coupled Plasma - Mass S	pectrometry-Dissolved		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1120 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Sciex Elan 6100 N/A 50 mL 50 mL	
Analyte		Result (mg/L)	Qualifier	RL	
Arsenic Lead Chromium Copper Selenium		0.0038 ND 0.021 0.0025 0.010		0.0020 0.0020 0.0020 0.0020 0.0020	

Client: Maul Foster & Alongi Inc

MW6-041906

Lab Sample ID: Client Matrix:	580-2284-11 Water		Date Sampled: Date Received:	04/19/2006 1015 04/19/2006 1400	
	6010B Inductiv	ely Coupled Plasma - Atomic Emis	sion Spectrometry-Dissolved	Ł	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/26/2006 1250 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 DV N/A 10 mL 10 mL	
Analyte		Result (mg/L)	Qualifier	RL	
Hexavalent chromium		ND		0.020	
	6020 Ind	uctively Coupled Plasma - Mass S	pectrometry-Dissolved		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1125 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Sciex Elan 6100 N/A 50 mL 50 mL	
Analyte		Result (mg/L)	Qualifier	RL	
Arsenic Lead Chromium Copper Selenium		0.024 ND 0.047 0.0051 0.019		0.0020 0.0020 0.0020 0.0020 0.0020 0.0020	

Client: Maul Foster & Alongi Inc

Client Sample ID: MW5-041906

Lab Sample ID: Client Matrix:	580-2284-12 Water		Date Sampled; Date Received;	04/19/2006 1230 04/19/2006 1400
	6010B Inductive	ely Coupled Plasma - Atomic Emis	ssion Spectrometry-Dissolved	d.
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 100 04/26/2006 1252 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 DV N/A 10 mL 10 mL
Analyte		Result (mg/L)	Qualifier	RL
Hexavalent chromium		350		2.0
nover-executive and the second second second second second second second second second second second second se	6020 Ind	uctively Coupled Plasma - Mass S	Spectrometry-Dissolved	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1130 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Sciex Elan 6100 N/A 50 mL 50 mL
Analyte		Result (mg/L)	Qualifier	RL
Arsenic Lead Chromium Copper Selenium		0.0049 ND 32 ND ND		0.0020 0.0020 0.0020 0.0020 0.0020 0.0020

### Client: Maul Foster & Alongi Inc

### Job Number: 580-2284-1

#### Client Sample ID: HA9-0.5

Lab Sample ID: Client Matrix:	580-2284-13 Solid	% Moisture:	35.4	Da Da	te Sampled: te Received:	04/19/2006 0820 04/19/2006 1400
	6010B	Inductively Co	oupled Plasma - Atomic	Emission Spec	trometry	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/28/2006 2136 04/28/2006 0930	Analy Prep I	sis Batch: 580-6339 Batch: 580-6303	Instrum Lab File Initial V Final W	ent ID: e ID: /eight/Volume: /eight/Volume:	PE Optima 3200 DV N/A 5.0611 g 50 mL
Analyte	DryWt C	Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL
Hexavalent chro	mium	lan selatan di kasaran	3.4		0.0033	0.31

### Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

### Client Sample ID: HA10.05

Lab Sample ID: Client Matrix:	580-2284-15 Solid	% Moisture:	25.1	Da Da	te Sampled: te Received:	04/19/2006 0950 04/19/2006 1400
	6010B	Inductively Co	oupled Plasma - Atomic	c Emission Spec	trometry	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/28/2006 2138 04/28/2006 0930	Analy Prep	sis Batch: 580-6339 Batch: 580-6303	Instrum Lab File Initial W Final W	ent ID: e ID: /eight/Volume: /eight/Volume:	PE Optima 3200 D\ N/A 5.0038 g 50 mL
Analyte	DryWt C	orrected: Y	<ul> <li>Result (mg/Kg)</li> </ul>	Qualifier	MDL	RL
Hexavalent chro	mium	windministeren nine Gerenendere)	0.074	J	0.0029	0.27

### Client: Maul Foster & Alongi Inc

Client Sample I	D: HA11-0.5							
Lab Sample ID:	580-2284-17			Da	te Sampled:	04/19/2006	1030	
Client Matrix:	Solid	% Moisture:	22.9	Da	te Received:	04/19/2006	1400	
	6010B	Inductively Co	upled Plasma - Atomic	Emission Spec	trometry			
Method:	6010B	Analys	sis Batch: 580-6339	9 Instrument ID:		PE Optin	na 3200 DV	
Preparation:	7195	Prep E	Batch: 580-6303	Lab File	e ID:	N/A		
Dilution:	1.0			Initial W	Veight/Volume:	5.0515 g		
Date Analyzed:	04/28/2006 2140			Final W	/eight/Volume:	50 mL		
Date Prepared:	04/28/2006 0930							
Analyte	DryWt 0	Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL		
Hexavalent chro	mium		0.45		0.0027	0.26		

#### Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

Client Sample ID: HA12-.05

Lab Sample ID: Client Matrix:	580-2284-19 Solid	% Moisture:	33.2	Da Da	te Sampled: te Received:	04/19/2006 04/19/2006	1130 1400
	6010B	Inductively Co	oupled Plasma - Atomic	c Emission Spec	trometry		
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 3050B 1.0 04/28/2006 0926 04/27/2006 1435	Analy Prep I	sis Batch: 580-6305 Batch: 580-6275	Instrum Lab File Initial V Final W	ent ID: e ID: Veight/Volume /eight/Volume:	PE Optin N/A 0.5597 50 mL	na 3200 DV g
Analyte	DryWt C	Corrected: Y	Result (mg/Kg)	Qualifier	MDL	RL	
Arsenic			9.0		0.59	6.7	
Lead			220	В	0.11	2.0	
Cadmium			0.48	JB	0.011	0.67	
Chromium			46	в	0.029	1.3	
Copper			39	В	0.072	1.3	

Job Number: 580-2284-1

Client: Maul Foster & Alongi Inc

Client Sample ID: MW- DUP-041806

Lab Sample ID: Client Matrix:	580-2284-22 Water		Date Sampled: Date Received:	04/18/2006 1430 04/19/2006 1400
	6010B Inductiv	ely Coupled Plasma - Atomic Emi	ssion Spectrometry-Dissolved	1
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6010B 7195 1.0 04/26/2006 1255 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Optima 3200 DV N/A 10 mL 10 mL
Analyte		Result (mg/L)	Qualifier	RL
Hexavalent chromium		ND	H	0.020
	6020 Ind	uctively Coupled Plasma - Mass S	pectrometry-Dissolved	
Method: Preparation: Dilution: Date Analyzed: Date Prepared:	6020 N/A 5.0 04/24/2006 1136 N/A	Analysis Batch: 580-6111	Instrument ID: Lab File ID: Initial Weight/Volume: Final Weight/Volume:	PE Sciex Elan 6100 N/A 50 mL 50 mL
Analyte		Result (mg/L)	Qualifier	RL
Arsenic Lead Chromium Copper Selenium		0.0073 ND 0.013 0.0033 0.0046		0.0020 0.0020 0.0020 0.0020 0.0020 0.0020

		General Chemistry			
Client Sample ID:	HA6-0.5				
Lab Sample ID: Client Matrix:	580-2284-4 Solid		Date Sampled: Date Received:	04/ <sup>-</sup> 04/ <sup>-</sup>	18/2006 1930 19/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	80 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Percent Moisture	20 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Client Sample ID:	HA7-0.5				
Lab Sample ID: Client Matrix:	580-2284-6 Solid		Date Sampled: Date Received:	04/ <sup>-</sup> 04/-	18/2006 1805 19/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	85 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoistur
Percent Moisture	15 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Client Sample ID:	HA8-0.5				
Lab Sample ID: Client Matrix:	580-2284-8 Solid		Date Sampled: Date Received:	04/ <sup>,</sup> 04/ <sup>,</sup>	18/2006 1730 19/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	84 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Percent Moisture	16 Anlv Batch: 580-6139	% Date Analyzed 04/25/2006 0829	D.10	1.0	PercentMoisture

Client: Maul Foster & Alongi Inc

		General Chemistry			
Client Sample ID:	HA9-0.5		í		
Lab Sample ID: Client Matrix:	580-2284-13 Solid		Date Sampled: Date Received:	04/ 04/	19/2006 0820 19/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	65 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Percent Moisture	35 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Client Sample ID:	HA10.05				
Lab Sample ID: Clíent Matrix:	580-2284-15 Solid		Date Sampled: Date Received:	04/ 04/	19/2006 0950 19/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	75 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Percent Moisture	25 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Client Sample ID:	HA11-0.5				
Lab Sample ID: Client Matrix:	580-2284-17 Solid		Date Sampled: Date Received:	04/* 04/*	19/2006 1030 19/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	77 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Percent Moisture	23 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture

	2.00	General Chemistry			
Client Sample ID:	HA1205				
Lab Sample ID: Client Matrix:	580-2284-19 Solid		Date Sampled: Date Received:	04/1 04/1	9/2006 1130 9/2006 1400
Analyte	Result	Qual Units	RL	Dil	Method
Percent Solids	67 Anly Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture
Percent Moisture	33 Aply Batch: 580-6139	% Date Analyzed 04/25/2006 0829	0.10	1.0	PercentMoisture



Job Number: 580-2284-1

### Client: Maul Foster & Alongi Inc

#### Method Blank - Batch: 580-6218

#### Method: 8260B Preparation: 5030B

Lab Sample ID:	MB 580-6218/3	Analysis Batch: 580-6218	Instrument ID: ITS40
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: X24010.D
Dilution:	1.0	Units: ug/L	Initial Weight/Volume: 5 mL
Date Analyzed:	04/25/2006 1433		Final Weight/Volume: 5 mL
Date Prepared:	04/25/2006 1433		a second second second second

Analyte	Result	Qual	MDL	RL	
Vinyl chloride	ND		0.14	1.0	
trans-1,2-Dichloroethene	ND		0.091	1.0	
cis-1,2-Dichloroethene	ND		0.062	1.0	
Trichloroethene	ND		0.055	1.0	
Surrogate	% Rec		Acceptance Limits	;	
Fluorobenzene (Surr)	98		80 - 120		
Toluene-d8	100		80 - 120		
Ethylbenzene-d10	101		80 - 120		
4-Bromofluorobenzene (Surr)	98		80 - 120		
Trifluorotoluene (Surr)	118		80 - 120		

Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

#### Laboratory Control/ Laboratory Control Duplicate Recovery Report - Batch: 580-6218

LCS Lab Sample	ID: LCS 580-6218/1	Analysis Batch: 580-6218	Instrument ID: ITS40
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: X24007.D
Dilution:	1.0	Units: ug/L	Initial Weight/Volume: 5 mL
Date Analyzed:	04/25/2006 1317		Final Weight/Volume: 5 mL
Date Prepared:	04/25/2006 1317		
LCSD Lab Sample	e ID: LCSD 580-6218/2	Analysis Batch: 580-6218	Instrument ID: ITS40

Client Matrix:	Water		
Dilution:	1.0		
Date Analyzed:	04/25/2006	1342	
Date Prepared:	04/25/2006	1342	

Analysis Batch:	580-6218
Prep Batch: N/A	
Units:ug/L	

Instrument ID:	1154	0	
Lab File ID:	X24008	D.	
Initial Weight/V	olume:	5	mL
Final Weight/V	olume:	5	mL

Method: 8260B

Preparation: 5030B

2	Rec.					
LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
108	110	50 - 145	2	20		
95	97	60 - 140	2	20		
96	102	70 - 125	6	20		
92	95	75 - 125	3	13		
L	CS % Rec	LCSD %	Rec	Accep	tance Limits	
1	00	102		80	0 - 120	
9	6	103		80	0 - 120	
1	00	107		80	0 - 120	
9	4	97		80	0 - 120	
	2 LCS 108 95 96 92 L 1 92 1 9 1 9 9	% Rec.           LCS         LCSD           108         110           95         97           96         102           92         95           LCS % Rec         100           96         100           94         94	% Rec.           LCS         LCSD         Limit           108         110         50 - 145           95         97         60 - 140           96         102         70 - 125           92         95         75 - 125           LCS % Rec         LCSD %           100         102           96         103           100         107           94         97	% Rec.           LCS         LCSD         Limit         RPD           108         110         50 - 145         2           95         97         60 - 140         2           96         102         70 - 125         6           92         95         75 - 125         3           LCS % Rec         LCSD % Rec           100         102           96         103           100         107           94         97	% Rec.         LCS         LCSD         Limit         RPD         RPD Limit           108         110         50 - 145         2         20           95         97         60 - 140         2         20           96         102         70 - 125         6         20           92         95         75 - 125         3         13           LCS % Rec         LCS D % Rec         Accep           100         102         80           96         103         80           100         107         80           94         97         80	% Rec.           LCS         LCSD         Limit         RPD         RPD Limit         LCS Qual           108         110         50 - 145         2         20           95         97         60 - 140         2         20           96         102         70 - 125         6         20           92         95         75 - 125         3         13           LCS % Rec         LCSD % Rec         Acceptance Limits           100         102         80 - 120           96         103         80 - 120           96         107         80 - 120           94         97         80 - 120

Job Number: 580-2284-1

Client: Maul Foster & Alongi Inc.

#### Method Blank - Batch: 580-6377

#### Method: 8260B Preparation: 5030B

Lab Sample ID	: MB 580-6377/1	Analysis Batch: 580-6377	Instrument ID: ITS40
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: X24092.D
Dilution:	1.0	Units: ug/L	Initial Weight/Volume: 5 mL
Date Analyzed:	05/01/2006 1325		Final Weight/Volume: 5 mL
Date Prepared:	05/01/2006 1325		

Result	Qual	MDL	RL
ND		0.14	1.0
ND		0.091	1.0
ND		0.062	1.0
ND		0.055	1.0
% Rec		Acceptance Limits	
103		80 - 120	
99		80 - 120	
99		80 - 120	
104		80 - 120	
113		80 - 120	
	Result ND ND ND % Rec 103 99 99 104 113	Result         Qual           ND         ND           ND         ND           ND         ND           % Rec         103           99         99           104         113	Result         Qual         MDL           ND         0.14         ND           ND         0.091         0.062           ND         0.055         0.055           % Rec         Acceptance Limits         103         80 - 120           99         80 - 120         99         80 - 120           104         80 - 120         113         80 - 120

Job Number: 580-2284-1

### Client: Maul Foster & Alongi Inc

### Laboratory Control/ Laboratory Control Duplicate Recovery Report - Batch: 580-6377

LCS Lab Sample	ID: LCS 580-6377/4	Analysis Batch: 580-6377	Instrument ID: ITS40
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: X24087.D
Dilution:	1.0	Units: ug/L	Initial Weight/Volume: 5 mL
Date Analyzed:	05/01/2006 1116		Final Weight/Volume: 5 mL
Date Prepared:	05/01/2006 1116		
LCSD Lab Sample	e ID: LCSD 580-6377/5	Analysis Batch: 580-6377	Instrument ID: ITS40

Client Matrix:	Water	Prep Batch: N/A
Dilution:	1.0	Units: ug/L
Date Analyzed:	05/01/2006 1142	100 C 100 C
Date Prepared:	05/01/2006 1142	

Instrument ID:	ITS4	0	
Lab File ID:	X24088	.D	
Initial Weight/	/olume:	5	mL
Final Weight/V	olume:	5	mL

Method: 8260B

Preparation: 5030B

	2	6 Rec.					
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Vinyl chloride	90	88	50 - 145	2	20		
trans-1,2-Dichloroethene	97	95	60 - 140	2	20		
cis-1,2-Dichloroethene	101	101	70 - 125	0	20		
Trichloroethene	96	97	75 - 125	0	13		
Surrogate	i.	CS % Rec	LCSD %	Rec	Accep	tance Limits	
Fluorobenzene (Surr)	1	06	101		8	0 - 120	
Toluene-d8	1	06	105		8	0 - 120	
Ethylbenzene-d10	1	04	107		8	0 - 120	
4-Bromofluorobenzene (Surr)	1	07	106		8	0 - 120	
Trifluorotoluene (Surr)	1	01	103		80	0 - 120	

Calculations are performed before rounding to avoid round-off errors in calculated results.

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Client: Maul Foster & Alongi Inc

#### Method Blank - Batch: 580-5990

Lab Sample ID:MB 580-5990/1-AClient Matrix:WaterDilution:1.0Date Analyzed:04/20/2006Date Prepared:04/20/200604/20/20060842

Analysis Batch: 580-6034 Prep Batch: 580-5990 Units: ug/L

### **Quality Control Results**

Job Number: 580-2284-1

#### Method: 8270C Preparation: 3510C

Instrument ID: 5973N Lab File ID: HP01646.D Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL Injection Volume:

Analyte	Result	Qual	MDL	RL
Naphthalene	ND		0.0060	0.10
2-Methylnaphthalene	ND		0.0090	0.13
1-Methylnaphthalene	ND		0.032	0.10
Acenaphthylene	ND		0.0040	0.10
Acenaphthene	ND		0.0030	0.10
Fluorene	ND		0.0080	0.10
Phenanthrene	0.0039	J	0.0030	0.10
Anthracene	ND		0.0080	0.10
Fluoranthene	ND		0.0090	0.10
Pyrene	0.028	J	0.013	0.10
Benzolalanthracene	ND		0.0090	0.10
Chrisene	ND		0.0090	0.10
Benzofluoranthana	ND		0.031	0.20
Penzolaburane	ND		0.060	0.20
Indepo[1 2 2 ed]pyrono	ND		0.015	0.10
Dihenz(a h)enthreeona	ND		0.012	0.10
Benzo[g,h,i]perylene	ND		0.018	0.10
Surrogate	% Rec		Acceptance Limits	
Nitrobenzene-d5	91		34 - 146	
2-Fluorobiphenyl	98		35 - 143	
Terphenyl-d14	100		35 - 166	

Job Number: 580-2284-1

#### Client: Maul Foster & Alongi Inc

#### Laboratory Control/ Laboratory Control Duplicate Recovery Report - Batch: 580-5990

LCS Lab Sample I	D: LCS 580-5990/2-A
Client Matrix:	Water
Dilution:	1.0
Date Analyzed:	04/20/2006 1417
Date Prepared:	04/20/2006 0842

LCSD Lab Sample ID: LCSD 580-5990/3-A

Water

04/20/2006 1440

04/20/2006 0842

1.0

Client Matrix:

Date Analyzed:

Date Prepared:

Dilution:

Analysis Batch: 580-6034 Prep Batch: 580-5990 Units: ug/L

Analysis Batch: 580-6034 Prep Batch: 580-5990 Units:ug/L

#### Method: 8270C Preparation: 3510C

Instrument ID: 5973N Lab File ID: HP01647.D Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL Injection Volume:

Instrument ID: 5973N Lab File ID: HP01648.D Initial Weight/Volume: 1000 mL Final Weight/Volume: 10 mL Injection Volume:

	2	6 Rec.					
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Naphthalene	99	98	42 - 129	1	32		
2-Methylnaphthalene	105	103	40 - 141	3	30		
1-Methylnaphthalene	109	108	50 - 150	1	50		
Acenaphthylene	106	106	46 - 128	0	45		
Acenaphthene	103	104	50 - 145	1	27		
Fluorene	114	116	46 - 143	1	29		
Phenanthrene	97	96	55 - 132	1	24		
Anthracene	98	96	51 - 134	2	28		
Fluoranthene	90	91	60 - 131	1	22		
Pyrene	88	90	48 - 157	2	38		
Benzo[a]anthracene	107	107	56 - 138	1	29		
Chrysene	102	103	57 - 139	1	33		
Benzofluoranthene	103	105	46 - 153	2	41		
Benzo[a]pyrene	114	114	53 - 137	1	27		
ndeno[1,2,3-cd]pyrene	94	94	49 - 148	1	34		
Dibenz(a,h)anthracene	89	90	49 - 150	1	42		
Benzo[g,h,i]perylene	94	95	52 - 147	1	32		
Surrogate	L	CS % Rec	LCSD %	Rec	Accep	tance Limits	
Nitrobenzene-d5	9	3	92		34	4 - 146	
2-Fluorobiphenyl	9	8	95		3	5 - 143	
Terphenyl-d14	9	6	96		38	5 - 166	

Calculations are performed before rounding to avoid round-off errors in calculated results.

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Job Number: 580-2284-1

Method Blank - Batch: 580-6001					M P	ethod: NWT reparation: 3	PH-Dx 510C	
Lab Sample ID: M Client Matrix: W Dilution: 1. Date Analyzed: 0. Date Prepared: 0.	IB 580-6001/1-A /ater 0 4/20/2006 1449 4/20/2006 1118	Analysi Prep Br Units:	s Batch: 580 atch: 580-60 mg/L	D-6025 001	In La In Fi In	strument ID: H ab File ID: F, itial Weight/Vol nal Weight/Vol jection Volume	P6890 A26388.D lume: 1000 ume: 5 mL :	mL
Analyte			Result	c	Qual		RL	
Motor Oil (>C24-C #2 Diesel (C10-C	36) 24)		ND ND				0.50	) 5
Surrogate			% Rec		1.1.1.1	Acceptance Lir	nits	
o-Terphenyl			111			50 - 150		
Laboratory Co Laboratory Co	ntrol/ ntrol Duplicate Recover	y Repor	t - Batch: 5	580-6001	N P	lethod: NWT reparation: 3	PH-Dx 3510C	
LCS Lab Sample Client Matrix: Dilution: Date Analyzed: Date Prepared:	ID: LCS 580-6001/2-A Water 1.0 04/20/2006 1509 04/20/2006 1118	Analy Prep Units	sis Batch: 5 Batch: 580-i : mg/L	80-6025 6001	Ins Lai Init Fin Inje	trument ID: H o File ID: F ial Weight/Volu al Weight/Volu ection Volume;	IP6890 A26389.D Ime: 1000 me: 5 m	) mL iL
LCSD Lab Sample Client Matrix: Dilution: Date Analyzed: Date Prepared:	e ID: LCSD 580-6001/3-A Water 1.0 04/20/2006 1535 04/20/2006 1118	Analysis Batch: 580-6025 Prep Batch: 580-6001 Units:mg/L		Ins La Init Fir Inj	Instrument ID: HP6890 Lab File ID: FA26390.D Initial Weight/Volume: 1000 mL Final Weight/Volume: 5 mL Injection Volume:		mL	
Analyte		LCS	<u>% Rec.</u> LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Motor Oil (>C24-C #2 Diesel (C10-C	C36) C24)	98 105	99 104	66 - 125 70 - 140	1 2	27 27	an an an an an an an an an an an an an a	
Surrogate		L	.CS % Rec	LCSD	% Rec	Accep	otance Limits	
o-Terphenyl		1	12	112		5	60 - 150	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Client: Maul Foster & Alongi Inc

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Client: Maul Foster & Alongi Inc Method Blank - Batch: 580-5974 Method: 6010B Preparation: 7195 Dissolved Lab Sample ID: MB 580-5974/11-A Analysis Batch: 580-6211 Instrument ID: PE Optima 3200 DV Client Matrix: Water Prep Batch: 580-5974 Lab File ID: N/A Dilution: 1.0 Units: mg/L Initial Weight/Volume: 10 mL Date Analyzed: 04/26/2006 1216 Final Weight/Volume: 10 mL Date Prepared: 04/19/2006 1603 Analyte RL Result Qual Hexavalent chromium ND 0.020 Laboratory Control/ Method: 6010B Laboratory Control Duplicate Recovery Report - Batch: 580-5974 Preparation: 7195 Dissolved LCS Lab Sample ID: LCS 580-5974/12-A Analysis Batch: 580-6211 Instrument ID: PE Optima 3200 DV Client Matrix: Water Prep Batch: 580-5974 Lab File ID: N/A Dilution: Initial Weight/Volume: 1.0 Units: mg/L 10 mL Date Analyzed: 04/26/2006 1218 Final Weight/Volume: 10 mL Date Prepared: 04/19/2006 1603 LCSD Lab Sample ID: LCSD 580-5974/13-A Analysis Batch: 580-6211 PE Optima 3200 DV Instrument ID: Client Matrix: Water Prep Batch: 580-5974 Lab File ID: N/A Dilution: 1.0 Units:mg/L Initial Weight/Volume: 10 mL Date Analyzed: 04/26/2006 1221 Final Weight/Volume: 10 mL Date Prepared: 04/19/2006 1603 % Rec. Analyte LCS RPD RPD Limit LCS Qual LCSD Qual LCSD Limit Hexavalent chromium 98 96 80 - 120 2 20

Calculations are performed before rounding to avoid round-off errors in calculated results.

## **Quality Control Results**

Method: 6010B

Dissolved

Preparation: 7195

Method: 6010B

Preparation: 7195

Job Number: 580-2284-1

Client: Maul Foster & Alongi Inc

### Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 580-5974

MS Lab Sample ID: Client Matrix: Dilution: Date Analyzed: Date Prepared:	580-2284-1 Water 1.0 04/26/2006 1230 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: PE Optima 3200 DV Lab File ID: N/A Initial Weight/Volume: 10 mL Final Weight/Volume: 10 mL
MSD Lab Sample ID: Client Matrix: Dilution: Date Analyzed: Date Prepared:	580-2284-1 Water 1.0 04/26/2006 1232 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974	Instrument ID: PE Optima 3200 DV Lab File ID: N/A Initial Weight/Volume: 10 mL Final Weight/Volume: 10 mL

	%	Rec.				Section 4	ALL CALLS
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Hexavalent chromium	95	92	75 - 125	4	20		

## Matrix Duplicate - Batch: 580-5974

			Dissolved
Lab Sample ID: Client Matrix: Dilution: Date Analyzed: Date Prepared:	580-2284-1 Water 1.0 04/26/2006 1228 04/19/2006 1603	Analysis Batch: 580-6211 Prep Batch: 580-5974 Units: mg/L	Instrument ID: PE Optima 3200 DV Lab File ID: N/A Initial Weight/Volume: 10 mL Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Hexavalent chromium	0.00954	0.00526	58	20	*

Calculations are performed before rounding to avoid round-off errors in calculated results,

## Page 52 of 60

Client: Maul Foster & Alongi Inc

#### Method Blank - Batch: 580-6275

Lab Sample ID: MB 580-6275/8-A Client Matrix: Solid Dilution: 1.0 Date Analyzed: 04/28/2006 0843 Date Prepared: 04/27/2006 1435

Analysis Batch: 580-6305 Prep Batch: 580-6275 Units: mg/Kg

### **Quality Control Results**

Job Number: 580-2284-1

#### Method: 6010B Preparation: 3050B

Instrument ID: PE Optima 3200 DV Lab File ID: N/A Initial Weight/Volume: 0.5 g Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL	
Arsenic	ND		0.45	5.0	
Lead	0.43	J	0.079	1.5	
Cadmium	0.0084	J	0.0082	0.50	
Chromium	0.029	J	0.021	1.0	
Copper	0.81	J	0.054	1.0	

#### Laboratory Control/ Laboratory Control Duplicate Recovery Report - Batch: 580-6275

#### Method: 6010B Preparation: 3050B

LCS Lab Sample ID: LCS 580-6275/9-A Analysis Batch: 580-6305 Instrument ID: PE Optima 3200 DV Client Matrix: Solid Prep Batch: 580-6275 Lab File ID: N/A Dilution: 1.0 Units: mg/Kg Initial Weight/Volume: 0.5 g Date Analyzed: 04/28/2006 0933 Final Weight/Volume: 50 mL Date Prepared: 04/27/2006 1435

LCSD Lab Sample ID: LCSD 580-6275/10-A		Analysis Batch: 580-6305	Instrument ID: PE Optima 3200 DV
Client Matrix:	Solid	Prep Batch: 580-6275	Lab File ID: N/A
Dilution:	1.0	Units: mg/Kg	Initial Weight/Volume: 0.5 a
Date Analyzed:	04/28/2006 0936	and the second second second second second second second second second second second second second second second	Final Weight/Volume: 50 mL
Date Prepared:	04/27/2006 1435		

	<u>% Rec.</u>						
Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Arsenic	99	99	80 - 120	0	35		
Lead	100	101	80 - 120	1	35		
Cadmium	95	95	80 - 120	0	35		
Chromium	98	98	80 - 120	0	35		
Copper	99	99	80 - 120	0	35		

Client: Maul Foster & Alongi Inc

## **Quality Control Results**

Job Number: 580-2284-1

Method Blank - Batch: 580-6303						Method: 6010B Preparation: 7195			
Lab Sample ID: Client Matrix: Dilution: Date Analyzed: Date Prepared:	Analysis Batch: 580-6339 Prep Batch: 580-6303 Units: mg/Kg				Instrument ID: PE Optima 3200 DV Lab File ID: N/A Initial Weight/Volume: 5 g Final Weight/Volume: 50 mL				
Analyte			Result		Qual	MDL	RL		
Hexavalent chro	mium		ND			0.0021	0.20		
Laboratory C Laboratory C	control/ control Duplicate Recover	y Repor	t - Batch:	580-6303		Method: 6010B Preparation: 719	95		
LCS Lab Sample ID: LCS 580-6303/12-A Client Matrix: Solid Dilution: 1.0 Date Analyzed: 04/28/2006 2101 Date Prepared: 04/28/2006 0930		Analy Prep Units	vsis Batch: Batch: 580 : mg/Kg	580-6339 -6303		Instrument ID: PE ( Lab File ID: N/A Initial Weight/Volume Final Weight/Volume	Optima 3200 DV a: 5 g a: 50 mL		
LCSD Lab Sample ID: LCSD 580-6303/13-A Client Matrix: Solid Dilution: 1.0 Date Analyzed: 04/28/2006 2103 Date Prepared: 04/28/2006 0930		Analy Prep Units	vsis Batch: Batch: 580 :mg/Kg	580-6339 -6303		Instrument ID: PE Lab File ID: N/A Initial Weight/Volume Final Weight/Volume	E Optima 3200 DV e: 5 g e: 50 mL		
Analyte		LCS	<u>% Rec.</u> LCSD	Limit	RP	D RPD Limit L	CS Qual LCSD Qual		
Hexavalent chr	omium	89	90	80 - 120	1	35			

Calculations are performed before rounding to avoid round-off errors in calculated results.

Page 54 of 60

Client: Maul Foster & Alongi Inc

#### Matrix Spike/

Matrix Spike Duplicate Recovery Report - Batch: 580-6303

### Job Number: 580-2284-1

#### Method: 6010B Preparation: 7195

MS Lab Sample ID:	580-2284-4	Analysis Batch: 580-6339	Instrument ID: PE Optima 3200 DV
Client Matrix:	Solid	Prep Batch: 580-6303	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 5.1119 g
Date Analyzed:	04/28/2006 2126		Final Weight/Volume: 50 mL
Date Prepared:	04/28/2006 0930		
MSD Lab Sample ID:	580-2284-4	Analysis Batch: 580-6339	Instrument ID: PE Optima 3200 DV
Client Matrix:	Solid	Prep Batch: 580-6303	Lab File ID: N/A
Dilution:	1.0		Initial Weight/Volume: 5.2012 g
Date Analyzed:	04/28/2006 2128		Final Weight/Volume: 50 mL
Date Prepared:	04/28/2006 0930		

	%	Rec.					
Analyte	MS	MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Hexavalent chromium	-6	2	75 - 125	86	35	*	*
Matrix Duplicate - Batch: 580-6303				1	Method: 6010 Preparation: 7	B 195	
Lab Sample ID: 580-2284-4 Client Matrix: Solid Dilution: 1.0 Date Analyzed: 04/28/2006 2116 Date Prepared: 04/28/2006 0930	Analysis Prep Ba Units:	Batch: 580 tch: 580-63 mg/Kg	0-6339 903		Instrument ID: P Lab File ID: N Initial Weight/Vo Final Weight/Vol	E Optima 32 /A lume: 5.062* ume: 50 m	00 DV g L
Analyte	Sam	ble Result/Q	ual Resu	lt	RPD	Limit	Qual
Hexavalent chromium	2.83		3.33		16	35	

Client: Maul Foster & Alongi Inc

### Method Blank - Batch: 580-6111

Lab Sample ID:MB 580-6111/2Client Matrix:WaterDilution:1.0Date Analyzed:04/24/2006 1003Date Prepared:N/A

Analysis Batch: 580-6111 Prep Batch: N/A Units: mg/L

### **Quality Control Results**

Job Number: 580-2284-1

#### Method: 6020 Preparation: N/A

Method: 6020

Preparation: N/A

Instrument ID: PE Sciex Elan 6100 Lab File ID: N/A Initial Weight/Volume: 50 mL Final Weight/Volume: 50 mL

Result	Qual	RL
ND		0.00040
ND		0.00040
ND		0.00040
ND		0.00040
ND		0.00040
	Result ND ND ND ND ND ND	Result Qual ND ND ND ND ND ND

#### Laboratory Control/ Laboratory Control Duplicate Recovery Report - Batch: 580-6111

#### Instrument ID: PE Sciex Elan 6100 LCS Lab Sample ID: LCS 580-6111/7 Analysis Batch: 580-6111 Client Matrix: Prep Batch: N/A Lab File ID: N/A Water 50 Initial Weight/Volume: Dilution: Units: mg/L 50 mL Final Weight/Volume: 54 mL Date Analyzed: 04/24/2006 1039 Date Prepared: N/A

LCSD Lab Sample	e ID: LCSD 580-6111/8	Analysis Batch: 580-6111	Instrument ID: PE Sclex Elan 6100
Client Matrix:	Water	Prep Batch: N/A	Lab File ID: N/A
Dilution:	50	Units:mg/L	Initial Weight/Volume: 50 mL
Date Analyzed:	04/24/2006 1044		Final Weight/Volume: 54 mL
Date Prepared:	N/A		

	<u>% Rec.</u>						
Analyte L	CS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Arsenic 1	01	100	80 - 120	1	20		
Lead 9	0	92	80 - 120	2	20		
Chromium 9	1	92	80 - 120	1	20		
Copper 9	9	98	80 - 120	0	20		
Selenium 1	04	104	80 - 120	1	20		


# DATA REPORTING QUALIFIERS

Job Number: 580-2284-1

Lab Section	Qualifier	Description
GC/MS Semi VOA		
	в	Compound was found in the blank and sample.
	L	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
Metals		
	в	Compound was found in the blank and sample.
	*	LCS, LCSD, MS, MSD, MD, or Surrogate exceeds the control limits
	J.	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
	н	Sample was prepped or analyzed beyond the specified holding time



Chain of Custody Record	STL Seattle 5755 8th Street E. Tacoma, WA 98424 Tel. 253-922-2310 Fax 253-922-5047 www.stl-inc.com	SEVERN STL®
Den Precision Engineering	9 Project Manager HERAMES	Data 18/06 Chain al Custody Warrber
Address	Telephone Number Nees Coded Fax Number	Lab Furnher . Page 1 of 2
City State Z	is code Site contact Lab contact	Analysis Attachist it Attachist in Soil Investory:
Project Name and Location Istatel Precision Engineering	(WA) Carrier/Wayoul Rumber	A D ALTE Corrige, i used
Contract/Purchase Order/Quote No.	Matrix Costaniers & Preservatives	Methy South Conditions of Receipt
Sample 1,D, and Localion/Description Containers for each sample may be combined on one line)	Air Air Aquebus Sed, Sall Unpres. H2504 HN03 HCl NaOH ZnAc/ NaOL	DINAXON TO MASSAUL, Chemium,
MW7-641806	A119/16/14-30 K 21/1-4	XXXXXX       Diss. Hetalsfield
MW4-041806	14/19/06 17:50 X 2 11 4	XXXXX         Attered
MW1-041806	4119 06 18:30 11 12 114	
HA6-0,5	A 19/06 17:30 X 1 1 1	X X A Ferrar only Hexco
HA 6- 1.0	A 18 06 20:00 X 1 1	A Auctive
HA 7- 0.5	4 /19 /04 14:05 X 1 1	1. X 1   A Leenew only Hexco
HA7- 1,5	41/15 /04 14:20 X 11 1	
-148-0.5		
+48-15	4 / / W / 06 14.24	
H48 - 4.5	4/18/26 13:30 X 1	X X I For new only HexG
HA8 - 1.5	4/18/06 13:45 X X	1 1 1 2 2 Rechive
MW1-041906	A1906 8:15 X 1 2 114 1	XXXXX         biss metals field filtered
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Turn Around Time Required (business days)       24 Hours       24 Hours       48 Hours       5 Days       10 D	hays  15 Days 00 Acquirements (Speeding) 15 Days 10 Other	<i>d</i>
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DISTRIBUTION; WHITE - Stays with the Samples; CAVAR	"~Returned to Offert with Report, Pitrik ~ Field Copy	STL2274-566 (12,702

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FAX NU. UU1

		STL Seattle					2	H N N H	Z	S-LE-
Chain of Custody Record		Tacoma, WA S Tacoma, WA S Tel. 253-922-2 Fax 253-922-5 Fax 253-922-5	8424 9424 9047					REZ	T	
Precision Praineening		Project Manag	AN Hu	ghes			Date 19	00	chain of Cus 24	stady Number 903
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Fraject Name and Location (State) Dependent Definite levited State	other wa	Carrist/Wayb	ill Nurtber		. د	als -Dx	nome limite etals	·P.4.W.I 99	ş	ecial Instructions/
Contract/Purchase Order/Qudie No.	1		tlabix	Conta	ilinevs & rvebies	Met MPH Hs	Ch s (		Cor	raditions of Receipt
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MW6-041906	4 19/06	lo'is	×	2 -	4	XXX	XX		DISS	Hetals field fill
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HA9- 1.5	8:30	4/17/66	×	-			<b>湯</b> 湯		+ 42	chit.
14. 10 - 0.S	9:50	4/19/46	X		, 	-	X		46	New any Hard
44 la - 1.5	10:00	-10/ PI	X	1.			4篇 - 级	TN.	3 42	SCHAVE
H411 - 015	10:30 1	4/19/26	X	-			X		A Pa	z Now only Hex (
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This Blank	4	Figlold \	X		1		X			
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### LOGIN SAMPLE RECEIPT CHECK LIST

Client: Maul Foster & Alongi Inc

Job Number: 580-2284-1

### Login Number: 2284

Question	T/F/NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	- interesting and a second sec
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	



# APPENDIX C Previous Geologic Cross Sections and Boring Logs

#### 2.16 Map of Site - Site Plan



Precision Engineering, Inc. Seattle, Washington Page 2 - 10



Figure 2.8.1 is a cross-section through the study area that depicts the stratigraphic relationship between the soil units. The cross-section shows the alluvium thinning towards the west until it is absent beneath the PEI facility.

Independent Remedial Action Report Procision Engineering, Inc. Seattle, Washington Page 2 - 4



#### Legend

- Deep Monitoring Well
- Shallow Monitoring Well
- 2014-2015 Soil Boring
- Air Sampling Location
- Subslab Sampling Location --- Sewer and drainage line  $\mathbf{\nabla}$
- X Catch Basin
- Outfall to Drainage Ditch
- Approximate Parcel Boundary
- --- Puget Sound Energy gas

Utility Lines

---Water

Â

- — Electrical
- Α' Location of Geologic Cross-Section (See Figure 10)

Notes: 1. All locations are approximate. 2. Approximate utility line locations from Seattle Public Utilities and markings made in the field by utility locators.

35

Kennedy/Jenks Consultants Former Precision Engineering Property Seattle, Washington

2014/2015 Remedial Investigation Sampling Locations

Figure 9

K/J Project Number 1396024.00 August 2015

70 Feet



#### Legend

Silts, clays, silt with sand (inferred recessional outwash and recent alluvium and fill)	▼ Depth to water measured March 2015	1	
Wood, peat, woody organic material	* Seattle Limousine Property	: Wet/Moisture : in borings	at <b>1</b>
Sand and silt with shell fragments	Notes:		e. Fee
Dense to very dense silt, sand, and gravel (inferred glacial till)	<ol> <li>All location are approximate.</li> <li>Ground surface estimated from multiple</li> </ol>	Screened	$\mathcal{O} = \mathcal{O}$ Vertical Exaggeratio
Sand and gravel with some fines (inferred advance outwash deposits or lens/interbed within the glacial sequence)	sources, including: survey, GPS, and Google Farth elevation data		
Dense silt, sand, and gravel (inferred advance outwash deposits or possibly glacial till)		logged boring	Horizontal Scale: Feet

# Unified Soil Classification System Abbreviations

ML: Silt with low to medium plasticity

#### Kennedy/Jenks Consultants

Former Precision Engineering Property Seattle, WA

Interpretive Geologic Cross Section A-A' and B-B'

#### Figure 10

1396024\*00 August 2015

on = 3X

## APPENDIX D Potentiometric Surface Contour Maps Data





14th Ave





Figure C-2 Potentiometric Surface Map **Deep Water Bearing Zone** July 2019 Precision Engineering, Inc. Seattle, Washington DRAFT Legend Deep Monitoring Well Shallow Monitoring Well Groundwater Elevation (feet NAVD88) King County Parcels **Property Parcel** S 14th Ave CUL Exceedance **Dissolved Arsenic Dissolved Chromium** TPH Notes: Exceedances shown represent detected concentrations above MTCA Method A, groundwater CULs; except for TCE, which represents an exceedance of the MTCA 48 Method B vapor intrusion screening level for groundwater. Deep monitoring wells are completed in the confined sand and gravel water-bearing zone. Shallow monitoring wells are completed in the confined alluvial water bearing zone. Water levels were measured on July 23 and 24, 2019. Water level elevations were calculated from depth to water measurements using measuring point survey elevations obtained from September 5, 2014 survey data as provided in Kennedy/Jenks Consultants (2015). CUL = cleanup level. NAVD88 = North American Vertical Datum of 1988. MTCA = Model Toxics Control Act. TCE = trichloroethene. TPH = total petroleum hydrocarbons. Feet Source: Aerial photograph obtained from King County (2019). Well locations for MW01-MW08 obtained from survey conducted by Duncanson, Inc. MAUL FOSTER ALONGI p. 971 544 2139 | www.maulfoster.com







**S** Director St All and a second second second 8 MW1 77. Cito Tim MW6 00 1 ATE-MW5 MW7 15.64 MW<sub>2</sub> MŴ9 14.34 MW8 State Route 99 Ramp

Figure C-4 Potentiometric Surface Map **Deep Water Bearing Zone** December 2019 Precision Engineering, Inc. Seattle, Washington DRAFT Legend Deep Monitoring Well ♣ Shallow Monitoring Well Groundwater Elevation (feet NAVD88) King County Parcels **Property Parcel CUL Exceedance Dissolved Arsenic Dissolved Chromium** TPH Notes: Exceedances shown represent detected concentrations above MTCA Method A, groundwater CULs; except for TCE, which represents an exceedance of the MTCA Method B vapor intrusion +8 screening level for groundwater. Deep monitoring wells are completed in the confined sand and gravel water-bearing zone. Shallow monitoring wells are completed in the confined alluvial water bearing zone. Water levels were measured on December 17, 2019. Water level elevations were calculated from Water level elevations were calculated from depth to water measurements using measuring point survey elevations obtained from September 5, 2014 survey data as provided in Kennedy/Jenks Consultants (2015). CUL = cleanup level. NAVD88 = North American Vertical Datum of 1988. MTCA = Model Toxics Control Act. TCE = trichloroethene. TPH = total petroleum hydrocarbons. 50 Feet Source: Aerial photograph obtained from King County (2019). Well locations for MW01-MW08 obtained from survey conducted by Duncanson, Inc. MAUL FOSTER ALONGI p. 971 544 2139 | www.maulfoster.com

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14th Ave









Figure C-6 Potentiometric Surface Map **Deep Water Bearing Zone** January 2020 Precision Engineering, Inc. Seattle, Washington DRAFT Legend Deep Monitoring Well  $\bullet$ Shallow Monitoring Well Groundwater Elevation (feet NAVD 88) King County Parcels Γ **Property Parcel CUL Exceedance Dissolved Arsenic Dissolved Chromium** TCE TPH

#### Notes:

S

14th Ave

+8

Exceedances shown represent detected concentrations above MTCA Method A, groundwater cleanup levels; except for TCE, which represents an exceedance of the MTCA Method B vapor intrusion screening level for groundwater. Deep monitoring wells are completed in the

confined sand and gravel water-bearing zone. Shallow monitoring wells are completed in the

confined alluvial water bearing zone. Water levels were measured on January 29, 2020.

Water level elevations were calculated from

depth to water measurements using measuring point survey elevations obtained from September 5, 2014 survey data as provided in Kennedy/Jenks Consultants (2015).

CUL = cleanup level.

NAVD88 = North American Vertical Datum of 1988. MTCA = Model Toxics Control Act. TCE = trichloroethene.

TPH = total petroleum hydrocarbons.



Source: Aerial photograph obtained from King County (2019). Well locations for MW01-MW08 obtained from survey conducted by Duncanson, Inc.













Figure C-8 Potentiometric Surface Map Deep Water Bearing Zone April 2020 Precision Engineering, Inc. Seattle, Washington DRAFT Legend Deep Monitoring Well Shallow Monitoring Well Groundwater Elevation (feet NAVD88) King County Parcels Property Parcel **CUL Exceedance Dissolved Arsenic Dissolved Chromium** TCE TPH Notes: Exceedances shown represent detected concentrations above MTCA Method A, 18 groundwater CULs; except for TCE, which represents an exceedance of the MTCA Method B vapor intrusion screening level for groundwater. Deep monitoring wells are completed in the confined sand and gravel water-bearing zone. Shallow monitoring wells are completed in the confined alluvial water bearing zone. Water levels were measured on April 28 and 29, 2020. Water levels were measured on April 28 and 29, 20 Water level elevations were calculated from depth to water measurements using measuring point survey elevations obtained from September 5, 2014 survey data as provided in Kennedy/Jenks Consultants (2015). CUL = cleanup level. NAVD88 = North American Vertical Datum of 1988. MTCA = Model Toxics Control Act. TCE = trichloroethene. TPH = total petroleum hydrocarbons. 50 Feet Source: Aerial photograph obtained from King County (2019). Well locations for MW01-MW08 obtained from survey conducted by Duncanson, Inc. MAUL FOSTER ALONGI p. 971 544 2139 | www.maulfoster.com

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14th Ave