ARCADIS
Infrastructure · Water · Environment · Buildings

ARCADIS U.S., Inc.
111 SW Columbia Street
Suite 670
Portland
Oregon 97201
Tel 503.220.8201
Fax 503.220.8209
www.arcadis-us.com

ENVIRONMENTAL

Ms. Libby Goldstein
Washington State Department of Ecology
3190 160th Ave. SE
Bellevue, Washington 98008-5452

Re: Subsurface Injection Completion Report, ARCO Station No. 00217 (5377), 13131 Bothell Everett Highway, Everett, Washington

Date:
July 5, 2012

Contact:
Alexander Lopez III

Phone:
503.220.8201 x 1122

Email:
alex.lopez.iii@arcadis-us.com

Our ref:
GP09BPNA.WA01.K0000

Dear Ms. Goldstein,

On behalf of BP West Coast Products, LLC, ARCADIS U.S. Inc. (ARCADIS) is pleased to present the enclosed Subsurface Injection Completion Report (report) for ARCO Station No. 00217 (5377) located at 13131 Bothell Everett Highway in Everett, Washington. Work presented in this report was performed pursuant to the Cleanup Action Plan submitted to the Washington State Department of Ecology on May 23, 2011.

If you have questions or comments regarding this report, please contact Alexander Lopez at 503.220.8201 x1122 or by email at alex.lopez.iii@arcadis-us.com.

Sincerely,

ARCADIS U.S., Inc.

Alexander Lopez III, L.G.
Project Geologist

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Imagine the result

BP West Coast Products, LLC

Subsurface Injection Completion Report

ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway
Everett, Washington

July 6, 2012

Brian Marcum
Environmental Engineer I

Alexander Lopez III, LG
Project Manager

Peter Campbell, PE
Project Engineer

PETER J CAMPBELL
STATE OF WASHINGTON
45051
REGISTERED
PROFESSIONAL ENGINEER

Exp 2/14/2014

Subsurface Injection Completion Report

ARCO Station No. 00217 (5377)
13131 Bothell-Everett Highway
Everett, Washington

Prepared for:
BP West Coast Products, LLC

Prepared by:
ARCADIS U.S., Inc.
111 SW Columbia Street
Suite 670
Portland
Oregon, 97201
Tel 503 220 8201
Fax 509 220 8209

Our Ref.:
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Date:
July 6, 2012

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Subsurface Injection Completion Report

ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway
Everett, Washington

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Subsurface Injection Completion Report

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13131 Bothell Everett Highway
Everett, Washington

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1 Introduction

On behalf of BP West Coast Products, LLC, ARCADIS U.S., Inc. (ARCADIS) has prepared this Subsurface Injection Completion Report (report) for Atlantic Richfield Company (ARCO) Station No. 00217 (5377)([Site) located at 13131 Bothell Everett Highway in Everett, Washington. The Site location is presented on Figure 1.

This report summarizes field activities and analytical results from limited subsurface investigation, injection well installation and development, and enhanced anaerobic bio-oxidation pilot testing using a magnesium sulfate (Epsom salt) solution and associated groundwater sampling results. This work was performed pursuant to the Cleanup Action Plan, ARCO Station 00217 (5377) (CAP;ARCADIS 2011).

2 Site Description

The Site is currently occupied by an ARCO retail fuel station and convenience store. Site features include the convenience store building, four dispenser islands under a single canopy, three underground storage tanks (USTs), and associated fueling system components. A Site aerial photograph is presented on Figure 2. A Site plan is presented on Figure 3.

The USTs are located in a common excavation in the northwest corner of the property and the station building is located in the northeast corner of the Site. Fuel dispensers are located in the southwest corner of the Site. The surface of the Site is paved with asphalt and concrete with landscaped areas on the western and southern margins of the property.

The Site is located at the northeast corner of Bothell Everett Highway (19th Avenue SE) and 132nd Street SE. The Site is bounded on the north and east by commercial properties, by 132nd Street SE to the south, and Bothell Everett Highway to the west. Local topography slopes slightly to the west. The approximate elevation of the Site is 460 feet above mean sea level.

2.1 Site Hydrogeology

The Site is located within the Puget-Willamette Trough Regional Aquifer System, which is a linear elongated basin stretching from the Canadian border to Central Oregon. Specifically, the Site is situated on Pleistocene-age Vashon Formation till deposits (Vashon Till). The Vashon Till generally consists of compact, unsorted sand, gravel,

and boulders in a matrix of silt and clay with sand and gravel lenses that typically act as a confining unit within the formation, but can yield usable amounts of water from thin lenses of sand and gravel (Thomas 1997).

Soil types encountered during previous drilling activities at the site consist primarily of silt with varying amounts of sand and gravel to an explored depth of 25 feet below ground surface (bgs). Measured depth to groundwater at the site during the March 2012 monitoring event ranged from approximately 4 to 7 feet bgs. Historically, measured groundwater depths at the site have ranged from 5 to 12 feet bgs. At the time of the last gauging event in March 2012, the groundwater horizontal gradient direction was to the west-southwest at approximately 0.036 foot per foot (ft/ft).

2.2 Site History

In January 2003, Evergreen Environmental Services, Inc. (Evergreen) of Mill Creek, Washington was contracted by BP West Coast Products, LLC to complete dispenser island and product distribution piping upgrades. Evergreen removed the concrete and asphalt surface, fill, and product piping bedding. The material removed was stockpiled on Site. No further documentation of the storage or disposal of the stockpiled material was provided by Delta Environmental Consultants, Inc. (Delta), the oversight contractor. During excavation activities, Delta collected one soil sample from beneath each of the four dispenser islands and two soil samples from beneath the product distribution piping.

Delta returned to the Site on February 4, 2003 and directed the over excavation of hydrocarbon-impacted soil beneath the northernmost dispenser island based on soil analytical results. Complete over excavation was not feasible due to field conditions and the extent of excavation was not documented. On February 4, 2003, Delta collected one soil sample from the base of the over excavation and four additional soil samples from the product distribution piping trenches. Concentrations of gasoline-range organics (GRO) and benzene were detected above their respective Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method A Soil Cleanup Levels (CLs) in samples PL4-4.0, PL5-4.0, and OE1-8.0. Boring locations are presented in Figure 4. On February 25, 2003 and March 6, 2003, Evergreen transported 105.39 tons of soil to Rinker Materials for thermal treatment and disposal; 16.91 tons of this soil was generated from over excavation and 88.48 tons of soil were generated during the station upgrade activities (Delta 2003).

In June 2004, Delta oversaw the installation of four soil borings completed as monitoring wells MW-1 through MW-4. The borings were installed by Cascade Drilling LP (Cascade), of Woodinville, Washington. Four soil samples were collected during drilling activities and analyzed for GRO, benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE), and total lead. GRO was detected in the soil samples collected from MW-2 and MW-3, with analytical results from MW-3 exceeding MTCA Method A CLs. Xylenes in MW-3 and total lead in each of the soil samples were detected at concentrations below MTCA Method A CLs. MW-3 was later abandoned in January 2005 to prepare for a WSDOT road widening project.

In July 2004, petroleum hydrocarbon odors were encountered by the Washington State Department of Transportation (WSDOT) during excavation activities in the vicinity of the northwest Site property boundary. On July 26, 2004, Delta collected six sidewall soil samples from the excavation at approximately 9.5 feet bgs. The excavation was approximately 37 feet long (north to south), 16 feet wide (east to west), and 12 feet deep. Water was encountered at approximately 11 feet bgs. Soil samples were not collected from the excavation bottom, however; one grab groundwater sample was collected. Soil and groundwater samples were analyzed for GRO, BTEX, MTBE and total lead. Constituents were not detected above the laboratory RLs in the soil samples with the exception of total lead which was detected in each of the soil samples at concentrations below MTCA Method A CLs. Concentrations of GRO, benzene, toluene, xylenes, and total lead were detected above their respective MTCA Method A CLs in the groundwater sample collected from the excavation bottom. Concentrations of ethylbenzene were detected above laboratory RLs but below MTCA Method A CLs. MTBE was not detected above laboratory RLs however, the RL equaled the MTCA Method A CL.

In August and November 2010, Cascade (under the direct supervision of ARCADIS) installed three on-site and three off-site soil borings completed as monitoring wells MW-5 through MW-7 and MW-8 through MW-10, respectively. Nine soil samples were collected during drilling activities and submitted for analysis of GRO, BTEX, and total lead. Soil samples collected from offsite borings MW-8 through MW-10 were submitted for an additional analysis of diesel range organics (DRO). COC concentrations were either below laboratory RLs or above laboratory RLs but below MTCA Method A CLs.

Quarterly groundwater monitoring and sampling began at the Site in 2004 and continued until July 2006 at which time monitoring was reduced to an annual frequency. In August 2010, monitoring frequency reverted back to quarterly, which is the current monitoring frequency. Historic analytical results indicate that well MW-2

contains GRO and benzene at concentrations above their respective MTCA Method A groundwater CLs. In addition, MW-5 has contained concentrations of GRO and total xylenes above their respective MTCA Method A CLs. Measureable light nonaqueous phase liquid (LNAPL) has not been detected at the site.

In the CAP (ARCADIS 2011) submitted to Ecology, ARCADIS proposed enhanced anaerobic bio-oxidation pilot testing to address remaining COC exceedances in groundwater. The remedial activities involved the installation of three injection wells for the purpose of injecting Epsom salt solution into the subsurface to enhance anaerobic bio-oxidation of petroleum hydrocarbons. Injection well locations were chosen based on the highest groundwater impacts observed in on site monitoring wells. Injection wells were located upgradient of the target monitoring wells to allow the existing groundwater gradient to deliver the solution to the impacted area. The following sections of this report describe the activities undertaken in the implementation of the proposed remedial action plan.

3 Limited Subsurface Investigation and Injection Well Installation

As part of a limited subsurface investigation and enhanced anaerobic bio-oxidation pilot testing, ARCADIS oversaw the installation of three injection wells on September 20 and November 1, 2011. This section describes the utility clearance procedures, injection well installation and sampling, injection well construction, and well development and waste disposal procedures.

3.1 Utility Clearance

ARCADIS contacted the Washington One-Call Utility Location Service to identify public underground utilities in the vicinity of the proposed injection well locations shown on Figure 3. In addition to the public locate, ARCADIS subcontracted Geomarkout of Seattle, Washington, a private utility location service, to locate onsite building utilities such as electrical, irrigation, sumps, security and electronic cables, etc. Finally, ARCADIS staff conducted a visual inspection of the Site to identify potential utility lines.

3.2 Injection Well Installation

Cascade (under the direct supervision of ARCADIS personnel) installed injection wells IW-1 and IW-3 on September 20, 2011 and injection well IW-2 on November 1, 2011. The injection well borings were pre-cleared using an air knife to 6.5 feet bgs to reduce the potential for damage to underground utilities. Soil samples were collected

continuously using an 18-inch split-spoon. Boring logs for each injection well were prepared by an ARCADIS field geologist using the Unified Soil Classification System; the logs are included in Appendix A.

Field screening of soil samples was performed using a photoionization detector (PID) and visual inspection methods. PID readings, soil types and other pertinent geologic observations were recorded on boring logs.

Soil samples were collected in the field in accordance with United Stated Environmental Protection Agency (USEPA) Method 5035A and placed in pre-weighed and preserved 40-milliliter volatile organic analysis vials. The samples were placed in a cooler with ice and submitted under standard chain of custody procedures to Pace Analytical Laboratories, Inc. located in Seattle, Washington (Pace).

Soil samples were selected based on visual and olfactory observations and PID head space screening in the field. A minimum of one soil sample was collected from each of the injection well borings. Samples were collected from the soil boring interval that had the highest VOC reading as indicated by PID field screening. An additional soil sample was collected if elevated VOC readings were measured at additional soil intervals.

Four soil samples, IW-1(7.5-8), IW-2(9-9.5), IW-3(6-6.5), and IW-3(9-9.5) were submitted for the following analyses:

- GRO by Northwest Method NWTPH-Gx; and
- BTEX by USEPA method 8260B (field preserved by USEPA method 5035A).

One composite soil sample, S-1, was submitted for Resource Conservation and Recovery Act 8 metals analysis by USEPA 6000/7000 Series for waste characterization.

Soil sample analytical data are summarized in Table 1 and presented on Figure 5.

3.3 Injection Well Construction

Injection wells were completed with 4-inch diameter Schedule 40 polyvinyl chloride casing and 10 feet of 0.010 inch slotted stainless steel screen. A #2/12 silica sand pack was placed from the bottom of the borings to 1 foot above the top of the screened interval in wells IW-1 and IW-3. The remaining annulus was filled with a 1 foot layer of

#10/20 silica sand followed by neat Portland cement to ground surface. The sand pack of IW-2 consisted of #2/12 silica sand from the bottom of the boring to 6 inches above the top of the screened interval, followed by a 6-inch layer of #10/20 silica sand. The remaining annulus was filled with neat Portland cement to ground surface. Water-tight well plugs and flush-mounted traffic-rated monitoring well monuments were installed at ground surface.

3.4 Injection Well Development

The injection wells were developed using a combination of surging and jetting techniques. Development through jetting introduces high-velocity water into the well screen through a small-diameter tube equipped with nozzles. Jetting was conducted simultaneously with water extraction to maintain a water level within the well column below static levels. Maintaining a water level below static levels creates a net flow of water and suspended sediments into the well. Each well was jetted in approximate two foot sections. Following jetting the well was gently surged to remove fines from the sand pack surrounding the well casing. Water in the well was then purged with a disposable polyethylene (PE) bailer to remove fine grained sediment suspended in the water column.

3.5 Management of Investigation-Derived Wastes

Soil cuttings and water generated during injection well installation, well development and groundwater monitoring activities were containerized in Department of Transportation-(DOT) approved 55-gallon steel drums. The investigation-derived waste (IDW) was labeled and stored on Site pending waste characterization. Following receipt of laboratory analytical data, the soil and water IDW was collected and transported by Kleen Environmental Technology for disposal at an appropriate offsite waste disposal facility.

4 Limited Subsurface Investigation Analytical Results

ARCADIS compared soil analytical data to the following MTCA Method A Soil CLs:

Soils

Constituent	Cleanup Level (mg/kg)
GRO	30/100[1]
Benzene	0.03
Toluene	7
Ethylbenzene	6
Total Xylenes	9

Notes:
CL from the Washington State Department of Ecology (Ecology) MTCA Method A Soil CLs for Unrestricted Land Uses (WAC 173-340-900, Table 740-1).
mg/kg = milligrams per kilogram
[1] *Method A CLs for GRO are determined based on the absence/presence of benzene; gasoline mixtures where benzene is present default to the lower cleanup standard.*

Soil analytical results from the limited subsurface investigation and injection well installation are presented in Table 1 and on Figure 4.

GRO was detected in two of the soil samples at concentrations exceeding the MTCA Method A CL:

- IW-2 (9-9.5) at 32.5 mg/kg
- IW-3 (9-9.5) at 229 mg/kg

The remaining soil samples did not contain concentrations of GRO above laboratory RLs.

Benzene was detected above the laboratory RL but below Method A CL in soil sample IW-2 (9-9.5). Benzene was not detected at concentrations above the laboratory RL in the remaining soil samples

Toluene was detected above the laboratory RL but below the Method A CL in soil sample IW-3 (9-9.5).Toluene was not detected at concentrations above the laboratory RL in the remaining soil samples

Ethylbenzene was detected above the laboratory RL, but below the Method A CL in soil samples IW-1 (7.5-8), IW-2 (9-9.5), and IW-3 (9-9.5). The remaining soil samples did not contain concentrations of ethylbenzene above the laboratory RL.

Total xylenes were detected in soil sample IW-3 (9-9.5) at a concentration of 24.5 mg/kg, which exceeds the MTCA Method A CL of 9,mg/kg. Total xylenes were detected above the laboratory RLs, but below Method A CLs in soil samples IW-1 (7.5-8) and IW-2 (9-9.5). The remaining soil sample did not contain concentrations of total xylenes above the laboratory RL.

5 Slug Test

On December 5, 2011 ARCADIS conducted falling and rising-head aquifer testing at wells IW-1 and IW-2 to estimate the injection flow rate that could be expected during pilot testing. Groundwater elevation data were collected using a pressure transducer and a water level indicator.

The falling-head aquifer test was conducted by instantaneously injecting a five gallon potable water “slug” into the well. Water levels within each well were monitored at 15 second intervals until the water level returned to static. Rising-head testing was performed by adding potable water to the well column from a 35 gallon holding tank at varying flow rates. The rising-head test involved introducing water into the well column at known flow rates and measuring the change in water level and determining at which flow rate the water level stabilized in the well column.

The rising-head test flow rates were initiated at 0.5 gallons per minute (gpm) in IW-1 and 0.5, 0.25, and 1.5 gpm in IW-2. Depth to water measurements were collected at 15 second intervals for approximately five minutes at each flow rate. Flow rates established during rising head testing indicated injection rates of 0.5 to 1.0 gpm could be expected during pilot testing. Field notes from the injection slug test are included as Attachment B.

6 Enhanced Anaerobic Bio-oxidation Pilot testing

6.1 Underground Injection Control Program Registration

Prior to implementing injection activities, ARCADIS registered the injection wells with the State of Washington Department of Ecology Underground Injection Control (UIC) program. ARCADIS received approval from the UIC Program to begin injections provided the following requirements were met:

- Complete a thorough site characterization;
- Develop a groundwater monitoring program;
- Develop a conceptual site model balancing injection concentrations and volumes with subsurface oxidizable material,
- Keep the injection material within the site property boundaries; and
- Prepare a spill prevention and contingency plan.

UIC program registration requirements were met prior to injection activities.

6.2 Injection Activities

Epsom salt injection activities were conducted to enhance anaerobic biodegradation of petroleum hydrocarbons at the site. The Epsom salt solution was produced by batch mixing 25 pounds (lbs) of Epsom salt in a granulated form with approximately 250 gallons of potable water in four injection tanks. The Epsom salt solution was injected under gravity flow directly into the injection wells.

Batch mixing and delivery of the Epsom salt solution was conducted using an injection system trailer operated by ARCADIS field personnel. A target injection concentration of approximately 12 grams per liter of Epsom salt solution was used for each batch tank mixture based on an initial conservative approach for sulfate dosing.

Approximately 1,850 gallons of Epsom salt solution were injected into the following injection wells: IW-1 (12 gallons), IW-2 (1,800 gallons), and IW-3 (44 gallons). During injection at IW-1 and IW-3, seepage from the well casing was observed which limited their ability to receive the target injection volumes. The flow rates into injection wells ranged between gravity flow and 0.4 gpm during injection activities. A data summary of flow rates and volumes for injected wells is summarized in Table 2.

6.3 Injection Monitoring

During injection activities, field parameters were collected from each batch tank. Water quality parameter data were collected using a YSI 556 multi-parameter meter and included temperature, pH and specific conductivity adjusted for temperature. Batch tank data collected during injection activities are presented in Table 3.

During injection, specific conductivity was measured periodically in downgradient dose response wells MW-2, MW-5, and MW-6 to monitor for breakthrough of the injected Epsom salt solution. Specific conductivity readings from the dose response wells were compared to readings obtained from the batch tanks. Specific conductivity is an effective means of monitoring Epsom salt solution breakthrough due to the elevated conductivity of the injection solution relative to ambient groundwater and can be monitored real time in the field. If a spike in specific conductivity was measured in a dose response well it was used as a semi-qualitative indicator of relative solution breakthrough and injections ceased.

Batch tank specific conductivity ranged from 4.622 millisiemens per centimeter (mS/cm) to 5.922 mS/cm, with an average of 5.333 mS/cm. Specific conductivity readings in wells MW-2, MW-5, and MW-6 prior to injection activities were 0.548, 0.388, and 0.476 mS/cm, respectively. The difference in specific conductivity between the batch tank and the response wells allowed ARCADIS to effectively monitor and detect the arrival of the injection reagents.

Specific conductivity readings in well MW-2 increased from 0.548 to 4.952 mS/cm on the final day of injections, indicating that Epsom salt solution breakthrough was achieved at that well after approximately 1,800 gallons of solution were injected.

Specific conductivity readings in wells MW-5 and MW-6 increased from 0.388 to 0.416 mS/cm and 0.476 to 0.473 mS/cm, respectively, indicating little to no Epsom salt response at these monitoring wells . Groundwater field parameter data collected from monitoring wells MW-2, MW-5, and MW-6 are presented in Table 4.

7 Groundwater Biogeochemical Analytical Sampling

Groundwater samples were collected for biogeochemical analysis before and after injection activities. Samples were collected from upgradient/crossgradient monitoring well MW-1, downgradient monitoring wells MW-9 and MW-10, and target dose response wells MW-2, MW-5, and MW-6.

ARCADIS conducted pre-injection baseline groundwater geochemical sampling and post-injection sampling to confirm baseline biogeochemical conditions at the site, to validate field dose response data, to determine the rate of sulfate utilization and to evaluate changes in biogeochemical conditions. The monitoring dates, wells and analytes are listed below:

- On December 2 and 5, 2011, pre-injection baseline monitoring was performed in conjunction with routine groundwater monitoring activities. Monitoring wells MW-1, MW-2, MW-5, MW-6, MW-9, and MW-10 were low-flow purged and sampled using a peristaltic pump and new PE tubing. Groundwater samples were analyzed for methane, total alkalinity, nitrate-nitrite nitrogen, sulfate, sulfide, and total and dissolved iron.
- On February 3, 2012, the final day of injection activities, wells MW-2, MW-5, and MW-6 were purged of one casing volume and sampled using a new disposable PE bailer. Groundwater samples were analyzed for sulfate and sulfide.
- On March 9, 2011, one month post injection, dose response wells MW-2 and MW-6 were purged of one casing volume and sampled using a new disposable PE bailer Groundwater samples were analyzed for sulfate, sulfide, methane, and total and dissolved iron. Samples collected from MW-5 were not submitted for geochemical analysis due to a low Epsom salt solution volume injected into IW-1.

Groundwater monitoring field data sheets are presented in Appendix C.

Groundwater biogeochemical analysis was performed using the following analytical methodologies:

- Methane by Method RSK 175;
- Total alkalinity as calcium carbonate ($CaCO_3$) by Method SM 2320B;
- Nitrate-nitrite nitrogen by USEPA Method 353.2;
- Sulfate by USEPA Method 300.0;
- Sulfide by USEPA Method SM-4500-S-2; and
- Total and dissolved iron USEPA Method 6010.

Samples were collected in laboratory-provided bottles, packed in a cooler with ice, and submitted to Pace, under standard chain-of-custody procedures. Analytical results for groundwater geochemical analyses are presented in Table 5. The laboratory analytical reports and chain-of-custody documentation are included in Appendix D.

7.1 Groundwater Geochemical Analytical Results for Upgradient and Crossgradient Monitoring Wells

On December 5, 2011, ARCADIS collected samples for baseline geochemical analysis from upgradient/crossgradient monitoring well MW-1 and downgradient monitoring wells MW-9 and MW-10. Baseline sample results are presented in Table 5; results are summarized below:

- Total alkalinity as $CaCO_3$ was 37.4 mg/L at MW-1, 34.9 mg/L at MW-9, and 22.6 mg/L at MW-10.
- Sulfate concentrations were detected at 59.1 mg/L in well MW-1 and 8.3 and 9.2 mg/L in wells MW-9 and MW-10, respectively.
- Sulfide concentrations were not detected above laboratory RLs, (<0.40 mg/L), in MW-1, MW-9, or MW-10.
- Methane concentrations were not detected above laboratory RLs, (<0.010 mg/L), in MW-1, MW-9, or MW-10.
- Nitrate-nitrite nitrogen concentrations were detected at 2.0, 2.1, and 1.8 mg/L in wells MW-1, MW-9, and MW-10, respectively.
- Total iron was detected at a concentration of 113 µg/L in well MW-1. Total iron concentrations were detected at 59,600 and 37,800 µg/L in wells MW-9 and MW-10, respectively.
- Dissolved iron concentrations were not detected above laboratory RLs, (<0.10 mg/L), in MW-1, MW-9, or MW-10.

The sulfate concentrations at these wells suggest that ambient groundwater does not contain a significant source of sulfate. Additionally, marginal nitrate and dissolved iron concentrations suggest that ambient groundwater is not strongly reducing. ARCADIS will collect additional samples for geochemical analysis from wells MW-1, MW-9, and MW-10 during semiannual groundwater monitoring, currently planned for the third quarter of 2012.

7.2 Groundwater Geochemical Analytical Results for Dose Response and Downgradient Reactive Zone Wells

7.2.1 Dose Response Well MW-2

Dose response well MW-2 is downgradient and within the target ROI of injection well IW-2.

Sulfate analytical results indicate that breakthrough was achieved after approximately 1,800 gallons were injected at IW-2; however, the target sulfate concentration at the dose response well (4,600 mg/L, based on batch tank concentrations) was not achieved. Based on the volume of reagent injected required to achieve breakthrough at dose response well MW-2, the estimated mobile porosity at IW-2 is approximately 8-percent. An increase in sulfide concentrations from non-detect (less than 0.40 mg/L) to 33 mg/L, on the final day of injection activities, is a direct indication of sulfate-reducing conditions within the plume. Dissolved iron concentrations in MW-2 decreased relative to baseline conditions while total iron concentrations increased, which is likely attributed to the precipitation of ferrous sulfide.

The results of MW-2 dose response monitoring indicate that sulfate-reducing conditions are present. Sulfate reduction produces sulfide, which was observed following injection at MW-2, but then later reduced to non-detect levels. The production of sulfide was coupled with a decrease in the concentration of dissolved iron and an increase in total iron. Increased concentrations of total iron indicate that new iron solids are being formed, likely through the generation of ferrous iron sulfide precipitates. As ferrous sulfide precipitates sequester iron from solution, a decrease in dissolved iron concentrations are expected and were observed. Additional post injection monitoring will continue to evaluate long term trends.

7.2.2 Dose Response Well MW-5

Dose response well MW-5 is located within the target ROI of injection well IW-1.

Epsom salt solution injected into IW-1 totaled approximately 12 gallons. The injected volume likely did not impact the bio-availability of sulfate in the vicinity of the well however, post injection monitoring indicates a slight increase in sulfate concentrations in MW-5. The total iron concentration decreased in well MW-5 and sulfide concentrations were not detected above the laboratory RLs however, sulfate reducing conditions in MW-5 may be established. Additional post injection monitoring will

continue to determine long term trends. MW-5 geochemical analytical data are presented in Table 5.

7.2.3 Downgradient Reactive Zone Well MW-6

Dose response well MW-6 is located crossgradient/downgradient of monitoring well MW-2 and injection well IW-2. Dose response monitoring was conducted at MW-6 to determine the effective migration of the injected Epsom salt solution beyond the area directly influenced by injection.

Analytical results indicate that sulfate concentrations in MW-6 increased relative to baseline conditions and continued to do so after injection activities were complete. Sulfide and dissolved iron concentrations have not been detected above laboratory RLs and total iron concentrations decreased in well MW-6.

Sulfide concentrations have not been detected above laboratory RLs however, sulfate concentrations have increased in MW-6. The increasing sulfate concentrations observed at MW-6 are the result of downgradient migration from the injection at IW-2 and associated zone of influence, as characterized by post-injection data at MW-2. Although sulfate concentrations are still exhibiting an increasing trend at MW-6, the maximum concentration observed (325 mg/L) is an order of magnitude lower than the maximum concentration observed at dose response well MW-2. This trend, although still evolving, indicates that sulfate is being consumed along a flow path. Additional post injection monitoring will continue to determine long term trends.

8 Summary and Conclusions

On September 20 and November 1, 2011, three permanent injection wells, IW-1, IW-2, and IW-3, were installed to perform enhanced anaerobic bio-oxidation injection pilot testing at the site. Select soil samples from injection well borings were collected for laboratory analysis during well installation. Soil samples collected from the 9-9.5 foot depth range in IW-2 and IW-3 exceeded the MTCA Method A CL for GRO in IW-2 and GRO and total xylenes in IW-3.

From January 25 to February 3, 2012, Epsom salt solution injection activities took place at the site. A total of approximately 1,850 gallons of Epsom salt solution were injected into injection wells IW-1, IW-2, and IW-3. During the injection event, seepage from the well casings of IW-1 and IW-3 was observed and injections into these wells ceased. As a result, approximately only 50 gallons of Epsom salt solution was injected

into IW-1 and IW-3. The majority of the solution, approxiamatley1,800 gallons, was injected into IW-2.

Groundwater geochemical samples were collected for laboratory analysis from dose response monitoring wells before and after the completion of injection activities. Results of the geochemical analysis suggest a sulfate reducing environment conducive to hydrocarbon degradation was created in the plume surrounding MW-2. Sulfate concentrations in the dose response monitoring wells did increase temporarily following injection activities. However, the target injection concentrations and volumes proposed in the CAP were not achieved. Increased sulfate concentrations observed in dose response well MW-2 reduced over time following the injection event, suggesting that sulfate is being consumed in the degradation of petroleum hydrocarbons. ARCADIS will continue to collect samples for geochemical analysis on a semiannual basis and the results will be presented to Ecology in conjunction with annual groundwater monitoring reporting.

Injection pilot testing results indicate that an alternative method of sulfate introduction may be a preferred approach to stimulate anaerobic bio-oxidation in the target area of elevated petroleum hydrocarbon related impacts. ARCADIS is currently considering sulfate application by alternative means. If an alternative sulfate delivery system is proposed, a revised Corrective Action Plan will be submitted to DOE for approval.

9 References

ARCADIS 2011, Cleanup Action Plan, ARCO Station 5377, 13131 Bothell-Everett Highway, Everett, Washington, May 23.

Delta 2003, Soil Sampling During Dispenser Island and Distribution Piping Upgrades, ARCO Facility No. 5377, Ecology Site ID# 5272, 13131 Bothell Everett Highway, Everett, Washington, April 17.

Thomas B.E., Wilkinson J.M., and Embry S.S.,The Ground-Water System and Ground-Water Quality in Western Snohomish County, Washington. Washington State Department of Ecology. Tacoma, Washington 1997.

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Tables

Table 1
Injection Well Soil Analytical Data

Subsurface Injection Completion Report
ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway Everett, WA

Sample ID	Depth (feet)	Sample Date	GRO (µg/kg)	Benzene[1] (µg/kg)	Toluene[1] (µg/kg)	Ethylbenzene[1] (µg/kg)	Total Xylenes[1] (µg/kg)
IW-1 (7.5-8)	7.5-8	9/20/2011	<5,600	<2.7	<2.7	4.4	10.3
IW-2 (9-9.5)	9-9.5	11/1/2011	32,500	5.3	<2.8	38.6	95.2
IW-3 (6-6.5)	6-6.5	9/20/2011	<6,100	<3.0	<3.0	<3.0	<8.9
IW-3 (9-9.5)	9-9.5	9/20/2011	229,000	<3.0	9.7	4,750	24,500

Notes:
GRO = Gasoline range organics, analyzed by NWTPH-Gx
µg/kg = Micrograms per kilogram
< = Analyte not detected above laboratory reporting limit
[1] Analyzed by United States Environmental Protection Agency Method 8260

Table 2
Injection Data Summary

Subsurface Injection Completion Report
ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway Everett, WA

Batch	Date	Time	Totalizer Volume Reading (gallons)	IW-1			IW-2			IW-3		
				Injection Pressure (psi)	Totalizer Volume (gallons)	Flow Rate (gpm)	Injection Pressure (psi)	Totalizer Volume (gallons)	Flow Rate (gpm)	Injection Pressure (psi)	Totalizer Volume (gallons)	Flow Rate (gpm)
1A	1/26/2012	11:15	500	0	12.20	0.2	0	35	0.2	0	35	0.2
1B/2A	1/27/2012	10:30	1000	0	12.20	0.2	0	327	0.4	0	44	0.2
3A	1/30/2012	11:15	2000	0	12.20	0	0	1079	--	0	44	--
3B	1/31/2012	13:15	2600	0	12.20	0	0	1421	--	0	44	0
3B	2/3/2012	9:30	3000	0	12.20	0	0	1782	0	0	44	0

Notes:

psi = Pounds per square inch

gpm = Gallons per minute
-- = Not analyzed, not measured, or not applicable

Table 3
Injection Tank Field Paramaeter Data Summary

Subsurface Injection Completion Report
ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway Everett, WA

Tank ID	Batch	Date	Time	Specific Conductivity (mS/cm)	pH	Temp °C
1	1A	1/24/2012	15:30	4.622	7.54	4.30
2	1A	1/24/2012	15:35	5.162	7.33	4.38
3	1B	1/26/2012	13:00	5.626	7.67	4.65
4	1B	1/26/2012	13:05	5.356	7.74	4.65
1	2A	1/26/2012	14:10	5.914	7.45	4.77
2	2A	1/26/2012	14:15	5.257	7.53	4.70
1	3A	1/27/2012	13:15	5.922	6.96	3.92
2	3A	1/27/2012	13:20	5.155	7.28	3.84
3	3A	1/27/2012	13:25	5.210	7.44	3.80
4	3A	1/27/2012	13:30	5.804	7.48	3.77
1	3B	1/30/2012	13:00	5.010	6.92	5.75
2	3B	1/30/2012	13:05	5.095	7.10	5.68
3	3B	1/30/2012	13:10	5.298	7.21	5.72
4	3B	1/30/2012	13:15	5.231	7.24	5.75

Notes:
mS/cm = Millisiemens per centimeter
°C = Degrees Celsius

Table 4
Dose Response Wells MW-2, MW-5, and MW-6 Groundwater Field Parameter Data

Subsurface Injection Completion Report
ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway Everett, WA

Well ID	Batch	Date	Time	Totalizer Volume (gallons)	DTW (ft BTOC)	Depth of reading (ft BTOC)	Specific Conductivity (mS/cm)	pH	Temperature °C	VOCs (ppm)	H_2S (ppm)
MW-2	--	12/2/2011	13:20	--	--	15	0.548	6.58	12.07	--	--
	--	1/25/2012	8:45	0	4.97	6.0	0.639	6.78	9.89	50.5	0
						19.7	0.643	6.74	12.89		
	1A	1/26/2012	10:45	500	4.62	6.0	0.613	6.79	9.30	15.9	0
						19.7	0.564	6.73	12.75		
	1B/2A	1/27/2012	11:00	1,000	5.33	6.0	0.692	6.74	8.98	27.1	0
						19.7	0.809	6.63	12.50		
	3A	1/30/2012	11:45	2,000	4.64	6.0	2.701	6.65	8.41	20.1	0
						19.7	3.607	6.41	12.34		
	3B	1/31/2012	13:30	2,600	3.88	6.0	4.555	6.57	7.93	25.9	0
						19.7	4.595	6.33	12.20		
	3B	2/3/2012	9:30	3,000	4.66	6.0	3.461	6.93	7.47	8.4	0
						19.7	4.952	6.54	11.71		
MW-5	--	12/2/2011	11:22	--	6.47	12.0	0.388	6.56	13.27	--	--
	--	1/25/2012	9:00	0	4.24	--	0.375	6.72	8.99	7.8	0
	1A	1/26/2012	11:15	500	3.71	--	0.376	6.77	8.35	15.9	0
	1B/2A	1/27/2012	11:30	1,000	3.63	--	0.372	6.69	8.33	11.9	0
	3A	1/30/2012	12:00	2,000	3.80	--	0.379	6.70	8.32	30.9	0
	3B	1/31/2012	13:40	2,600	4.49	--	0.385	6.73	8.51	17.7	0
	3B	2/3/2012	10:00	3,000	4.35	--	0.416	6.78	8.66	50.1	0
MW-6	--	12/5/2011	14:00	--	6.84	12.0	0.476	6.12	11.5	--	--
	--	1/25/2012	8:30	0	5.16	--	0.462	6.31	9.46	0.0	0
	1A	1/26/2012	11:00	500	4.87	--	0.471	6.26	9.07	0.0	0
	1B/2A	1/27/2012	11:15	1,000	4.68	--	0.426	6.28	9.33	0.0	0
	3A	1/30/2012	11:30	2,000	5.82	--	0.401	6.31	9.15	0.0	0
	3B	1/31/2012	13:20	2,600	4.29	--	0.419	6.33	9.21	0.0	0
	3B	2/3/2012	9:55	3,000	4.75	--	0.473	6.42	8.49	0.2	0

Notes:
DTW = Depth to water
mS/cm = Millisiemens per centimeter
°C = Degrees Celsius
ft BTOC = Feet below top of casing
VOCs = Volatile organic compounds
H_2S = Hydrogen sulfide
ppm = Parts per million
-- = Not analyzed, not measured, or not applicable

Table 5
Site Groundwater Geochemical Analytical Data

Subsurface Injection Completion Report
ARCO Station No. 00217 (5377)
13131 Bothell Everett Highway Everett, WA

Relative Location	Monitoring Well ID	Date Sampled	Total Alkalinity[1] (as $CaCO_3$) (mg/L)	Sulfate[2] (mg/L)	Sulfide[3] (mg/L)	NO2 plus NO3 Nitrogen[4] (mg/L)	Nitrite as N (mg/L)	Methane[5] (µg/L)	Total Fe[6] (µg/L)	Dissolved Fe[6] (µg/L)
Upgradient/Crossgradient	**MW-1**	12/5/2011	37.4	59.1	<0.40	2.0	<0.010	<10.0	113	<100
Dose Response Wells	**MW-2**	12/2/2011	217	18.8	<0.40	<0.050	0.019	1,730	18,800	5,010
		2/3/2012	--	3,100	33.3	--	--	--	--	--
		3/9/2011	--	238	<0.40	--	--	<6.6	37,700	2,720
	MW-5	12/2/2011	178	2.1	<0.40	<0.050	<0.010	299	3,650	596
		2/3/2012	--	44.6	<0.40	--	--	--	--	--
		3/9/2012	--	--	--	--	--	--	2,440	--
	MW-6	12/5/2011	121	14.6	<0.40	0.15	<0.010	<10.0	6,870	<100
		2/3/2012	--	97.6	<0.40	--	--	--	--	--
		3/9/2012	--	325	<0.40	--	--	90.1	2,290	<100
Downgradient	**MW-9**	12/5/2011	34.9	8.3	<0.40	2.1	<0.010	<10.0	59,600	<100
	MW-10	12/5/2011	22.6	9.2	<0.40	1.8	<0.010	<10.0	37,800	<100

Notes:
USEPA = United States Environmental Protection Agency
$CaCO_3$ = Calcium carbonate
mg/L = Milligrams per liter
µg/L = Micrograms per liter
mS/cm = Millisiemens per centimeter
-- = Not analyzed, not measured, or not applicable
Fe = Iron
N = Nitrogen

[1] Total alkalinity analyzed using Method SM 2320B
[2] Sulfate analyzed by USEPA method 300.0
[3] Sulfide analyzed by Method SM 4500-S 2 F
[4] Nitrogen, Nitrite/Nitrate analyzed by USEPA method 353.2
[5] Methane analyzed using Method RSK 175
[6] Total and dissolved iron analyzed by USEPA method 6010

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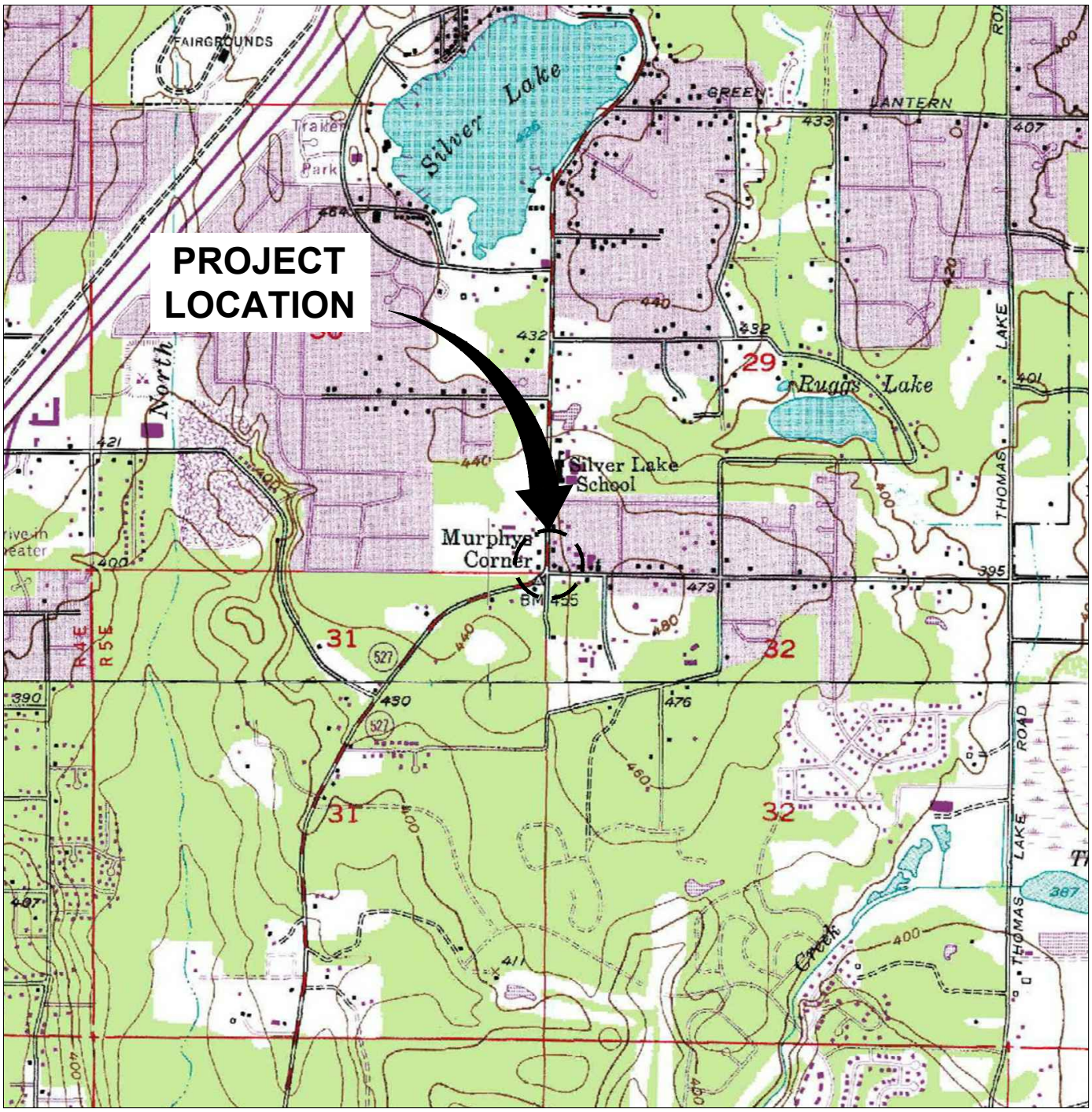
Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD.,EVERETT AND BOTHELL, WA, 1991.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.

WASHINGTON

ATLANTIC RICHFIELD COMPANY
ARCO STATION NO. 00217 (5377)
13131 BOTHELL EVERETT HIGHWAY, EVERETT, WASHINGTON

SUBSURFACE INJECTION COMPLETION REPORT

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:--- PIC:--- PM: S. DAVIS TM: T. POTTER LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\WA01K0000\GP09BPNAWA01B01.dwg LAYOUT: 1 SAVED: 3/30/2012 1:59 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 4/2/2012 10:00 AM BY: REYES, ALEC

IMAGE: GOOGLE EARTH PRO

0 200' 400'

Scale: 1 in. = 200 ft.

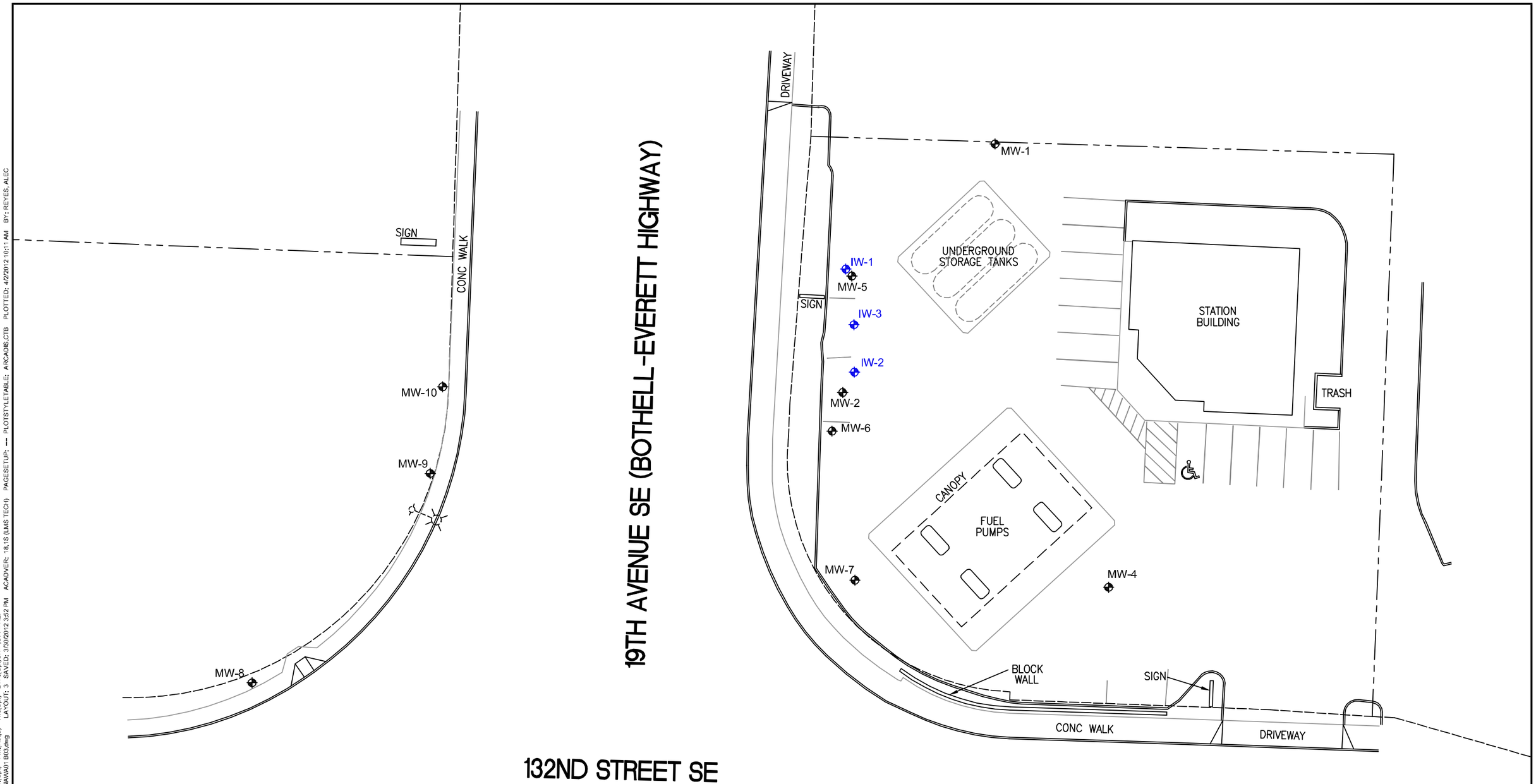
ATLANTIC RICHFIELD COMPANY
ARCO STATION NO. 00217 (5377)
13131 BOTHELL EVERETT HIGHWAY, EVERETT, WASHINGTON
SUBSURFACE INJECTION COMPLETION REPORT

SITE AERIAL PHOTO

ARCADIS

FIGURE
2

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:--- PIC:--- PM: S. DAVIS TM: T. POTTER LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\WA01K0000\GP09BPNAWA01B02.dwg LAYOUT: 2 SAVED: 3/30/2012 3:14 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 4/2/2012 10:04 AM BY: REYES, ALEC



LEGEND:

APPROXIMATE PROPERTY BOUNDARY

MW-3 GROUNDWATER MONITORING WELL LOCATION

IW-1 INJECTION WELL LOCATION

0 30' 60'

GRAPHIC SCALE

ATLANTIC RICHFIELD COMPANY
ARCO STATION NO. 00217 ((5377)
13131 BOTHELL EVERETT HIGHWAY, EVERETT, WASHINGTON

SUBSURFACE INJECTION COMPLETION REPORT

SITE PLAN

ARCADIS

FIGURE
3

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 4/2/2012 10:11 AM BY: REYES, ALEC
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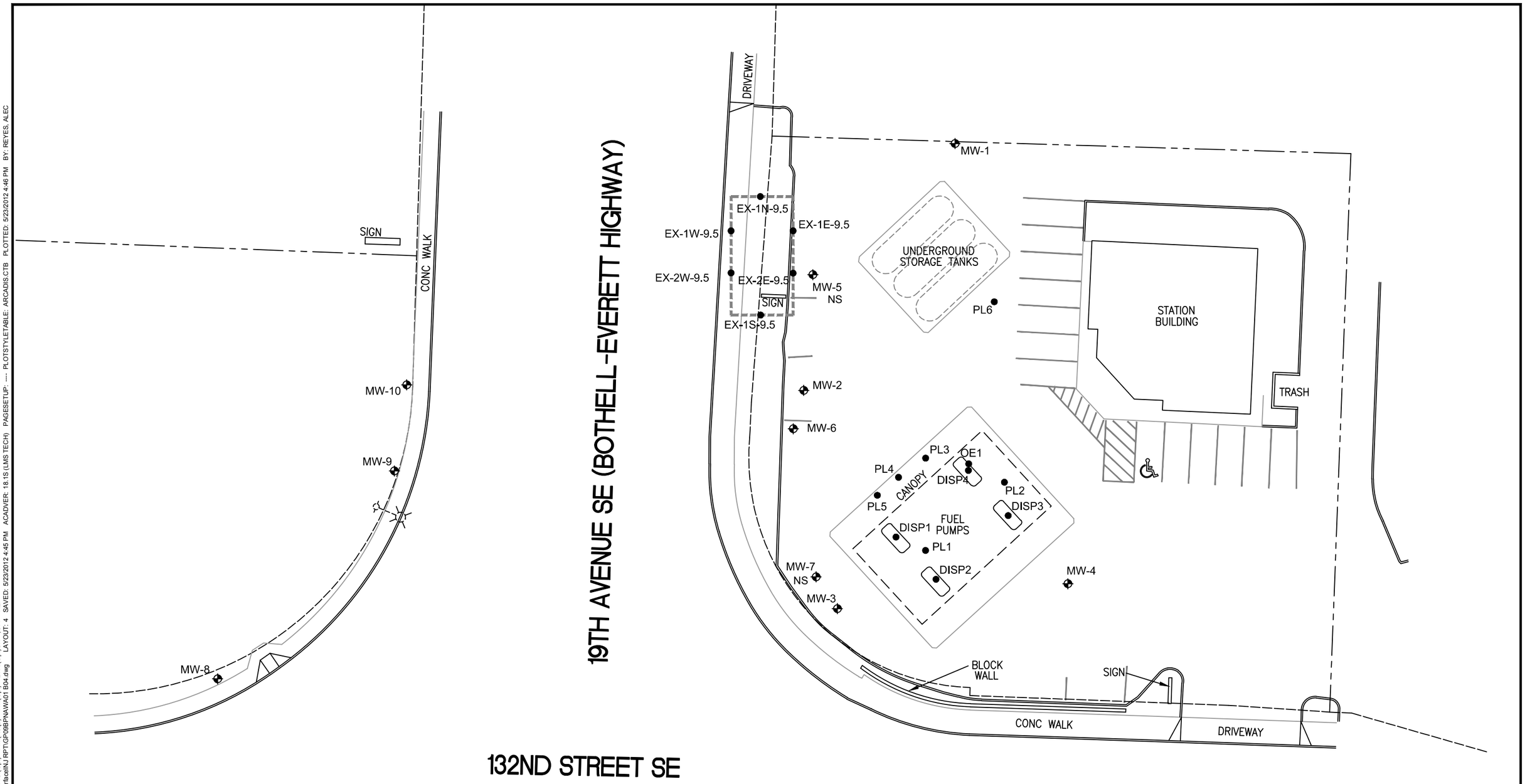

LEGEND:

— — —	APPROXIMATE PROPERTY BOUNDARY
MW-3 ⊕	GROUNDWATER MONITORING WELL LOCATION
NS	NOT SAMPLED
PL1 ●	SOIL SAMPLING LOCATION

0 30' 60'
GRAPHIC SCALE

ATLANTIC RICHFIELD COMPANY
ARCO STATION NO. 00217 (5377)
13131 BOTHELL EVERETT HIGHWAY, EVERETT, WASHINGTON
SUBSURFACE INJECTION COMPLETION REPORT

HISTORIC SOIL BORING LOCATIONS

ARCADIS

FIGURE
4

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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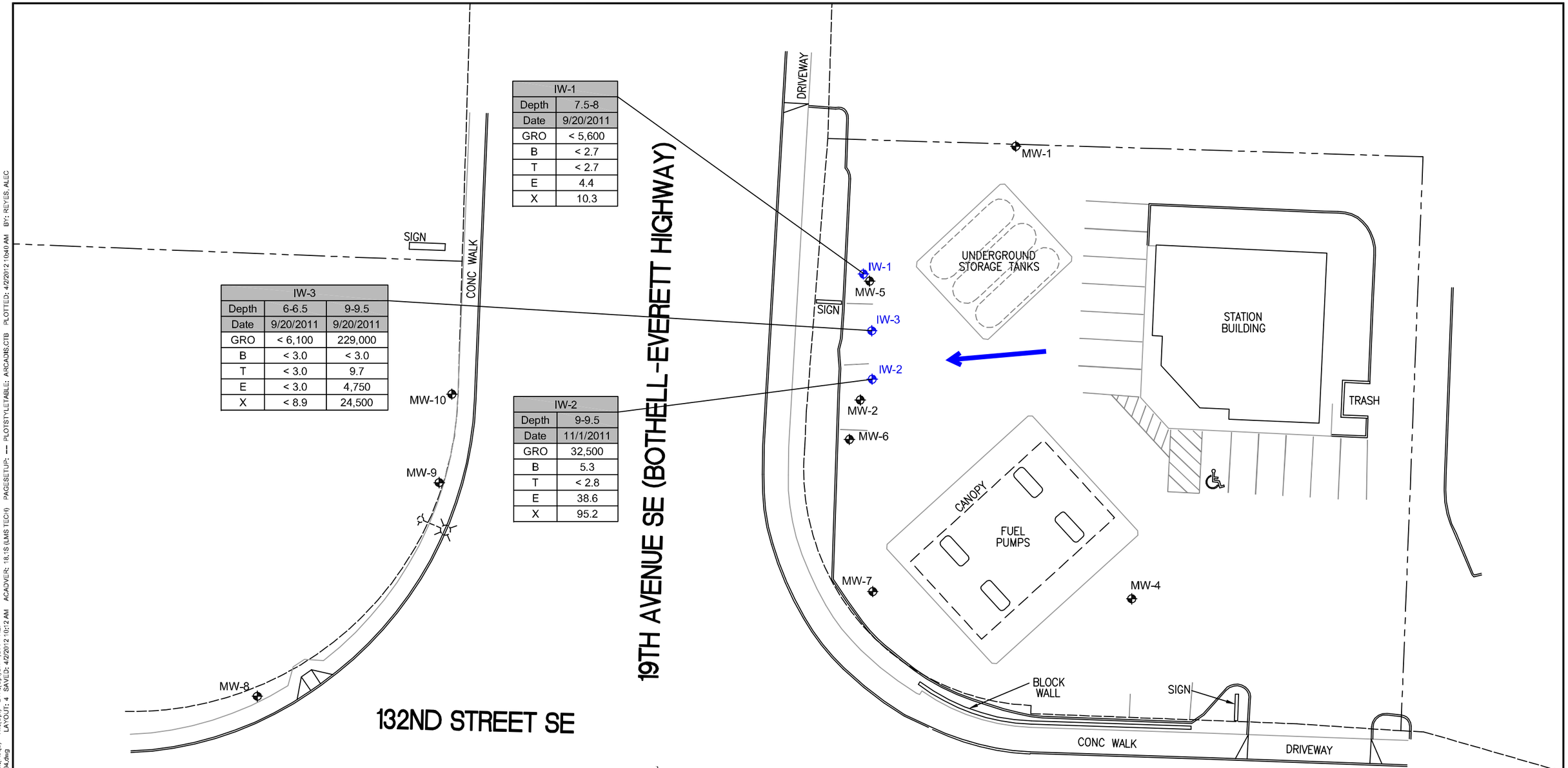

IW-1	
Depth	7.5-8
Date	9/20/2011
GRO	< 5,600
B	< 2.7
T	< 2.7
E	4.4
X	10.3

IW-2	
Depth	9-9.5
Date	11/1/2011
GRO	32,500
B	5.3
T	< 2.8
E	38.6
X	95.2

IW-3		
Depth	6-6.5	9-9.5
Date	9/20/2011	9/20/2011
GRO	< 6,100	229,000
B	< 3.0	< 3.0
T	< 3.0	9.7
E	< 3.0	4,750
X	< 8.9	24,500

LEGEND:

———	APPROXIMATE PROPERTY BOUNDARY
MW-3	GROUNDWATER MONITORING WELL LOCATION
IW-1	INJECTION WELL LOCATION
	APPROXIMATE HYDRAULIC GRADIENT DIRECTION - DECEMBER 2, 2011
GRO	TOTAL PETROLEUM HYDROCARBONS, GASOLINE RANGE ORGANICS
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES

NOTE: ALL CONCENTRATIONS IN MICROGRAMS PER KILOGRAM (µg/KG)

0 30' 60'
GRAPHIC SCALE

ATLANTIC RICHFIELD COMPANY
ARCO STATION NO. 00217 (5377)
13131 BOTHELL EVERETT HIGHWAY, EVERETT, WASHINGTON
SUBSURFACE INJECTION COMPLETION REPORT

INJECTION WELL SOIL DATA

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FIGURE
5

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LY:R:(Opt)ON=*;OFF=*REF* ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 4/2/2012 10:40 AM BY: REYES, ALEC
G:\ENVCAD\Emeryville\ACT\GP09BP-NA\WA01\K0000\GP09BPNAWA01 C04.dwg LAYOUT: 4 SAVED: 4/2/2012 10:12 AM

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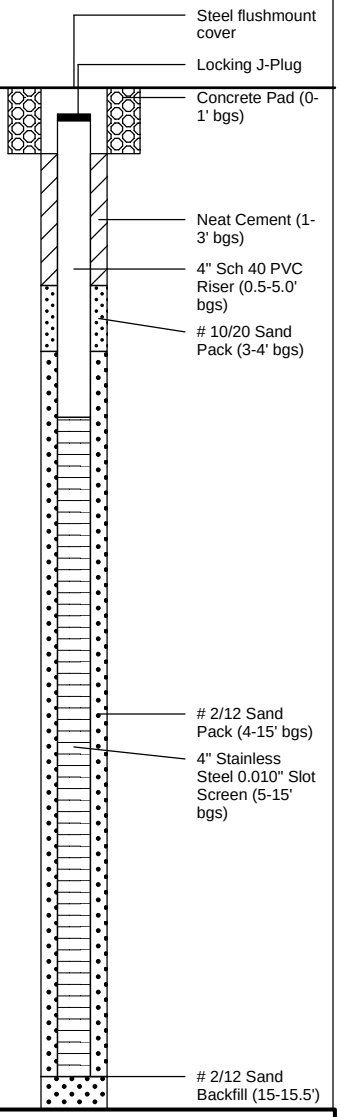
Appendix **A**

Boring Logs

Date Start/Finish: 09/20/2011 **Drilling Company:** Cascade Drilling Company **Driller's Name:** NA **Drilling Method:** Hollow Stem Auger **Auger Size:** NA **Rig Type:** NA **Sampling Method:** Split Spoon (1.5')	**Northing:** NA **Easting:** NA **Casing Elevation:** NA **Borehole Depth:** 15.5 feet **Surface Elevation:** NA **Descriptions By:** EE/LW	**Well/Boring ID:** **IW-1** **Client:** ARCADIS BP WA **Location:** WA-00217 (5377) 13131 Bothell-Everett Highway Everett, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (Inches)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	0									Asphalt.
										Brown SAND, very loose, damp.
										Asphalt.
			2-2.5				0.0			Brown fine to medium SAND, very loose, moderately graded, little Pebbles, dry.
			4-4.5	NA	NA	NA	0.0			Grey Silty SAND, moderately dense to dense, some Pebbles, dry.
5	-5									
			6-6.5				0.9			Grey Silty SAND, stiff, little Pebbles, dry.
			6.5-8	13"	12 12 73	NA	9.8	X		Grey Clayey SILT, little fine Sand, trace Gravel, soft, low to high plasticity, slightly moist.
			8-9.5	18"	7 50/6	NA	0.7			Silty CLAY, stiff to moderately stiff, moderate plasticity, trace Gravel, slightly moist.
10	-10		9.5-11	18"	50/6	NA	0.0			Grey Clayey SILT, stiff to soft, trace fine to coarse Gravel, slightly moist.
			11-12.5	18"	70/6	NA	0.0			Silty CLAY, stiff to moderately stiff, moderate plasticity, trace Gravel, slightly moist.
			12.5-14	18"	50/6	NA	0.1			Silty CLAY, stiff to moderately stiff, moderate plasticity, some Gravel, dry.
										NA
15	-15		14-15.5	NA	50/6	NA	0.1			

Well/Boring Construction



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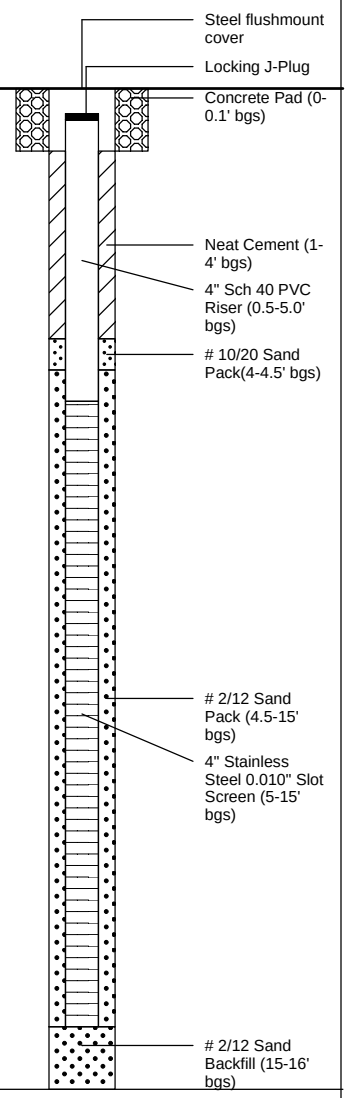
Remarks: bgs = below ground surface
NA = Not Applicable/Available
' = Foot/Feet
" = Inches.

Sample: 7.5-8' bgs (PID= 9.8ppm)

Date Start/Finish: 11/01/2011 **Drilling Company:** Cascade Drilling Company **Driller's Name:** NA **Drilling Method:** Hollow Stem Auger **Auger Size:** NA **Rig Type:** NA **Sampling Method:** Split Spoon (1.5')	**Northing:** NA **Easting:** NA **Casing Elevation:** NA **Borehole Depth:** 16 Feet **Surface Elevation:** NA **Descriptions By:** EE	**Well/Boring ID:** **IW-2** **Client:** ARCADIS BP WA **Location:** WA-00217 (5377) 13131 Bothell-Everett Highway Everett, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (Inches)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	0									Asphalt.
			2-2.5				5.0			Dark brown fine to coarse SAND, some Gravel, trace Silt, dense, well graded. Note: Asphalt at 2.7' bgs.
										Dark grey-brown fine to coarse SAND, some Clay and Gravel, dense, well graded, moderate plasticity Clay.
			4-4.5	NA	NA	NA	2.8			
5	-5						12.7			
			6.5-8	0"	16 21 20	NA	NA			Dark grey fine to coarse Clayey SAND, little Gravel, moderate plasticity, well graded, damp.
			8-9.5	18"	8 10 14	NA	1689	X		Grey fine Silty SAND, little Clay, loose to dense, trace Gravel, moderately graded, damp.
10	-10		9.5-11	18"	11 15 16	NA	647			Grey fine to medium Clayey SAND, little Silt and Gravel, no to low plasticity, wet.
			11-12.5	10"	16 21 35	NA	17.5			Light brown Silty CLAY, very stiff, moderately plastic, trace Gravel.
			12.5-14.5	NA	NA	NA	NA			NA
15	-15		14.5-16	12"	17 50/6	NA	92			Light brown Silty CLAY, little fine to medium Sand and Gravel, very stiff, moderate plasticity, moist to dry.

Well/Boring Construction



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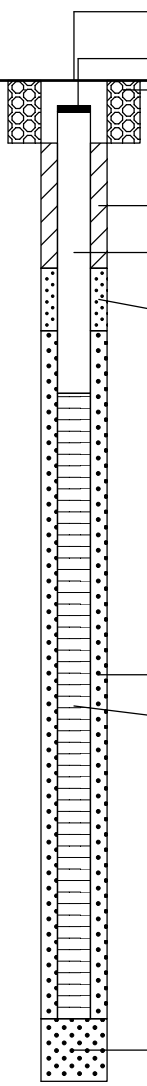
Remarks: bgs = below ground surface
NA = Not Applicable/Available
' = Foot/Feet
" = Inches

Sample: 9-9.5' bgs (PID= 15.0ppm)

Date Start/Finish: 09/20/2011 **Drilling Company:** Cascade Drilling Company **Driller's Name:** NA **Drilling Method:** Hollow Stem Auger **Auger Size:** NA **Rig Type:** NA **Sampling Method:** Split Spoon (1.5')	**Northing:** NA **Easting:** NA **Casing Elevation:** NA **Borehole Depth:** 16.5 Feet **Surface Elevation:** NA **Descriptions By:** EE/LW	**Well/Boring ID:** **IW-3** **Client:** ARCADIS BP WA **Location:** WA-00217 (5377) 13131 Bothell-Everett Highway Everett, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (Inches)	Blow Counts	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	0									Asphalt.
										Dark brown SAND, some fine to medium Gravel, trace Silt, well graded, dry.
			2-2.5				5.0			
			4-4.5	NA	NA	NA	2.8			
5	-5									
			6-6.5				12.7	X		
			6.5-8	0"	16 21 20	NA	NA			No Recovery. Obstruction of split spoon probing.
			8-9.5	18"	8 10 14	NA	1689	X		Grey Silty SAND, little Clay, trace fine to medium Pebbles, loose to very loose, well graded, strong odor, moist.
10	-10		9.5-11	18"	11 15 16	NA	647			Grey Clayey SILT, little fine Sand and fine to medium gravel, moist.
			11-12.5	10"	16 21 35	NA	17.5			Grey Sandy SILT, little Clay, slight plasticity, stiff, trace fine to coarse Gravel, dry.
			12.5-15	NA	NA	NA	NA			No Sample.
15	-15		15-16.5	12"	17 50/6	NA	92			Grey Sandy SILT, little Clay, slight plasticity, stiff, trace fine to coarse Gravel, dry.
										No Recovery.

Well/Boring Construction



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Remarks: bgs = below ground surface
NA = Not Applicable/Available
' = Foot/Feet
" = Inches

Sample: 6-6.5' bgs (PID= 12.7ppm); 9-9.5' bgs (PID= 1684ppm)

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Appendix **B**

Injection Slug Test Field Data Sheets

Pump Test Log Well IW-1
WA-0027

Date: 12/8/1

Static Water Level: 6.02'
Depth to well bottom: 14.44'
Water Column: 8.42'
90% of water column: 7.58'
DTW: 6.86'
Depth to ~~pump intake~~ Transducer: 14.00'
Total Volume Introduced: 5 gallons

Transducer Location (Well ID): IW-1
Transducer Log Title: IW-1

Time	Slug Volume	Depth to Water (Feet)	Slug In Time	Slug In Depth to Water	Notes (appearance, periodic transducer DTW)
1347 13:50	5 gal.	6.02'	13:50	NM	5 gal. Slug-in
1347.30		3.41		3.41'	
1347.40		3.64			
1347.50		3.72			
1348.00		3.75			
1348.10		3.78			
1348.20		3.79			
1348.30		3.80			
1348.40		3.82			
1348.50		3.84			
1349.10		3.87			
1349.30		3.89			
1349.50		3.91			
1350.20		3.93			
1350.50		3.96			
1351.20		3.97			
1351.50		3.98			
1352.50		4.02			
1352.50		4.03			
1355.50		4.09			
1357.50		4.13			
~~1361~~ 1402.50		4.20			
1407.50		4.28			
1412.50		4.34			
1417.50		4.41			

Pump Test Log Well IW-1 **Date:** 12/5/11

Depth to pump inlet: TOC Depth to well bottom: 14.44'

Transducer 1 Test ID: IW-1

Transducer 1 Start Time:

Target Injection Rates:

Time	Injection Rate (gpm)	Depth to Water (Feet)	Notes (appearance, periodic transducer DTW)
1429	~~0.5~~ 1.0	4.49	
.15		4.38	
.30		4.27	
.45		4.11	
1430.00		3.98	
1430.15		3.89	
1430.30		3.77	
1430.45		3.58	
1431.00		3.51	
1431.15		3.38	
1431.30		3.25	
1431.45		3.12	
1432.00		2.99	
1432.15		2.81	
1432.30		2.75	
1432.45		2.62'	
1433.00		2.53'	
1433.15		2.44'	
1433.30		2.38'	
1433.45		2.18'	
1434.0		2.09'	
1434.15		1.99'	
1434.30		1.91'	

Pump Test Log Well IW-2

Date: 12/5/1

Static Water Level: 6.92'
Depth to well bottom: 14.50'
Water Column: 7.58'
90% of water column: 6.82'

Transducer Location (Well ID): IW-2
Transducer Log Title: IW-2

Depth to pump intake: TOC
Total Volume Introduced: 5 Gallons

Time	Slug Volume	Depth to Water (Feet)	Slug In Time	Slug In Depth to Water	Notes (appearance, periodic transducer DTW)
PM 1500	5 Gal.	6.92'	1500	6.92	5 Gal. Slug Introduced
1500:30		3.85'			
1500:40		4.14'			
1500:50		4.25'			
1501:00		4.30'			
1501:10		4.31'			
1501:20		4.31'			
1501:30		4.32'			
1501:40		4.32'			
1501:50		4.32'			
1502:00		4.32'			
1502:30		4.32'			
1503:00		4.32'			
1503:30		4.33'			
1504:00		4.33'			
1505		4.34'			
1506		4.37'			
1507		4.38'			
1508		4.39'			
1513		4.42'			
1518		4.45'			
1523		4.61'			
~~1528~~					
~~1532~~					
1528		4.79'			

Pump Test Log Well IW-2 **Date:** 12/5/11

~~Former Unocal Edmonds Terminal~~
~~Edmonds WA~~

Time	Injection Rate (gpm)	Depth to Water (Feet)	Notes (appearance, periodic transducer DTW)
1539	0.5	4.76'	
1540		4.65'	
1540.15		4.53'	
1540.30		4.48'	
.45		4.40'	
.00		4.35'	
.15		4.30'	
.30		4.29'	
.45		4.28'	
1542.15	0.75	4.18'	
.30		4.10'	
.45		4.07'	
1543.00		4.02'	
.15		3.99'	
.30		3.91'	
.45		3.91	
.00	1.5	3.15'	
.15		1.20'	

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Appendix **C**

Groundwater Monitoring Field Data Sheets

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Groundwater Monitoring Well Gauging Form

Site ID: WA-00217 Project #: GP09BPNA.WA01

Site Address: 13131 Bothell Everett Hwy Everett, WA Date: 12/2/2011

Well ID	Time	Sheen/ Odor	LNAPL Depth	LNAPL Thinkness	DTW	TD	Notes
MW-1	9:14	—	—	—	7.23	17.95	2" case
MW-2	9:45	—	—	—	6.38	19.68	4" case
MW-4	10:12	—	—	—	8.79	23.75	2" case
MW-5	9:20	—	—	—	6.47	14.52	1" case
MW-6	9:51	—	—	—	6.53	14.29	1" case
MW-7	10:01	—	—	—	7.37	13.90	1" case
MW-8	8:59	—	—	—	6.49	13.79	1" case
MW-9	8:49	—	—	—	7.38	14.49	1" case
MW-10	8:41	—	—	—	7.00	14.17	1" case
IW-1	9:07	—	—	—	6.19	14.44	4" case
IW-2	9:37	—	—	—	6.77	14.50	4" case
IW-3	9:29	—	—	—	6.32	14.45	4" case

ARCADIS Groundwater Sampling Form

Page 1 of 1

Project No. GP09BPNA.WA01.K0000 Well ID MW- 1 Date 12/7/2011

Project Name/Location WA-00217/13131 Bothell Everett Hwy, Everett, WA Weather

Measuring Pt. Description TOC Screen Setting (ft-bmp) Refer to Log Casing Diameter (in.) 2" Well Material X PVC ___ SS

Static Water Level (ft-btoc) 7.09' Total Depth (ft-btoc) 17.95 Water Column/ Gallons in Well 10.86 / 1.759 Initial PID Reading (ppm) 0.0

TOC Elevation NM Pump Intake (ft-btoc) 12.16' Purge Method: Low-Flow / Centrifugal / Submersible / Other Sample Method LFS

Pump On/Off 1204/1222 Volumes Purged

Sample Time: Label 1224 Start 1224 End 1229 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Ferrous Iron: NM

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
1212	3	200	NM	<0.1	6.27	0.238	NM	7.11	13.73	257.8	Cloudy	None
1215	6	↓	↓	0.2	6.27	0.230	NM	5.66	13.95	263.0	"	"
1218	9	↓	↓	0.3	6.26	0.235	NM	5.55	14.12	266.5	"	"
1221	12	~200	NM	0.4	6.26	0.235	NM	5.54	14.14	268.7	"	"

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.25" = 0.06 1.5" = 0.09 2" = 0.162 2.5" = 0.26 3" = 0.37 3.5" = 0.50 4" = 0.653 6" = 1.47

Well Information

Well Location: North side of 5.72 Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: NM

GW Samp Form 12/12/2011

ARCADIS Groundwater Sampling Form

Page 5 of ____

Project No. GP09BPNA.WA01.K0000 Well ID MW- 2 Date 12/2/2011

Project Name/Location WA-00217/13131 Bothell Everett Hwy, Everett, WA Weather ____

Measuring Pt. Description TOC Screen Setting (ft-bmp) — Casing Diameter (in.) 2 Well Material X PVC ___ SS

Static Water Level (ft-btoc) 6.38 Total Depth (ft-btoc) 19.68 Water Column/ Gallons in Well — Initial PID Reading (ppm) ____

TOC Elevation — Pump Intake (ft-btoc) 15 Purge Method: Low-Flow ___ Centrifugal ___ Submersible ___ Other ___ Sample Method LFS

Pump On/Off 13:15 Volumes Purged L1

Sample Time: Label 13:20 Start 13:30 End 13:50 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
13:17	0	100	6.38	L1	6.56	0.553	—	2.61	11.57	47.3	clear	none
13:20	3	100	6.41	L1	6.55	0.550	—	1.00	11.82	30.4	|	|
13:23	6	100	6.45	L1	6.55	0.548	—	1.01	12.09	14.2	|	|
13:26	9	100	6.47	L1	6.55	0.548	—	0.83	12.07	7.8	|	|
Hach	Kit	=	10	mg/L	Fe							

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.162	3" = 0.37	4" = 0.653	

Well Information

Well Location: Western Property Edge Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: ____

GW Samp Form 12/8/2011

ARCADIS Groundwater Sampling Form

Page 2 of ____

Project No. GP09BPNA.WA01.K0000 Well ID MW-5 Date 12/2/2011

Project Name/Location WA-00217/13131 Bothell Everett Hwy, Everett, WA Weather Clear

Measuring Pt. Description TOC Screen Setting (ft-bmp) — Casing Diameter (in.) 1" Well Material X PVC ___ SS

Static Water Level (ft-btoc) 6.47 Total Depth (ft-btoc) 14.52 Water Column/ Gallons in Well — Initial PID Reading (ppm) ____

TOC Elevation — Pump Intake (ft-btoc) 12 Purge Method: Low-Flow ___ Centrifugal ___ Submersible ___ Other ___ Sample Method LFS

Pump On/Off 11:15 Volumes Purged 4L

Sample Time: Label 11:22 Start 11:30 End 14:15 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
11:18	0	100	6.47	1	6.58	0.398	—	1.45	13.21	89.0	clear	none
11:21	3	100	9.31	1	6.54	0.390	—	1.90	13.11	74.6		
11:24	6	100	11.27	1	6.58	0.387	—	3.70	13.33	58.9		
11:27	9	100	[illegible]	1	6.56	0.388	—	2.95	13.27	51.0		
			15.99									
Purged dry at 11:34, will allow to recharge and sample at end of day.												
14:00	DTW = 9.65											
Filled remaining container @ 14:15												

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.25" = 0.06 1.5" = 0.09 2" = 0.162 2.5" = 0.26 3" = 0.37 3.5" = 0.50 4" = 0.653 6" = 1.47

Well Information

Well Location: Western Property Edge

Condition of Well: Good

Well Completion: Flush Mount / Stick Up

Well Locked at Arrival: Yes / No

Well Locked at Departure: Yes / No

Key Number To Well:

GW Samp Form 12/12/2011

ARCADIS Groundwater Sampling Form

Page ____ of ____

Project No. GP09BPNA.WA01.K0000 Well ID MW-6 Date 12/5/2011

Project Name/Location WA-00217/13131 Bothell Everett Hwy, Everett, WA Weather

Measuring Pt. Description TOC Screen Setting (ft-bmp) — Casing Diameter (in.) 1" Well Material X PVC ___ SS

Static Water Level (ft-btoc) 6.84 Total Depth (ft-btoc) 14.29 Water Column/ Gallons in Well 0.298 Initial PID Reading (ppm) 0.6

TOC Elevation — Pump Intake (ft-btoc) 12 Purge Method: Low-Flow ___ Centrifugal ___ Submersible ___ Other ___ Sample Method LFS

Pump On/Off 1117/ Volumes Purged L1

Sample Time: Label 14:00 Start 14:15 End 14:35 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
1120	5	250	NM	<0.1	6.16	0.478	NM	3.73	11.52	500.1	Brown	None
1123	6	~50	↓	0.2	6.12	0.476	NM	1.77	11.54	79.9	"	"
1126	9	↓	↓	0.25	↓							
1129	12	~50	NM	0.3	↓							
Well	went	Dry.	Will	wait	for	recharge	to	collect	sample			
			@ <0.2 g.p.l.									

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.5" = 0.09 2.5" = 0.26 3.5" = 0.50 6" = 1.47
1.25" = 0.06 2" = 0.162 3" = 0.37 4" = 0.653

Well Information

Well Location: South West Corner of Site Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: NM

GW Samp Form 12/12/2011

ARCADIS Groundwater Sampling Form

Page ___ of ___

Project No. GP09BPNA.WA01.K0000 Well ID MW-9 Date 12/5/2011

Project Name/Location WA-00217/13131 Bothell Everett Hwy, Everett, WA Weather Cloudy, 40s

Measuring Pt. Description TOC | Screen Setting (ft-bmp) Refer | Casing Diameter (in.) 1" | Well Material X PVC ___ SS

Static Water Level (ft-btoc) 7.68' | Total Depth (ft-btoc) 14.49 | Water Column/ Gallons in Well 6.81 / 0.27 | Initial PID Reading (ppm) 0.1

TOC Elevation NM | Pump Intake (ft-btoc) ~12' | Purge Method: Low-Flow, Centrifugal, Submersible, Other | Sample Method LFS

Pump On/Off 1015 / | Volumes Purged

Sample Time: Label 1 | Start | End | Replicate/ Code No. No Duplicates | Sampled by Kyle Haslam

Ferrous Iron = 5.2 mg/l

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
1018	3	~50	NM	<0.1	5.52	0.138	NM	3.65	10.74	304.9	Brown	None
1021	6	~50	↓	0.2	5.54	0.136	NM	2.59	11.10	304.0	"	"
1024	9	~50	↓	0.25	5.54	0.135	NM	2.27	11.25	304.6	"	"
1027	12	~50	NM	0.3	5.54	0.135	NM	2.15	11.22	304.3	"	"

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot: 1" = 0.04, 1.25" = 0.06, 1.5" = 0.09, 2" = 0.162, 2.5" = 0.26, 3" = 0.37, 3.5" = 0.50, 4" = 0.653, 6" = 1.47

Well Information

Well Location: West of Site | Well Locked at Arrival: Yes / No

Condition of Well: Good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well: NM

GW Samp Form 12/7/2011

ARCADIS Groundwater Sampling Form

Project No. GP09BPNA.WA01.K0000 Well ID MW- 10 Date 12/5/2011

Project Name/Location WA-00217/13131 Bothell Everett Hwy, Everett, WA Weather Cloudy, 20s

Measuring Pt. Description TOC Screen Setting (ft-bmp) Refer to Boring Log Casing Diameter (in.) 1" Well Material X PVC ___ SS

Static Water Level (ft-btoc) 7.54 Total Depth (ft-btoc) 14.17 Water Column/ Gallons in Well 6.65 / 0.27 Initial PID Reading (ppm) 0.0

TOC Elevation NM Pump Intake (ft-btoc) 12' Purge Method: Low-Flow / Centrifugal / Submersible / Other Sample Method LFS

Pump On/Off 0920/0930 Volumes Purged

Sample Time: Label 0937 Start 0937 End 0945 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
0925	3	250	NM	<0.1	5.07	0.153	NM	7.87	10.29	252.0	Brown	None
0926	6	250	NM	0.2	5.51	0.101	NM	4.92	10.28	266.9	"	"
0929	9	250	NM	0.25	5.54	0.101	NM	4.87	10.42	270.8	"	"
0932	12	250	NM	0.3	5.57	0.101	NM	4.89	11.00	275.9	"	"

Hach Kit = 5.4 mg/L Fe

Constituents Sampled	Container	Number	Preservative

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.162	3" = 0.37	4" = 0.653	

Well Information

Well Location: West of Site Well Locked at Arrival: Yes / No

Condition of Well: Good Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: NM

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Groundwater Monitoring Well Gauging Form

Site ID: WA-00217 Project #: GP09BPNA.WA01.K0000

Site Address: 13131 Bothell Everett Hwy Date: 2-3-2012
Everett, WA 98444

Well ID	Time	Sheen/ Odor	LNAPL Depth	LNAPL Thinkness	DTW	TD	Notes
MW-6	9:34	None	—	—	4.75	14.29	0.2 PPM H_2S = 0
MW-2	9:40	None	—	—	4.66	19.69	8.4 PPM H_2S = 0
MW-5	9:43	None	—	—	4.35	14.53	50.1 PPM H_2S = 0

ARCADIS Groundwater Sampling Form

Project No. GP091BPNA.WA01.K0000 Well ID MW- 2 Date 2-3-2012

Project Name/Location Weather Clear

Measuring Pt. Description TOC | Screen Setting (ft-bmp) — | Casing Diameter (in.) 2" | Well Material X PVC ___ SS

Static Water Level (ft-btoc) 4.66 | Total Depth (ft-btoc) 19.69 | Water Column/ Gallons in Well 2.43 | Initial PID Reading (ppm) 8.4

TOC Elevation — | Pump Intake (ft-btoc) — | Purge Method: Bailer, Centrifugal, Submersible, Other | Sample Method Bailer

Pump On/Off — | Volumes Purged 2.5 gallons

Sample Time: Label 10:15, Start 10:20, End 10:30 | Replicate/ Code No. No Duplicates | Sampled by Kyle Haslam

Stabilized Range: ~.5 ft | 0.1 | 3% | 10% | 3%

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
9:30	0	—	4.66	0	6.54	4.952	—	—	11.71	—	Clear	None
Sulfide Field Test =				0	mg/L							

Constituents Sampled	Container	Number	Preservative
Sulfate		1	None
Sulfide		1	NaOH + Zn Acetate

Well Casing Volumes

Gallons/Foot: 1" = 0.04, 1.25" = 0.06, 1.5" = 0.09, 2" = 0.162, 2.5" = 0.26, 3" = 0.37, 3.5" = 0.50, 4" = 0.653, 6" = 1.47

Well Information

Well Location: Western Property Edge | Well Locked at Arrival: Yes / No

Condition of Well: Good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well: NA

GW Samp Form 11/16/2011

ARCADIS Groundwater Sampling Form

Project No. GP09BPNA.WA01.K0000 Well ID MW-5 Date 2-3-2012

Project Name/Location WA-00217 Weather Clear

Measuring Pt. Description TOC

Screen Setting (ft-bmp) —

Casing Diameter (in.) 1"

Well Material X PVC ___ SS

Static Water Level (ft-btoc) 4.35

Total Depth (ft-btoc) 14.53

Water Column/ Gallons in Well 0.40

Initial PID Reading (ppm) 50.1

TOC Elevation —

Pump Intake (ft-btoc) —

Purge Method: Bailer; Centrifugal; Submersible; Other

Sample Method Bailer

Pump On/Off —

Volumes Purged 0.5 gallons

Sample Time: Label 10:40; Start 10:45; End 10:55

Replicate/ Code No. No Duplicates

Sampled by Kyle Haslam

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
10:00	0	—	4.35	0	6.78	0.416	—	—	8.66	—	Clear	None
Sulfide Field Test = 0 mg/L												

Constituents Sampled	Container	Number	Preservative
Sulfate		1	None
Sulfide		1	NaOH + Zn Acetate

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.162	3" = 0.37	4" = 0.653	

Well Information

Well Location: ___ Well Locked at Arrival: Yes / No

Condition of Well: ___ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: ___

ARCADIS Groundwater Sampling Form

Project No. 6P09B17 NA, WA01, Kaw Well ID MW-6 Date 2-3-2012

Project Name/Location WA-00217 Weather Clear

Measuring Pt. Description TOC | Screen Setting (ft-bmp) | Casing Diameter (in.) 1" | Well Material X PVC ___ SS

Static Water Level (ft-btoc) 4.75 | Total Depth (ft-btoc) 14.29 | Water Column/ Gallons in Well 0.38 | Initial PID Reading (ppm) 0.2

TOC Elevation — | Pump Intake (ft-btoc) — | Purge Method: Bailer, Centrifugal, Submersible, Other | Sample Method Bailer

Pump On/Off — | Volumes Purged 0.38 gallons

Sample Time: Label 9:45, Start 9:49, End 10:00 | Replicate/ Code No. No Duplicates | Sampled by Kyle Haslam

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
9:50	0	—	4.75	0	6.42	0.473	—	—	8.49	—	Clear	None
Sulfide Field Test = 0 mg/L												

Constituents Sampled	Container	Number	Preservative
Sulfide		1	~~[illegible]~~ NaOH + Zn Acetate
Sulfide		1	None

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.162	3" = 0.37	4" = 0.653	

Well Information

Well Location: Western Property Edge | Well Locked at Arrival: Yes / No

Condition of Well: Good | Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up | Key Number To Well: N/A

ARCADIS

Site ID: **WA-00217** Project #: **GP09BPNA.WA01.K/N0000**

Site Address: **13131 19th Ave NE Everett, WA** Date: 3/9/12

Well ID	Time	Sheen/ Odor	LNAPL Depth	Casing Dia	DTW	TD	Notes
MW-1	8:34	-- / No	NA	2"	4.31	17.88	0.0 ppmv Water in vault
MW-2	8:23	-- / No	NA	2"	4.94	19.59	15.9 ppmv Water in vault
MW-4	8:10	-- / No	NA	2"	6.53	23.69	0.0 ppmv Water in vault. Replaced gasket.
MW-5	8:31	-- / No	NA	1"	3.79	14.51	25.0 ppmv Water in vault
MW-6	8:20	-- / No	NA	1"	4.98	14.27	0.0 ppmv Water in vault
MW-7	8:14	-- / No	NA	1"	5.88	13.76	0.0 ppmv, Water in vault 'Sea monkeys' in water
MW-8	7:48	-- / No	NA	1"	5.15	13.69	0.5 ppmv Water in vault
MW-9	7:54	-- / No	NA	1"	6.84	14.37	0.0 Water in vault
MW-10	8:01	-- / No	NA	1"	6.54	14.25	0.0

ARCADIS Groundwater Sampling Form

Project No. GP09BPNA.WA01.K/N0000 Well ID MW- 2 Date 3/9/12

Project Name/Locatior 13131 19th Ave NE Everett, WA 98208 Weather overcast, drizzle

Measuring Pt. Description TOC Screen Setting (ft-bmp) – Casing Diameter (in.) 2 Well Material X PVC ___ SS

Static Water Level (ft-btoc) 4.94 Total Depth (ft-btoc) 14.58 Water Column/ Gallons in Well 2.37 Initial PID Reading (ppm) 15.9

TOC Elevation – Pump Intake (ft-btoc) 12 Purge Method: Peristaltic Pump; Centrifugal ___; Submersible ___; Other ___ Sample Method Peristaltic Pump

Pump On/Off On Volumes Purged ___

Sample Time: Label 12:40/12:55 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Start 12:40

End 12:50

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
8:23	–	–	4.94	–	–	–	–	–	–	–	–	No
12:27	1	200	5.01	<1	5.72	1.79	41.6	1.82	9.66	252	nearly clear	
12:31	5	200	5.01	<1	5.73	1.85	40.8	0.00	9.69	223		
12:34	8	200	4.98	<1	5.74	1.60	42.3	0.00	9.64	191		
12:37	11	200	4.96	<1	5.78	1.56	41.6	0.00	9.34	160		
12:40	14	200	5.02	<1	5.80	1.52	41.1	0.00	9.38	135		

Constituents Sampled	Container	Number	Preservative
GRO (NWTPH-Gx)	Vial		HCl
BTEX (8260B)	↓	3	HCl
MTBE (8260B)	↓		HCl
Total Lead (6020)	pres. poly	1	HNO3
Total/Dissolved Iron (6010)	unpres / pres poly	2	no / HNO3
Methane (RSK175)	30mL vials	3	–
Sulfide (4500 S2F)	500mL poly	1	NaOH Zinc acetate
Sulfate (300.0)	250mL poly	1	–

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.5" = 0.09 2.5" = 0.26 3.5" = 0.50 6" = 1.47
1.25" = 0.06 2" = 0.162 3" = 0.37 4" = 0.653

Well Information

Well Location: W side of site Well Locked at Arrival: Yes / No

Condition of Well: W alley side Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: N/A

GW Samp Form
3/6/2012

ARCADIS Groundwater Sampling Form

Project No. GP09BPNA.WA01.K/N0000 Well ID MW- 5 Date 3/9/12

Project Name/Locatior 13131 19th Ave NE Everett, WA 98208 Weather drizzling, cold

Measuring Pt. Description TOC Screen Setting (ft-bmp) – Casing Diameter (in.) 1 Well Material X PVC ___ SS

Static Water Level (ft-btoc) 3.79 Total Depth (ft-btoc) 14.51 Water Column/ Gallons in Well 0.43 Initial PID Reading (ppm) 25.0

TOC Elevation – Pump Intake (ft-btoc) 9 Purge Method: Peristaltic Pump Centrifugal ___ Submersible ___ Other ___ Sample Method Peristaltic Pump

Pump On/Off on Volumes Purged ___

Sample Time: Label 13:55 Start 13:35 End 13:05 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Stabilized Range:			~.5 ft		0.1	3%	10%		3%			
Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
8:31	–	–	3.79	–	–	–	–	–	–	–	–	NO
13:43	2	200	5.11	<1	5.62	0.470	43.7	4.45	8.90	293	nearly clear	No
13:46	5	200	5.36	<1	5.62	0.468	41.0	0.56	8.80	292	↓	No
13:49	8	200	6.21	<1	5.64	0.466	40.1	0.00	8.59	290	↓	↓
13:52	11	200	6.86	<1	5.66	0.469	41.6	0.00	8.59	286	↓	↓

Constituents Sampled	Container	Number	Preservative
GRO (NWTPH-Gx)	40 mL VOA		HCl
BTEX (8260B)	40 mL VOA	3	↓
MTBE (8260B)	" "		↓
Total Lead (6020)	250 mL poly	1	HNO_3
Total/Dissolved Iron (6010)			
Methane (RSK175)			
Sulfide (4500 S2F)			
Sulfate (300.0)			

Well Casing Volumes

Gallons/Foot					
	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.162	3" = 0.37	4" = 0.653	

Well Information

Well Location: NW corner of site Well Locked at Arrival: Yes / (No)

Condition of Well: ok Well Locked at Departure: Yes / (No)

Well Completion: (Flush Mount) / Stick Up Key Number To Well: NA

ARCADIS Groundwater Sampling Form

Project No. GP09BPNA.WA01.K/N0000 Well ID MW- 6 Date 3/7/12

Project Name/Locatior 13131 19th Ave NE Everett, WA 98208 Weather overcast, windy

Measuring Pt. Description TOC Screen Setting (ft-bmp) – Casing Diameter (in.) 1 Well Material X PVC ___ SS

Static Water Level (ft-btoc) 4.98 Total Depth (ft-btoc) 14.27 Water Column/ Gallons in Well 0.37 Initial PID Reading (ppm) 0.0

TOC Elevation – Pump Intake (ft-btoc) 9.5' Purge Method: Peristaltic Pump, Centrifugal ___, Submersible ___, Other ___ Sample Method Peristaltic Pump

Pump On/Off On Volumes Purged ___

Sample Time: Label ~~8:20~~ 11:25 / 11:40 Replicate/ Code No. No Duplicates Sampled by Kyle Haslam

Start 11:25

End 11:35

Stabilized Range: ~.5 ft 0.1 3% 10% 3%

Time	Minutes Elapsed	Rate (gpm) (mL/min)	Depth to Water (ft)	Gallons Purged	pH	Cond. (µMhos) (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (°C)	Redox ORP (mV)	Appearance Color	Appearance Odor
8:20	-	-	4.98	-	-	-	-	-	-	-	-	No
11:12	4	100	5.29	<1	5.78	0.73	140.0	9.61	9.50	334	slightly cloudy	↓
11:15	7	100	5.22	<1	5.51	0.73	138.0	0.00	[illegible]	346	↓	↓
[illegible]	11	80	5.88	<1	5.50	0.92	131.0	0.00	9.59	347	↓	↓
11:22	14	80	5.72	<1	5.50	0.93	120.0	0.00	9.41	345	↓	↓
11:25	17	80	5.78	<1	5.52	0.95	73.2	0.00	9.27	343	↓	↓

Constituents Sampled	Container	Number	Preservative
GRO (NWTPH-Gx)	40 mL VOA	3	HCl
BTEX (8260B)	↓		↓
MTBE (8260B)	↓		
Total Lead (6020)	250 mL poly	1	HNO_3
Total/Dissolved Iron (6010)			
Methane (RSK175)			
Sulfide (4500 S2F)			
Sulfate (300.0)			

Well Casing Volumes

Gallons/Foot 1" = 0.04 1.25" = 0.06 1.5" = 0.09 2" = 0.162 2.5" = 0.26 3" = 0.37 3.5" = 0.50 4" = 0.653 6" = 1.47

Well Information

Well Location: W side of site, NW of [illegible] islands, SE of [illegible] Well Locked at Arrival: Yes / No

Condition of Well: [illegible] Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: NA

GW Samp Form 3/6/2012

ARCADIS

Appendix **D**

Laboratory Analytical Reports

Pace Analytical Services, Inc.
940 South Harney
Seattle, WA 98108
(206)767-5060

December 16, 2011

Alex Lopez
Arcadis
111 SW Columbia St.
Ste. 725
Portland, OR 97201

RE: Project: WA-0217
Pace Project No.: 2510198

Dear Alex Lopez:
Enclosed are the analytical results for sample(s) received by the laboratory on December 02, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield

andy.brownfield@pacelabs.com
Project Manager

Enclosures

cc: Timothy Bellis, Arcadis OR
Jonathan Flomerfelt, Arcadis U.S., Inc.
Brian Marcum, Arcadis OR
Lynne Stewart, Arcadis OR

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Seattle, WA 98108
(206)767-5060

CERTIFICATIONS

Project: WA-0217
Pace Project No.: 2510198

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Mexico Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
North Dakota Certification #: R-036A
Ohio VAP Certification #: CL101
Oklahoma Certification #: D9921
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Washington Certification #: C754
Wisconsin Certification #: 999407970

Washington Certification IDs
940 South Harney Street, Seattle, WA 98108
Alaska CS Certification #: UST-025
Arizona Certification #: AZ0770
California Certification #: 01153CA
Florida/NELAP Certification #: E87617
Oregon Certification #: WA200007
Washington Certification #: C555

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SAMPLE ANALYTE COUNT

Project: WA-0217
Pace Project No.: 2510198

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2510198001	**IW-1**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510198002	**IW-2**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510198003	**IW-3**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510198004	**MW-2**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	LPM	9	PASI-S
		NWTPH-Gx	LNH	2	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510198005	**MW-5**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S

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SAMPLE ANALYTE COUNT

Project: WA-0217
Pace Project No.: 2510198

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 5030B/8260	LPM	9	PASI-S
		NWTPH-Gx	LPM	2	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510198006	**TRIP BLANK**	EPA 5030B/8260	ERB	9	PASI-S
		NWTPH-Gx	ERB	2	PASI-S

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510198

Sample: IW-1 **Lab ID: 2510198001** Collected: 12/02/11 10:50 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	**51.0**	ug/L	10.0	1		12/06/11 13:15	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**1020**	ug/L	100	1	12/07/11 09:27	12/12/11 15:14	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/07/11 09:27	12/12/11 12:10	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**210**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/05/11 15:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**24.8**	mg/L	2.0	2		12/09/11 15:37	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.050	1		12/12/11 16:08		
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		12/12/11 16:08		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/02/11 17:03	14797-65-0	

Sample: IW-2 **Lab ID: 2510198002** Collected: 12/02/11 12:55 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	**15.2**	ug/L	10.0	1		12/06/11 13:25	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**686**	ug/L	100	1	12/07/11 09:27	12/12/11 15:18	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/07/11 09:27	12/12/11 12:14	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**186**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/05/11 15:00	18496-25-8	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510198

Sample: IW-2 **Lab ID: 2510198002** Collected: 12/02/11 12:55 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**27.1**	mg/L	2.0	2		12/09/11 15:53	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	**0.86**	mg/L	0.050	1		12/12/11 16:09		
Nitrogen, NO2 plus NO3	**0.87**	mg/L	0.050	1		12/12/11 16:09		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/02/11 17:03	14797-65-0	

Sample: IW-3 **Lab ID: 2510198003** Collected: 12/02/11 12:15 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	**201**	ug/L	10.0	1		12/06/11 13:36	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**1710**	ug/L	100	1	12/07/11 09:27	12/12/11 15:22	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/07/11 09:27	12/12/11 12:17	7439-89-6	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**194**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/05/11 15:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**38.4**	mg/L	2.0	2		12/09/11 16:09	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.050	1		12/12/11 16:11		
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		12/12/11 16:11		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/02/11 17:03	14797-65-0	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510198

Sample: MW-2 **Lab ID: 2510198004** Collected: 12/02/11 13:30 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	**1730**	ug/L	10.0	1		12/06/11 13:46	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**18800**	ug/L	100	1	12/07/11 09:27	12/12/11 15:25	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**5010**	ug/L	100	1	12/07/11 09:27	12/12/11 12:21	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	**0.82**	ug/L	0.20	1		12/15/11 13:45	71-43-2	
Ethylbenzene	**348**	ug/L	1.0	1		12/15/11 13:45	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/15/11 13:45	1634-04-4	
Toluene	**1.9**	ug/L	1.0	1		12/15/11 13:45	108-88-3	
Xylene (Total)	**412**	ug/L	3.0	1		12/15/11 13:45	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	117	%	79-121	1		12/15/11 13:45	460-00-4	
Dibromofluoromethane (S)	94	%	81-119	1		12/15/11 13:45	1868-53-7	
1,2-Dichloroethane-d4 (S)	90	%	72-127	1		12/15/11 13:45	17060-07-0	
Toluene-d8 (S)	107	%	77-120	1		12/15/11 13:45	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	**4120**	ug/L	50.0	1		12/10/11 05:07		
Surrogates								
4-Bromofluorobenzene (S)	94	%	50-150	1		12/10/11 05:07	460-00-4	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**217**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	**0.40**	mg/L	0.40	1		12/05/11 15:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**18.8**	mg/L	2.0	2		12/12/11 13:17	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.050	1		12/12/11 16:12		
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		12/12/11 16:12		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	**0.019**	mg/L	0.010	1		12/02/11 17:03	14797-65-0	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510198

Sample: MW-5 **Lab ID: 2510198005** Collected: 12/02/11 14:15 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	**299**	ug/L	10.0	1		12/06/11 13:57	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**3650**	ug/L	100	1	12/07/11 09:27	12/12/11 15:29	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**596**	ug/L	100	1	12/07/11 09:27	12/12/11 12:32	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	**0.87**	ug/L	0.20	1		12/15/11 14:02	71-43-2	
Ethylbenzene	**448**	ug/L	10.0	10		12/15/11 13:28	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/15/11 14:02	1634-04-4	
Toluene	**1.3**	ug/L	1.0	1		12/15/11 14:02	108-88-3	
Xylene (Total)	**845**	ug/L	30.0	10		12/15/11 13:28	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	112	%	79-121	1		12/15/11 14:02	460-00-4	
Dibromofluoromethane (S)	93	%	81-119	1		12/15/11 14:02	1868-53-7	
1,2-Dichloroethane-d4 (S)	91	%	72-127	1		12/15/11 14:02	17060-07-0	
Toluene-d8 (S)	108	%	77-120	1		12/15/11 14:02	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	**11000**	ug/L	500	10		12/15/11 13:28		
Surrogates								
4-Bromofluorobenzene (S)	119	%	50-150	10		12/15/11 13:28	460-00-4	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**178**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/05/11 15:00	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**2.1**	mg/L	1.0	1		12/08/11 18:41	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	ND	mg/L	0.050	1		12/12/11 16:14		
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		12/12/11 16:14		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/02/11 17:03	14797-65-0	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510198

Sample: TRIP BLANK **Lab ID: 2510198006** Collected: 12/02/11 00:00 Received: 12/02/11 16:05 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		12/13/11 23:36	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/11 23:36	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/13/11 23:36	1634-04-4	
Toluene	ND	ug/L	1.0	1		12/13/11 23:36	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/11 23:36	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	119	%	79-121	1		12/13/11 23:36	460-00-4	
Dibromofluoromethane (S)	95	%	81-119	1		12/13/11 23:36	1868-53-7	
1,2-Dichloroethane-d4 (S)	92	%	72-127	1		12/13/11 23:36	17060-07-0	
Toluene-d8 (S)	105	%	77-120	1		12/13/11 23:36	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		12/08/11 23:45		
Surrogates								
4-Bromofluorobenzene (S)	127	%	50-150	1		12/08/11 23:45	460-00-4	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: AIR/13773 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 1110143 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	10.0	12/06/11 08:23	

LABORATORY CONTROL SAMPLE & LCSD: 1110144 1110145

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	56.7	60.9	94	100	70-130	7	30	

SAMPLE DUPLICATE: 1110613

Parameter	Units	10177224001 Result	Dup Result	RPD	Qualifiers
Methane	ug/L	7980	8770	9	E

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MPRP/2678 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 96460 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	100	12/12/11 14:24	

LABORATORY CONTROL SAMPLE: 96461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	9200	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96462 96463

Parameter	Units	2510186001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron	ug/L	437	10000	10000	9630	9540	92	91	75-125	1	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96478 96479

Parameter	Units	2510199001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron	ug/L	125000	10000	10000	103000	106000	-222	-184	75-125	4	M1

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MPRP/2680 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 96472 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	12/12/11 12:03	

LABORATORY CONTROL SAMPLE: 96473

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9500	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96474 96475

Parameter	Units	2510199001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron, Dissolved	ug/L	402	10000	10000	10300	9150	99	87	75-125	12	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MSV/6024
QC Batch Method: EPA 5030B/8260
Analysis Method: EPA 5030B/8260
Analysis Description: 8260 MSV Water 10 mL Purge
Associated Lab Samples: 2510198006

METHOD BLANK: 97214
Matrix: Water
Associated Lab Samples: 2510198006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.20	12/13/11 20:14	
Ethylbenzene	ug/L	ND	1.0	12/13/11 20:14	
Methyl-tert-butyl ether	ug/L	ND	1.0	12/13/11 20:14	
Toluene	ug/L	ND	1.0	12/13/11 20:14	
Xylene (Total)	ug/L	ND	3.0	12/13/11 20:14	
1,2-Dichloroethane-d4 (S)	%	96	72-127	12/13/11 20:14	
4-Bromofluorobenzene (S)	%	116	79-121	12/13/11 20:14	
Dibromofluoromethane (S)	%	98	81-119	12/13/11 20:14	
Toluene-d8 (S)	%	106	77-120	12/13/11 20:14	

LABORATORY CONTROL SAMPLE: 97215

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	18.0	90	66-123	
Ethylbenzene	ug/L	20	17.7	88	67-122	
Methyl-tert-butyl ether	ug/L	20	19.6	98	65-138	
Toluene	ug/L	20	18.5	93	64-118	
Xylene (Total)	ug/L	60	55.4	92	68-122	
1,2-Dichloroethane-d4 (S)	%			92	72-127	
4-Bromofluorobenzene (S)	%			105	79-121	
Dibromofluoromethane (S)	%			96	81-119	
Toluene-d8 (S)	%			101	77-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97317 97318

Parameter	Units	2510218004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	1.4	20	20	19.7	22.5	91	105	63-138	13	
Ethylbenzene	ug/L	ND	20	20	18.8	21.6	92	106	65-135	14	
Methyl-tert-butyl ether	ug/L	ND	20	20	18.9	21.4	94	107	59-143	13	
Toluene	ug/L	ND	20	20	18.1	20.8	89	103	64-128	14	
Xylene (Total)	ug/L	ND	60	60	55.4	62.7	91	103	65-133	12	
1,2-Dichloroethane-d4 (S)	%						94	91	72-127		
4-Bromofluorobenzene (S)	%						112	111	79-121		
Dibromofluoromethane (S)	%						96	94	81-119		
Toluene-d8 (S)	%						106	106	77-120		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MSV/6044 | Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 | Analysis Description: 8260 MSV Water 10 mL Purge
Associated Lab Samples: 2510198004, 2510198005

METHOD BLANK: 97407 | Matrix: Water
Associated Lab Samples: 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.20	12/15/11 10:54	
Ethylbenzene	ug/L	ND	1.0	12/15/11 10:54	
Methyl-tert-butyl ether	ug/L	ND	1.0	12/15/11 10:54	
Toluene	ug/L	ND	1.0	12/15/11 10:54	
Xylene (Total)	ug/L	ND	3.0	12/15/11 10:54	
1,2-Dichloroethane-d4 (S)	%	93	72-127	12/15/11 10:54	
4-Bromofluorobenzene (S)	%	121	79-121	12/15/11 10:54	
Dibromofluoromethane (S)	%	94	81-119	12/15/11 10:54	
Toluene-d8 (S)	%	107	77-120	12/15/11 10:54	

LABORATORY CONTROL SAMPLE: 97408

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	17.4	87	66-123	
Ethylbenzene	ug/L	20	17.0	85	67-122	
Methyl-tert-butyl ether	ug/L	20	18.3	92	65-138	
Toluene	ug/L	20	17.4	87	64-118	
Xylene (Total)	ug/L	60	50.9	85	68-122	
1,2-Dichloroethane-d4 (S)	%			91	72-127	
4-Bromofluorobenzene (S)	%			115	79-121	
Dibromofluoromethane (S)	%			93	81-119	
Toluene-d8 (S)	%			108	77-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97484 97485

Parameter	Units	2510266002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	20	20	19.3	19.8	96	99	63-138	2	
Ethylbenzene	ug/L	ND	20	20	19.5	20.0	97	100	65-135	3	
Methyl-tert-butyl ether	ug/L	0.84	20	20	18.2	17.9	87	85	59-143	2	
Toluene	ug/L	ND	20	20	19.4	20.0	97	100	64-128	3	
Xylene (Total)	ug/L	ND	60	60	57.7	59.3	96	98	65-133	3	
1,2-Dichloroethane-d4 (S)	%						90	88	72-127		
4-Bromofluorobenzene (S)	%						116	113	79-121		
Dibromofluoromethane (S)	%						93	93	81-119		
Toluene-d8 (S)	%						109	110	77-120		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MSV/5993 — Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx — Analysis Description: NWTPH-Gx MSV Water
Associated Lab Samples: 2510198006

METHOD BLANK: 96707 — Matrix: Water
Associated Lab Samples: 2510198006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	ug/L	ND	50.0	12/08/11 23:11	
4-Bromofluorobenzene (S)	%	116	50-150	12/08/11 23:11	

LABORATORY CONTROL SAMPLE: 96708

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	ug/L	500	542	108	65-139	
4-Bromofluorobenzene (S)	%			112	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96709 96710

Parameter	Units	2510199001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	ug/L	ND	500	500	619	1320	119	260	48-147	72	D6,M1
4-Bromofluorobenzene (S)	%						112	110	50-150		

SAMPLE DUPLICATE: 96711

Parameter	Units	2510199001 Result	Dup Result	RPD	Qualifiers
Gasoline Range Organics	ug/L	ND	28.6J		
4-Bromofluorobenzene (S)	%	111	115	3	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MSV/6007 | Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx | Analysis Description: NWTPH-Gx MSV Water
Associated Lab Samples: 2510198004

METHOD BLANK: 96907 | Matrix: Water
Associated Lab Samples: 2510198004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	ug/L	ND	50.0	12/10/11 03:19	
4-Bromofluorobenzene (S)	%	98	50-150	12/10/11 03:19	

LABORATORY CONTROL SAMPLE: 96908

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	ug/L	500	577	115	65-139	
4-Bromofluorobenzene (S)	%			98	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96909 96910

Parameter	Units	2510190014 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	ug/L	6630	500	500	7390	7670	152	208	48-147	4	M1
4-Bromofluorobenzene (S)	%						97	98	50-150		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: MSV/6047 | Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx | Analysis Description: NWTPH-Gx MSV Water
Associated Lab Samples: 2510198005

METHOD BLANK: 97478 | Matrix: Water
Associated Lab Samples: 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	ug/L	ND	50.0	12/15/11 10:54	
4-Bromofluorobenzene (S)	%	121	50-150	12/15/11 10:54	

LABORATORY CONTROL SAMPLE: 97479

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	ug/L	500	562	112	65-139	
4-Bromofluorobenzene (S)	%			120	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97615 97616

Parameter	Units	2510348001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	ug/L	ND	500	500	610	598	119	116	48-147	2	
4-Bromofluorobenzene (S)	%						120	118	50-150		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: WET/3325 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 97099 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	1.0	12/13/11 15:00	

LABORATORY CONTROL SAMPLE: 97100

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	100	97.0	97	90-110	

SAMPLE DUPLICATE: 97101

Parameter	Units	2510198001 Result	Dup Result	RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	210	214	2	

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Seattle, WA 98108
(206)767-5060

QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: WET/3308 Analysis Method: SM 4500-S-2 F
QC Batch Method: SM 4500-S-2 F Analysis Description: 4500S2F Sulfide, Iodometric
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 96239 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.40	12/05/11 15:00	

LABORATORY CONTROL SAMPLE: 96240

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	8.6	8.6	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96241 96242

Parameter	Units	2510197001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfide	mg/L	ND	8.6	8.6	8.7	8.8	101	102	75-125	.9	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: WETA/2326 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 96624 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	12/08/11 10:31	

LABORATORY CONTROL SAMPLE: 96625

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	15	15.4	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96626 96627

Parameter	Units	2510197001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfate	mg/L	221	300	300	558	566	113	115	90-110	1	M1

MATRIX SPIKE SAMPLE: 96628

Parameter	Units	2510215002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	14.6	15	30.3	105	90-110	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: WETA/2330 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 96755 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.050	12/12/11 15:47	

LABORATORY CONTROL SAMPLE: 96756

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	1	1.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96757 96758

Parameter	Units	2510152001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	1	1	1.1	1.1	106	105	90-110	.4	

MATRIX SPIKE SAMPLE: 96759

Parameter	Units	2510214005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	356 ug/L	1	1.4	109	90-110	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510198

QC Batch: WETA/2321 Analysis Method: SM 4500-NO2 B
QC Batch Method: SM 4500-NO2 B Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

METHOD BLANK: 96140 Matrix: Water
Associated Lab Samples: 2510198001, 2510198002, 2510198003, 2510198004, 2510198005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.010	12/02/11 17:03	

LABORATORY CONTROL SAMPLE: 96141

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.05	0.046	93	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96142 96143

Parameter	Units	2510198001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrite as N	mg/L	ND	.05	.05	0.051	0.056	92	100	71-109	8	

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QUALIFIERS

Project: WA-0217
Pace Project No.: 2510198

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel Clean-Up

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis
PASI-S	Pace Analytical Services - Seattle

ANALYTE QUALIFIERS

D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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(206)767-5060

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WA-0217
Pace Project No.: 2510198

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2510198001	**IW-1**	RSK 175	AIR/13773		
2510198002	**IW-2**	RSK 175	AIR/13773		
2510198003	**IW-3**	RSK 175	AIR/13773		
2510198004	**MW-2**	RSK 175	AIR/13773		
2510198005	**MW-5**	RSK 175	AIR/13773		
2510198001	**IW-1**	EPA 3010	MPRP/2678	EPA 6010	ICP/2536
2510198002	**IW-2**	EPA 3010	MPRP/2678	EPA 6010	ICP/2536
2510198003	**IW-3**	EPA 3010	MPRP/2678	EPA 6010	ICP/2536
2510198004	**MW-2**	EPA 3010	MPRP/2678	EPA 6010	ICP/2536
2510198005	**MW-5**	EPA 3010	MPRP/2678	EPA 6010	ICP/2536
2510198001	**IW-1**	EPA 3010	MPRP/2680	EPA 6010	ICP/2538
2510198002	**IW-2**	EPA 3010	MPRP/2680	EPA 6010	ICP/2538
2510198003	**IW-3**	EPA 3010	MPRP/2680	EPA 6010	ICP/2538
2510198004	**MW-2**	EPA 3010	MPRP/2680	EPA 6010	ICP/2538
2510198005	**MW-5**	EPA 3010	MPRP/2680	EPA 6010	ICP/2538
2510198004	**MW-2**	EPA 5030B/8260	MSV/6044		
2510198005	**MW-5**	EPA 5030B/8260	MSV/6044		
2510198006	**TRIP BLANK**	EPA 5030B/8260	MSV/6024		
2510198004	**MW-2**	NWTPH-Gx	MSV/6007		
2510198005	**MW-5**	NWTPH-Gx	MSV/6047		
2510198006	**TRIP BLANK**	NWTPH-Gx	MSV/5993		
2510198001	**IW-1**	SM 2320B	WET/3325		
2510198002	**IW-2**	SM 2320B	WET/3325		
2510198003	**IW-3**	SM 2320B	WET/3325		
2510198004	**MW-2**	SM 2320B	WET/3325		
2510198005	**MW-5**	SM 2320B	WET/3325		
2510198001	**IW-1**	SM 4500-S-2 F	WET/3308		
2510198002	**IW-2**	SM 4500-S-2 F	WET/3308		
2510198003	**IW-3**	SM 4500-S-2 F	WET/3308		
2510198004	**MW-2**	SM 4500-S-2 F	WET/3308		
2510198005	**MW-5**	SM 4500-S-2 F	WET/3308		
2510198001	**IW-1**	EPA 300.0	WETA/2326		
2510198002	**IW-2**	EPA 300.0	WETA/2326		
2510198003	**IW-3**	EPA 300.0	WETA/2326		
2510198004	**MW-2**	EPA 300.0	WETA/2326		
2510198005	**MW-5**	EPA 300.0	WETA/2326		
2510198001	**IW-1**	EPA 353.2	WETA/2330		
2510198002	**IW-2**	EPA 353.2	WETA/2330		
2510198003	**IW-3**	EPA 353.2	WETA/2330		
2510198004	**MW-2**	EPA 353.2	WETA/2330		
2510198005	**MW-5**	EPA 353.2	WETA/2330		
2510198001	**IW-1**	SM 4500-NO2 B	WETA/2321		
2510198002	**IW-2**	SM 4500-NO2 B	WETA/2321		

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WA-0217
Pace Project No.: 2510198

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2510198003	**IW-3**	SM 4500-NO2 B	WETA/2321		
2510198004	**MW-2**	SM 4500-NO2 B	WETA/2321		
2510198005	**MW-5**	SM 4500-NO2 B	WETA/2321		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2510198

Page: 1 of 1

1532670

Section A Required Client Information:

Company: ARCADIS
Address: 2300 Eastlake Ave E Suite 200
Seattle WA 98102
Email To: alex.lopez III@arcadis-us.com
Phone: 916-726-4721 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Alex Lopez III
Copy To: Richard Rodriguez
Purchase Order No.:
Project Name: WA-0217
Project Number: GP09BPNA.WA01.K0000

Section C Invoice Information:

Attention: Chris Robinson
Company Name: ARCADIS
Address: See Section A
Pace Quote Reference:
Pace Project Manager: Regina Sky Marie
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER Ecology

Site Location STATE: WA

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	GRO by NWTH-Gx	BTEX/MTBE 8260	Nitrate as N	Nitrite/Nitrate 353.2	Sulfate by 300.0	Sulfide by 4500S2E	Total Alkalinity 9023	Total/Dissolved Iron	Methane RSK 175	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	IW-1	WT	G			12/2/11	10:50		8	5	1	1	0	1				Y	X		X	X	X	X	X	X	X			NOT GRO
2	IW-2						12:55		8	5	1	1		1					X		X	X	X	X	X	X	X			NOT GRO
3	IW-3						12:15		8	5	1	1		1							X	X	X	X	X	X	X			
4	MW-2						13:30		14	5	1	1	6	1					X	X	X	X	X	X	X	X	X			
5	MW-5						14:15		14	5	1	1	6	1					X	X	X	X	X	X	X	X	X			
6																														
7																														
8																														
9																														
10																														
11																														
12																														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kyle Hoslam / ARCADIS	12/2/11	16:05	[signature]	12/2/11	1605	6.8	Y	N	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kyle Hoslam

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12/2/2011

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Container Count

2510198

Pace Analytical

CLIENT: Arcadis

COC PAGE ____ of ____

COC ID# _____

Trip Blank(s) Provided? Y / N

Sample Line Item	VG9H	AG1H	AG1U	BP1U	BP2U	BP3U	BP3N	BP3S	WGKU	WGFU	WG2U	DG9M	DG9B	VG9W	VSG	BP2Z			Comments
1						1	1	1							3	1			
2						↓	↓	↓							↓	↓			
3						↓	↓	↓							↓	↓			
4	6					↓	↓	↓							↓	↓			
5	6					1	1	1							3	1			
6	2																		
7																			
8																			
9																			
10																			
11																			
12																			

AG1H	1 liter HCL amber glass	BP2S	500mL H2SO4 plastic	JGFU	4 oz amber glass soil jar
AG1U	1liter unpreserved amber glass	BP2U	500mL unpreserved plastic	WGKU	8 oz clear glass soil jar
AG2S	500mL H2SO4 amber glass	BP2Z	500mL NaOH, Zn Ac	WGFU	4 oz clear glass soil jar
AG2U	500mL unpreserved amber glass	BP3C	250mL NaOH plastic	WG2U	2 oz clear glass soil jar
AG3S	250mL H2SO4 amber glass	BP3N	250mL HNO3 plastic	JGFM	4 oz amber glass soil jar with MeOH
BG1H	1 liter HCL clear glass	BP3S	250mL H2SO4 plastic	VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass	BP3U	250mL unpreserved plastic	VG9W	40mL clear vial pre-weighted with DI water
BP1N	1 liter HNO3 plastic	DG9B	40mL Na Bisulfate clear vial	VSG	Headspace septa vial
BP1S	1 liter H2SO4 plastic	DG9H	40mL HCL amber voa vial	VG9H	40mL HCL clear vial
BP1U	1 liter unpreserved plastic	DG9M	40mL MeOH clear vial	WGFX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac	DG9T	40mL Na Thio amber vial	VG9T	40mL Na Thio. clear vial
BP2N	500mL HNO3 plastic	DG9U	40mL unpreserved amber vial	ZPLC	Ziploc Bag
BP2O	500mL NaOH plastic	I	Wipe/Swab	U	Summa Can

F-SEA-C-014-rev.01, 10Nov2011

2510198

Sample Condition Upon Receipt

Pace Analytical

Client Name: Arcadis Project # _____

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☑ Client ☐ Commercial ☐ Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☑ No

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____ Temp. Blank Yes ____ No ____

Thermometer Used 132013 or 101731962 or 226099 Type of Ice: Wet Blue None ☑ Samples on ice, cooling process has begun

Cooler Temperature 6.8 Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: RC 12/2/11

Temp should be above freezing ≤ 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes ☐No ☐N/A	6. NO2
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Follow Up / Hold Analysis Requested:	☐Yes ☑No ☐N/A	8.
Sufficient Volume:	☑Yes ☐No ☐N/A	9.
Correct Containers Used:	☑Yes ☐No ☐N/A	10.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	11.
Filtered volume received for Dissolved tests	☑Yes ☐No ☐N/A	12. LAB FILTER
Sample Labels match COC:	☑Yes ☐No ☐N/A	13.
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing preservation have been checked.	☐Yes ☑No ☐N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☐No ☑N/A	
Exceptions: VOA, coliform, TOC, O&G		Initial when completed ____ Lot # of added preservative ____
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	15.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	16.
Trip Blanks Present:	☑Yes ☐No ☐N/A	17.
Trip Blank Custody Seals Present	☑Yes ☐No ☐N/A	
Pace Trip Blank Creation Date: 11/30		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: ARB **Date:** 12/5/11

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
940 South Harney
Seattle, WA 98108
(206)767-5060

December 20, 2011

Alex Lopez
Arcadis
111 SW Columbia St.
Ste. 725
Portland, OR 97201

RE: Project: WA-0217
Pace Project No.: 2510215

Dear Alex Lopez:
Enclosed are the analytical results for sample(s) received by the laboratory on December 06, 2011. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield

andy.brownfield@pacelabs.com
Project Manager

Enclosures

cc: Timothy Bellis, Arcadis OR
Jonathan Flomerfelt, Arcadis U.S., Inc.
Brian Marcum, Arcadis OR
Lynne Stewart, Arcadis OR

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Seattle, WA 98108
(206)767-5060

CERTIFICATIONS

Project: WA-0217
Pace Project No.: 2510215

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Mexico Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
North Dakota Certification #: R-036A
Ohio VAP Certification #: CL101
Oklahoma Certification #: D9921
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Washington Certification #: C754
Wisconsin Certification #: 999407970

Washington Certification IDs
940 South Harney Street, Seattle, WA 98108
Alaska CS Certification #: UST-025
Arizona Certification #: AZ0770
California Certification #: 01153CA
Florida/NELAP Certification #: E87617
Oregon Certification #: WA200007
Washington Certification #: C555

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940 South Harney
Seattle, WA 98108
(206)767-5060

SAMPLE ANALYTE COUNT

Project: WA-0217
Pace Project No.: 2510215

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2510215001	**MW-1**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	CC	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510215002	**MW-6**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	CC	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510215003	**MW-9**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	CC	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S
2510215004	**MW-10**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	CC	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
		SM 2320B	CMS	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S

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SAMPLE ANALYTE COUNT

Project: WA-0217
Pace Project No.: 2510215

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 300.0	CMS	1	PASI-S
		EPA 353.2	CMS	2	PASI-S
		SM 4500-NO2 B	CMS	1	PASI-S

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510215

Sample: MW-1 **Lab ID: 2510215001** Collected: 12/05/11 12:24 Received: 12/06/11 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	ND	ug/L	10.0	1		12/07/11 17:30	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**113**	ug/L	100	1	12/14/11 12:12	12/15/11 14:30	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/14/11 12:24	12/15/11 11:54	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		12/13/11 04:12	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/11 04:12	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/13/11 04:12	1634-04-4	
Toluene	ND	ug/L	1.0	1		12/13/11 04:12	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/11 04:12	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	95	%	79-121	1		12/13/11 04:12	460-00-4	
Dibromofluoromethane (S)	107	%	81-119	1		12/13/11 04:12	1868-53-7	
1,2-Dichloroethane-d4 (S)	109	%	72-127	1		12/13/11 04:12	17060-07-0	
Toluene-d8 (S)	96	%	77-120	1		12/13/11 04:12	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		12/13/11 04:12		
Surrogates								
4-Bromofluorobenzene (S)	95	%	50-150	1		12/13/11 04:12	460-00-4	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**37.4**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/12/11 14:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**59.1**	mg/L	5.0	5		12/09/11 16:41	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	**2.0**	mg/L	0.050	1		12/12/11 16:26		
Nitrogen, NO2 plus NO3	**2.0**	mg/L	0.050	1		12/12/11 16:26		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/06/11 17:33	14797-65-0	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510215

Sample: MW-6 **Lab ID: 2510215002** Collected: 12/05/11 14:15 Received: 12/06/11 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	ND	ug/L	10.0	1		12/07/11 17:41	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**6870**	ug/L	100	1	12/14/11 12:12	12/15/11 14:34	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/14/11 12:24	12/15/11 12:05	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		12/13/11 04:30	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/11 04:30	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/13/11 04:30	1634-04-4	
Toluene	ND	ug/L	1.0	1		12/13/11 04:30	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/11 04:30	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	95	%	79-121	1		12/13/11 04:30	460-00-4	
Dibromofluoromethane (S)	106	%	81-119	1		12/13/11 04:30	1868-53-7	
1,2-Dichloroethane-d4 (S)	108	%	72-127	1		12/13/11 04:30	17060-07-0	
Toluene-d8 (S)	96	%	77-120	1		12/13/11 04:30	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		12/13/11 04:30		
Surrogates								
4-Bromofluorobenzene (S)	95	%	50-150	1		12/13/11 04:30	460-00-4	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**121**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/12/11 14:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**14.6**	mg/L	1.0	1		12/08/11 14:16	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	**0.15**	mg/L	0.050	1		12/12/11 16:27		
Nitrogen, NO2 plus NO3	**0.15**	mg/L	0.050	1		12/12/11 16:27		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/06/11 17:33	14797-65-0	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510215

Sample: MW-9 **Lab ID: 2510215003** Collected: 12/05/11 10:30 Received: 12/06/11 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	ND	ug/L	10.0	1		12/07/11 17:51	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**59600**	ug/L	100	1	12/14/11 12:12	12/15/11 14:38	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/14/11 12:24	12/15/11 12:09	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		12/13/11 04:48	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/11 04:48	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/13/11 04:48	1634-04-4	
Toluene	ND	ug/L	1.0	1		12/13/11 04:48	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/11 04:48	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	95	%	79-121	1		12/13/11 04:48	460-00-4	
Dibromofluoromethane (S)	107	%	81-119	1		12/13/11 04:48	1868-53-7	
1,2-Dichloroethane-d4 (S)	111	%	72-127	1		12/13/11 04:48	17060-07-0	
Toluene-d8 (S)	96	%	77-120	1		12/13/11 04:48	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		12/13/11 04:48		
Surrogates								
4-Bromofluorobenzene (S)	95	%	50-150	1		12/13/11 04:48	460-00-4	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**34.9**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/12/11 14:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**8.3**	mg/L	1.0	1		12/08/11 19:46	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	**2.1**	mg/L	0.050	1		12/12/11 16:36		
Nitrogen, NO2 plus NO3	**2.1**	mg/L	0.050	1		12/12/11 16:36		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/06/11 17:33	14797-65-0	

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ANALYTICAL RESULTS

Project: WA-0217
Pace Project No.: 2510215

Sample: MW-10 **Lab ID: 2510215004** Collected: 12/05/11 09:37 Received: 12/06/11 10:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	ND	ug/L	10.0	1		12/07/11 18:02	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**37800**	ug/L	100	1	12/14/11 12:12	12/15/11 14:56	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	12/14/11 12:24	12/15/11 12:12	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		12/13/11 05:06	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/11 05:06	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		12/13/11 05:06	1634-04-4	
Toluene	ND	ug/L	1.0	1		12/13/11 05:06	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/11 05:06	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	95	%	79-121	1		12/13/11 05:06	460-00-4	
Dibromofluoromethane (S)	107	%	81-119	1		12/13/11 05:06	1868-53-7	
1,2-Dichloroethane-d4 (S)	110	%	72-127	1		12/13/11 05:06	17060-07-0	
Toluene-d8 (S)	97	%	77-120	1		12/13/11 05:06	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		12/13/11 05:06		
Surrogates								
4-Bromofluorobenzene (S)	95	%	50-150	1		12/13/11 05:06	460-00-4	
2320B Alkalinity	Analytical Method: SM 2320B							
Alkalinity, Total as CaCO3	**22.6**	mg/L	1.0	1		12/13/11 15:00		
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		12/12/11 14:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**9.2**	mg/L	1.0	1		12/08/11 20:02	14808-79-8	
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2							
Nitrogen, Nitrate	**1.8**	mg/L	0.050	1		12/12/11 16:30		
Nitrogen, NO2 plus NO3	**1.8**	mg/L	0.050	1		12/12/11 16:30		
SM4500NO2-B, Nitrite, unpres	Analytical Method: SM 4500-NO2 B							
Nitrite as N	ND	mg/L	0.010	1		12/06/11 17:33	14797-65-0	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: AIR/13789 Analysis Method: RSK 175
QC Batch Method: RSK 175 Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 1111239 Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	10.0	12/07/11 14:13	

LABORATORY CONTROL SAMPLE & LCSD: 1111240 1111241

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	63.4	62.9	104	104	70-130	.8	30	

SAMPLE DUPLICATE: 1111791

Parameter	Units	5055462001 Result	Dup Result	RPD	Qualifiers
Methane	ug/L	ND	10.8		

SAMPLE DUPLICATE: 1111792

Parameter	Units	2510214006 Result	Dup Result	RPD	Qualifiers
Methane	ug/L	ND	ND		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: MPRP/2689 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 97299 Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	100	12/15/11 14:04	

LABORATORY CONTROL SAMPLE: 97300

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	10900	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97301 97302

Parameter	Units	2510214005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron	ug/L	35400	10000	10000	47800	45000	124	96	75-125	6	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: MPRP/2690 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 97303 | Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	12/15/11 11:47	

LABORATORY CONTROL SAMPLE: 97304

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9380	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97305 97306

Parameter	Units	2510215001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	9550	10500	95	105	75-125	10	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: MSV/6014 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Water 10 mL Purge
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 97065 Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.20	12/12/11 23:40	
Ethylbenzene	ug/L	ND	1.0	12/12/11 23:40	
Methyl-tert-butyl ether	ug/L	ND	1.0	12/12/11 23:40	
Toluene	ug/L	ND	1.0	12/12/11 23:40	
Xylene (Total)	ug/L	ND	3.0	12/12/11 23:40	
1,2-Dichloroethane-d4 (S)	%	103	72-127	12/12/11 23:40	
4-Bromofluorobenzene (S)	%	94	79-121	12/12/11 23:40	
Dibromofluoromethane (S)	%	103	81-119	12/12/11 23:40	
Toluene-d8 (S)	%	96	77-120	12/12/11 23:40	

LABORATORY CONTROL SAMPLE: 97066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.1	101	66-123	
Ethylbenzene	ug/L	20	20.8	104	67-122	
Methyl-tert-butyl ether	ug/L	20	22.0	110	65-138	
Toluene	ug/L	20	18.7	94	64-118	
Xylene (Total)	ug/L	60	60.7	101	68-122	
1,2-Dichloroethane-d4 (S)	%			100	72-127	
4-Bromofluorobenzene (S)	%			96	79-121	
Dibromofluoromethane (S)	%			105	81-119	
Toluene-d8 (S)	%			96	77-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97067 97068

Parameter	Units	2510213004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	20	20	21.4	22.1	107	110	63-138	3	
Ethylbenzene	ug/L	ND	20	20	21.9	22.9	109	114	65-135	4	
Methyl-tert-butyl ether	ug/L	15.2	20	20	38.5	38.6	116	117	59-143	.2	
Toluene	ug/L	ND	20	20	19.8	20.8	99	104	64-128	5	
Xylene (Total)	ug/L	ND	60	60	64.3	66.9	107	111	65-133	4	
1,2-Dichloroethane-d4 (S)	%						99	99	72-127		
4-Bromofluorobenzene (S)	%						96	97	79-121		
Dibromofluoromethane (S)	%						104	104	81-119		
Toluene-d8 (S)	%						97	98	77-120		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: MSV/6015 Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx Analysis Description: NWTPH-Gx MSV Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 97069 Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	ug/L	ND	50.0	12/12/11 23:22	
4-Bromofluorobenzene (S)	%	96	50-150	12/12/11 23:22	

LABORATORY CONTROL SAMPLE: 97070

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	ug/L	500	561	112	65-139	
4-Bromofluorobenzene (S)	%			95	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97071 97072

Parameter	Units	2510213004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	ug/L	ND	500	500	595	628	117	124	48-147	5	
4-Bromofluorobenzene (S)	%						94	95	50-150		

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: WET/3325 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 97099 Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	ND	1.0	12/13/11 15:00	

LABORATORY CONTROL SAMPLE: 97100

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	100	97.0	97	90-110	

SAMPLE DUPLICATE: 97101

Parameter	Units	2510198001 Result	Dup Result	RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	210	214	2	

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940 South Harney
Seattle, WA 98108
(206)767-5060

QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: WET/3322 — Analysis Method: SM 4500-S-2 F
QC Batch Method: SM 4500-S-2 F — Analysis Description: 4500S2F Sulfide, Iodometric
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 97007 — Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.40	12/12/11 14:50	

LABORATORY CONTROL SAMPLE: 97008

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	8.6	8.7	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 97009 97010

Parameter	Units	2510214005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfide	mg/L	ND	8.6	8.6	8.6	8.5	99	99	75-125	.5	

MATRIX SPIKE SAMPLE: 97011

Parameter	Units	2510233001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	4.8	8.6	11.4	77	75-125	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: WETA/2326 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 96624 Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	12/08/11 10:31	

LABORATORY CONTROL SAMPLE: 96625

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	15	15.4	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96626 96627

Parameter	Units	2510197001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfate	mg/L	221	300	300	558	566	113	115	90-110	1	M1

MATRIX SPIKE SAMPLE: 96628

Parameter	Units	2510215002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	14.6	15	30.3	105	90-110	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: WETA/2330 | Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 | Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 96755 | Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	ND	0.050	12/12/11 15:47	

LABORATORY CONTROL SAMPLE: 96756

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	1	1.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96757 96758

Parameter	Units	2510152001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	ND	1	1	1.1	1.1	106	105	90-110	.4	

MATRIX SPIKE SAMPLE: 96759

Parameter	Units	2510214005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	356 ug/L	1	1.4	109	90-110	

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QUALITY CONTROL DATA

Project: WA-0217
Pace Project No.: 2510215

QC Batch: WETA/2323 | Analysis Method: SM 4500-NO2 B
QC Batch Method: SM 4500-NO2 B | Analysis Description: SM4500NO2-B, Nitrite, unpres
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

METHOD BLANK: 96408 | Matrix: Water
Associated Lab Samples: 2510215001, 2510215002, 2510215003, 2510215004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrite as N	mg/L	ND	0.010	12/06/11 17:33	

LABORATORY CONTROL SAMPLE: 96409

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrite as N	mg/L	.05	0.048	96	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 96410 96411

Parameter	Units	2510215004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Nitrite as N	mg/L	ND	.05	.05	0.050	0.054	80	88	71-109	7	

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QUALIFIERS

Project: WA-0217
Pace Project No.: 2510215

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel Clean-Up

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis
PASI-S	Pace Analytical Services - Seattle

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WA-0217
Pace Project No.: 2510215

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2510215001	**MW-1**	RSK 175	AIR/13789		
2510215002	**MW-6**	RSK 175	AIR/13789		
2510215003	**MW-9**	RSK 175	AIR/13789		
2510215004	**MW-10**	RSK 175	AIR/13789		
2510215001	**MW-1**	EPA 3010	MPRP/2689	EPA 6010	ICP/2544
2510215002	**MW-6**	EPA 3010	MPRP/2689	EPA 6010	ICP/2544
2510215003	**MW-9**	EPA 3010	MPRP/2689	EPA 6010	ICP/2544
2510215004	**MW-10**	EPA 3010	MPRP/2689	EPA 6010	ICP/2544
2510215001	**MW-1**	EPA 3010	MPRP/2690	EPA 6010	ICP/2545
2510215002	**MW-6**	EPA 3010	MPRP/2690	EPA 6010	ICP/2545
2510215003	**MW-9**	EPA 3010	MPRP/2690	EPA 6010	ICP/2545
2510215004	**MW-10**	EPA 3010	MPRP/2690	EPA 6010	ICP/2545
2510215001	**MW-1**	EPA 5030B/8260	MSV/6014		
2510215002	**MW-6**	EPA 5030B/8260	MSV/6014		
2510215003	**MW-9**	EPA 5030B/8260	MSV/6014		
2510215004	**MW-10**	EPA 5030B/8260	MSV/6014		
2510215001	**MW-1**	NWTPH-Gx	MSV/6015		
2510215002	**MW-6**	NWTPH-Gx	MSV/6015		
2510215003	**MW-9**	NWTPH-Gx	MSV/6015		
2510215004	**MW-10**	NWTPH-Gx	MSV/6015		
2510215001	**MW-1**	SM 2320B	WET/3325		
2510215002	**MW-6**	SM 2320B	WET/3325		
2510215003	**MW-9**	SM 2320B	WET/3325		
2510215004	**MW-10**	SM 2320B	WET/3325		
2510215001	**MW-1**	SM 4500-S-2 F	WET/3322		
2510215002	**MW-6**	SM 4500-S-2 F	WET/3322		
2510215003	**MW-9**	SM 4500-S-2 F	WET/3322		
2510215004	**MW-10**	SM 4500-S-2 F	WET/3322		
2510215001	**MW-1**	EPA 300.0	WETA/2326		
2510215002	**MW-6**	EPA 300.0	WETA/2326		
2510215003	**MW-9**	EPA 300.0	WETA/2326		
2510215004	**MW-10**	EPA 300.0	WETA/2326		
2510215001	**MW-1**	EPA 353.2	WETA/2330		
2510215002	**MW-6**	EPA 353.2	WETA/2330		
2510215003	**MW-9**	EPA 353.2	WETA/2330		
2510215004	**MW-10**	EPA 353.2	WETA/2330		
2510215001	**MW-1**	SM 4500-NO2 B	WETA/2323		
2510215002	**MW-6**	SM 4500-NO2 B	WETA/2323		
2510215003	**MW-9**	SM 4500-NO2 B	WETA/2323		
2510215004	**MW-10**	SM 4500-NO2 B	WETA/2323		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2510215

Page: 1 of 1

1467445

Section A Required Client Information:

Company: ARCADIS
Address: 2300 Eastlake Ave E Suite 200, Seattle, WA 98102
Email To: alex.lopez.111@arcadis-us.com
Phone: (253) 279-7160 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Alex Lopez
Copy To: Richard Rodriguez
Purchase Order No.:
Project Name: WA-0217
Project Number: GP09BPNA.WA01.K0000

Section C Invoice Information:

Attention: Alex Lopez
Company Name: ARCADIS
Address: See Section A
Pace Quote Reference:
Pace Project Manager: Regina Ste. Marie
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☒ OTHER Ecology

Site Location STATE: WA

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N): GRO by NWTPH-Gx	BTEX/MTBE by 8260	Methane by RSK 175	Total Alkalinity by 310.1	Sulfide by 4500S2F	Sulfate by 300.0	Nitrate as N by 300.0	Total/Dissolved Iron by 6010	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1	WT	G			12/5/11	12:24		14	5	1	1	6	1				X	X	X	X	X	X	X	X			
2	MW-6						14:15		14	5	1	1	6	1				X	X	X	X	X	X	X	X			
3	MW-9						10:30		14	5	1	1	6	1				X	X	X	X	X	X	X	X			
4	MW-10						9:37		14	5	1	1	6	1				X	X	X	X	X	X	X	X			
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Please use any additional	Kyle Haslam / ARCADIS	12/5/2011	17:00	Refrigerator	12/5/2011	17:00	
water in the 250ml unpres.	Refrigerator	12/6/11	1000		12/6/11	1000	
container to run analysis		12/6/11	1001		12/6/11	1002	
from the 1 liter unpreserved		12/6/11	1020	Colleen Weaver / PACE	12/6/11	1020	3.0 Y N Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kyle Haslam

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12/5/2011

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Container Count

2510215

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CLIENT: Arcadis

COC PAGE 1 of 1
COC ID# 1467445

Trip Blank(s) Provided?
Y / (N)

Sample Line Item	VG9H	AG1H	AG1U	BP1U	BP2U	BP3U	BP3N	BP3S	WGKU	WGFU	WG2U	DG9M	DG9B	VG9W	VSG	BP2Z			Comments
1	6			1		1	1 <2	1 <2							3	1 >12			
2	↓			↓		↓	↓	↓							↓	↓			
3																↓			
4	↓			↓		↓	↓	↓							↓	↓			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

AG1H	1 liter HCL amber glass	BP2S	500mL H2SO4 plastic	JGFU	4 oz amber glass soil jar
AG1U	1liter unpreserved amber glass	BP2U	500mL unpreserved plastic	WGKU	8 oz clear glass soil jar
AG2S	500mL H2SO4 amber glass	BP2Z	500mL NaOH, Zn Ac	WGFU	4 oz clear glass soil jar
AG2U	500mL unpreserved amber glass	BP3C	250mL NaOH plastic	WG2U	2 oz clear glass soil jar
AG3S	250mL H2SO4 amber glass	BP3N	250mL HNO3 plastic	JGFM	4 oz amber glass soil jar with MeOH
BG1H	1 liter HCL clear glass	BP3S	250mL H2SO4 plastic	VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass	BP3U	250mL unpreserved plastic	VG9W	40mL clear vial pre-weighted with DI water
BP1N	1 liter HNO3 plastic	DG9B	40mL Na Bisulfate clear vial	VSG	Headspace septa vial
BP1S	1 liter H2SO4 plastic	DG9H	40mL HCL amber voa vial	VG9H	40mL HCL clear vial
BP1U	1 liter unpreserved plastic	DG9M	40mL MeOH clear vial	WGFX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac	DG9T	40mL Na Thio amber vial	VG9T	40mL Na Thio. clear vial
BP2N	500mL HNO3 plastic	DG9U	40mL unpreserved amber vial	ZPLC	Ziploc Bag
BP2O	500mL NaOH plastic	I	Wipe/Swab	U	Summa Can

F-SEA-C-014-rev.01, 10Nov2011

Pace Analytical

Sample Condition Upon Receipt

2510215

Client Name: Arcadis Project # _____

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☐ No

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____ Temp. Blank Yes ✓ No _____

Thermometer Used 132013 or 101731962 or 226099 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 3.0c Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 12Apr11 CW

Temp should be above freezing ≤ 6°C

				Comments:
Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72hr):	☑Yes	☐No	☐N/A	6. Nitrate
Rush Turn Around Time Requested:	☐Yes	☑No	☐N/A	7.
Follow Up / Hold Analysis Requested:	☐Yes	☑No	☐N/A	8.
Sufficient Volume:	☐Yes	☑No	☐N/A	9. Received 1L poly 1/4 full
Correct Containers Used:	☑Yes	☐No	☐N/A	10.
-Pace Containers Used:	☑Yes	☐No	☐N/A	
Containers Intact:	☑Yes	☐No	☐N/A	11.
Filtered volume received for Dissolved tests	☑Yes	☐No	☐N/A	12. to be lab filtered
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix:	☐Yes	☑No	☐N/A	13. no sample ID or date ~~on~~ for MW-6 just a time on 250 poly w/HNO3 all other containers have information on them
All containers needing preservation have been checked.	☑Yes	☐No	☐N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes	☐No	☐N/A	
Exceptions: VOA, coliform, TOC, O&G				Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes	☐No	☑N/A	15.
Headspace in VOA Vials (>6mm):	☐Yes	☑No	☐N/A	16.
Trip Blanks Present:	☐Yes	☑No	☐N/A	17.
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A	
Pace Trip Blank Creation Date:				

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: _____ **Date:** _____

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
940 South Harney
Seattle, WA 98108
(206)767-5060

February 17, 2012

Alex Lopez
Arcadis
111 SW Columbia St.
Ste. 725
Portland, OR 97201

RE: Project: ARCO 00217
Pace Project No.: 2510767

Dear Alex Lopez:
Enclosed are the analytical results for sample(s) received by the laboratory on February 06, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield

andy.brownfield@pacelabs.com
Project Manager

Enclosures

cc: Timothy Bellis, Arcadis OR
Jonathan Flomerfelt, Arcadis U.S., Inc.
Brian Marcum, Arcadis OR
Lynne Stewart, Arcadis OR

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CERTIFICATIONS

Project: ARCO 00217
Pace Project No.: 2510767

Washington Certification IDs
940 South Harney Street, Seattle, WA 98108
Alaska CS Certification #: UST-025
Arizona Certification #: AZ0770
California Certification #: 01153CA
Florida/NELAP Certification #: E87617
Oregon Certification #: WA200007
Washington Certification #: C555

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SAMPLE ANALYTE COUNT

Project: ARCO 00217
Pace Project No.: 2510767

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2510767001	**MW-5**	SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
2510767002	**MW-2**	SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
2510767003	**MW-6**	SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S

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ANALYTICAL RESULTS

Project: ARCO 00217
Pace Project No.: 2510767

Sample: MW-5 **Lab ID: 2510767001** Collected: 02/03/12 10:55 Received: 02/06/12 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		02/07/12 12:50	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**44.6**	mg/L	5.0	5		02/13/12 17:59	14808-79-8	

Sample: MW-2 **Lab ID: 2510767002** Collected: 02/03/12 10:30 Received: 02/06/12 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	**33.3**	mg/L	0.40	1		02/07/12 12:50	18496-25-8	P4
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**3100**	mg/L	250	250		02/13/12 18:35	14808-79-8	

Sample: MW-6 **Lab ID: 2510767003** Collected: 02/03/12 10:00 Received: 02/06/12 12:45 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		02/07/12 12:50	18496-25-8	1n
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**97.6**	mg/L	10.0	10		02/13/12 18:53	14808-79-8	

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Seattle, WA 98108
(206)767-5060

QUALITY CONTROL DATA

Project: ARCO 00217
Pace Project No.: 2510767

QC Batch: WET/3441 | Analysis Method: SM 4500-S-2 F
QC Batch Method: SM 4500-S-2 F | Analysis Description: 4500S2F Sulfide, Iodometric
Associated Lab Samples: 2510767001, 2510767002, 2510767003

METHOD BLANK: 101930 | Matrix: Water
Associated Lab Samples: 2510767001, 2510767002, 2510767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.40	02/07/12 12:50	

LABORATORY CONTROL SAMPLE: 101931

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	8.4	8.4	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 101932 101933

Parameter	Units	2510703001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfide	mg/L	ND	8.4	8.4	8.3	8.4	99	100	75-125	.5	

MATRIX SPIKE SAMPLE: 101934

Parameter	Units	2510742001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	ND	8.4	6.4	76	75-125	

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Seattle, WA 98108
(206)767-5060

QUALITY CONTROL DATA

Project: ARCO 00217
Pace Project No.: 2510767

QC Batch: WETA/2400 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2510767001, 2510767002, 2510767003

METHOD BLANK: 102143 | Matrix: Water
Associated Lab Samples: 2510767001, 2510767002, 2510767003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	02/10/12 12:39	

LABORATORY CONTROL SAMPLE: 102144

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	15	14.7	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 102145 102146

Parameter	Units	2510742001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfate	mg/L	10.6	15	15	25.5	25.5	99	99	90-110	.3	

MATRIX SPIKE SAMPLE: 102147

Parameter	Units	2510767001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	44.6	75	123	105	90-110	

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QUALIFIERS

Project: ARCO 00217
Pace Project No.: 2510767

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel Clean-Up

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

LABORATORIES

PASI-S	Pace Analytical Services - Seattle

ANALYTE QUALIFIERS

1n	Matrix interference noted.
P4	Sample field preservation does not meet EPA or method recommendations for this analysis.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: ARCO 00217
Pace Project No.: 2510767

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2510767001	**MW-5**	SM 4500-S-2 F	WET/3441		
2510767002	**MW-2**	SM 4500-S-2 F	WET/3441		
2510767003	**MW-6**	SM 4500-S-2 F	WET/3441		
2510767001	**MW-5**	EPA 300.0	WETA/2400		
2510767002	**MW-2**	EPA 300.0	WETA/2400		
2510767003	**MW-6**	EPA 300.0	WETA/2400		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2510767

Page: 1 of 1

1491700

Section A Required Client Information:
Company: ARCADIS
Address: 2300 Eastlake Ave E Seattle WA 98102
Email To: Alex Lopez
Phone: (206) 726-4712 Fax:
Requested Due Date/TAT:

Section B Required Project Information: Alex Lopez
Report To: Jonnathon Flomerfelt
Copy To: Peter Campbel, Harini Shanmugam
Purchase Order No.: GP09BPNA WA01 K0000
Project Name: ARCO 00217
Project Number: 00217

Section C Invoice Information:
Attention: Alex Lopez
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager: Andy Brownfield
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____
Site Location STATE: WA

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Sulfate by 300.0; Sulfide by 4500S2F

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH + Zn Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N) Sulfate	Sulfide	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-5	WT	G	2-3-12	10:55				2	1				1				X	X		
2	MW-2	↓	↓	↓	10:30				2	1				1				X	X		
3	MW-6	↓	↓	↓	10:00				2	1				1				X	X		
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Kyle Haslam / ARCADIS	2-3-12	15:00	Refrigerator / KAT	2-3-12	15:00				
	Refrigerator / Kyle Haslam	2-6-12	11:50	Bulk Pace	2/6/12	1150				
	Bulk / Pace	2-6-12	1245	Colette Weaver / PACE	020612	1245	4.6	Y	N	X

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Kyle HASLAM
SIGNATURE of SAMPLER: Kyle AH
DATE Signed (MM/DD/YY): 2-3-12

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Container Count

2510767

Pace Analytical
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CLIENT: Arcadis

COC PAGE 1 of 1
COC ID# 14011700

Trip Blank(s) Provided?
Y / (N)

Sample Line Item	VG9H	AG1H	AG1U	BP1U	BP2U	BP3U	BP3N	BP3S	WGKU	WGFU	WG2U	DG9M	DG9B	VG9W	VSG	BP2Z			Comments
1						1										1 7105			
2						1										1 7105			
3						1										1 7105			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

AG1H	1 liter HCL amber glass	BP2S	500mL H2SO4 plastic	JGFU	4 oz amber glass soil jar
AG1U	1liter unpreserved amber glass	BP2U	500mL unpreserved plastic	WGKU	8 oz clear glass soil jar
AG2S	500mL H2SO4 amber glass	BP2Z	500mL NaOH, Zn Ac	WGFU	4 oz clear glass soil jar
AG2U	500mL unpreserved amber glass	BP3C	250mL NaOH plastic	WG2U	2 oz clear glass soil jar
AG3S	250mL H2SO4 amber glass	BP3N	250mL HNO3 plastic	JGFM	4 oz amber glass soil jar with MeOH
BG1H	1 liter HCL clear glass	BP3S	250mL H2SO4 plastic	VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass	BP3U	250mL unpreserved plastic	VG9W	40mL clear vial pre-weighted with DI water
BP1N	1 liter HNO3 plastic	DG9B	40mL Na Bisulfate clear vial	VSG	Headspace septa vial
BP1S	1 liter H2SO4 plastic	DG9H	40mL HCL amber voa vial	VG9H	40mL HCL clear vial
BP1U	1 liter unpreserved plastic	DG9M	40mL MeOH clear vial	WGFX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac	DG9T	40mL Na Thio amber vial	VG9T	40mL Na Thio. clear vial
BP2N	500mL HNO3 plastic	DG9U	40mL unpreserved amber vial	ZPLC	Ziploc Bag
BP2O	500mL NaOH plastic	I	Wipe/Swab	U	Summa Can

F-SEA-C-014-rev.01, 10Nov2011

Sample Condition Upon Receipt

Pace Analytical

Client Name: Arcadis

Project # 2510767

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☐ No

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other _____ Temp. Blank Yes ✓ No _____

Thermometer Used 132013 or 101731962 or 226099 **Type of Ice:** Wet Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 4.6°C **Biological Tissue is Frozen:** Yes No

Temp should be above freezing ≤ 6°C

Date and Initials of person examining contents: 020612 CW

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Follow Up / Hold Analysis Requested:	☐Yes ☑No ☐N/A	8.
Sufficient Volume:	☑Yes ☐No ☐N/A	9.
Correct Containers Used:	☑Yes ☐No ☐N/A	10.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	11.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	12.
Sample Labels match COC:	☑Yes ☐No ☐N/A	13.
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	14. added 2 pellets of NaOH 020612 @ 1412
All containers needing preservation are found to be in compliance with EPA recommendation.	☐Yes ☑No ☐N/A	
Exceptions: VOA, coliform, TOC, O&G	☐Yes ☐No ☑N/A	Initial when completed CW / Lot # of added preservative 106172
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	15.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	16.
Trip Blanks Present:	☐Yes ☐No ☑N/A	17.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Creation Date: _____		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: ARB **Date:** 2/7/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
940 South Harney
Seattle, WA 98108
(206)767-5060

March 26, 2012

Alex Lopez
Arcadis
111 SW Columbia St.
Ste. 725
Portland, OR 97201

RE: Project: WA-00217
Pace Project No.: 2511180

Dear Alex Lopez:
Enclosed are the analytical results for sample(s) received by the laboratory on March 12, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield

andy.brownfield@pacelabs.com
Project Manager

Enclosures

cc: Timothy Bellis, Arcadis OR
Jonathan Flomerfelt, Arcadis U.S., Inc.
Brian Marcum, Arcadis OR
Lynne Stewart, Arcadis OR

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CERTIFICATIONS

Project: WA-00217
Pace Project No.: 2511180

Minnesota Certification IDs
1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
EPA Region 8 Certification #: Pace
Florida/NELAP Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Iowa Certification #: 368
Kansas Certification #: E-10167
Louisiana Certification #: 03086
Louisiana Certification #: LA080009
Maine Certification #: 2007029
Maryland Certification #: 322
Michigan DEQ Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT CERT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New Mexico Certification #: Pace
New York Certification #: 11647
North Carolina Certification #: 530
North Dakota Certification #: R-036
North Dakota Certification #: R-036A
Ohio VAP Certification #: CL101
Oklahoma Certification #: D9921
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Tennessee Certification #: 02818
Texas Certification #: T104704192
Washington Certification #: C754
Wisconsin Certification #: 999407970

Washington Certification IDs
940 South Harney Street, Seattle, WA 98108
Alaska CS Certification #: UST-025
Arizona Certification #: AZ0770
California Certification #: 01153CA
Florida/NELAP Certification #: E87617
Oregon Certification #: WA200007
Washington Certification #: C555

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SAMPLE ANALYTE COUNT

Project: WA-00217
Pace Project No.: 2511180

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2511180001	**MW-2**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S
2511180002	**MW-6**	RSK 175	SK4	1	PASI-M
		EPA 6010	BGA	1	PASI-S
		EPA 6010	BGA	1	PASI-S
		SM 4500-S-2 F	KMT	1	PASI-S
		EPA 300.0	CMS	1	PASI-S

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ANALYTICAL RESULTS

Project: WA-00217
Pace Project No.: 2511180

Sample: MW-2 **Lab ID: 2511180001** Collected: 03/09/12 12:55 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	ND	ug/L	6.6	1		03/14/12 14:49	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**37700**	ug/L	100	1	03/16/12 10:10	03/20/12 12:18	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**2720**	ug/L	100	1	03/16/12 07:42	03/21/12 14:50	7439-89-6	
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		03/15/12 16:45	18496-25-8	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**238**	mg/L	20.0	20		03/21/12 01:54	14808-79-8	

Sample: MW-6 **Lab ID: 2511180002** Collected: 03/09/12 11:40 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
RSK 175 AIR Headspace	Analytical Method: RSK 175							
Methane	**90.1**	ug/L	6.6	1		03/14/12 15:00	74-82-8	
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**2290**	ug/L	100	1	03/16/12 10:10	03/20/12 12:22	7439-89-6	
6010 MET ICP, Dissolved (LF)	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	ND	ug/L	100	1	03/16/12 07:42	03/21/12 14:54	7439-89-6	
4500S2F Sulfide, Iodometric	Analytical Method: SM 4500-S-2 F							
Sulfide	ND	mg/L	0.40	1		03/15/12 16:45	18496-25-8	1n
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**325**	mg/L	20.0	20		03/21/12 02:13	14808-79-8	

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511180

QC Batch: AIR/14447 | Analysis Method: RSK 175
QC Batch Method: RSK 175 | Analysis Description: RSK 175 AIR HEADSPACE
Associated Lab Samples: 2511180001, 2511180002

METHOD BLANK: 1154114 | Matrix: Water
Associated Lab Samples: 2511180001, 2511180002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Methane	ug/L	ND	6.6	03/14/12 12:47	

LABORATORY CONTROL SAMPLE & LCSD: 1154115 1154116

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methane	ug/L	60.7	58.8	59.3	97	98	70-130	.9	30	

SAMPLE DUPLICATE: 1154607

Parameter	Units	10185526001 Result	Dup Result	RPD	Qualifiers
Methane	ug/L	ND	ND		

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511180

QC Batch: MPRP/2874 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET
Associated Lab Samples: 2511180001, 2511180002

METHOD BLANK: 106729 | Matrix: Water
Associated Lab Samples: 2511180001, 2511180002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	100	03/20/12 11:53	

LABORATORY CONTROL SAMPLE: 106730

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	11400	114	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 106731 106732

Parameter	Units	2511209002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron	ug/L	13600	10000	10000	25900	25000	122	114	75-125	3	

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511180

QC Batch: MPRP/2870 | Analysis Method: EPA 6010
QC Batch Method: EPA 3010 | Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 2511180001, 2511180002

METHOD BLANK: 106685 | Matrix: Water
Associated Lab Samples: 2511180001, 2511180002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	100	03/21/12 14:02	

LABORATORY CONTROL SAMPLE: 106686

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	10900	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 106687 106688

Parameter	Units	2511189005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	10800	10500	108	105	75-125	3	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 106689 106690

Parameter	Units	2511214004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron, Dissolved	ug/L	ND	10000	10000	10800	10800	107	107	75-125	.09	

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511180

QC Batch: WET/3532 | Analysis Method: SM 4500-S-2 F
QC Batch Method: SM 4500-S-2 F | Analysis Description: 4500S2F Sulfide, Iodometric
Associated Lab Samples: 2511180001, 2511180002

METHOD BLANK: 106527 | Matrix: Water
Associated Lab Samples: 2511180001, 2511180002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfide	mg/L	ND	0.40	03/15/12 16:45	

LABORATORY CONTROL SAMPLE: 106528

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfide	mg/L	7.6	7.6	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 106529 106530

Parameter	Units	2511192001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfide	mg/L	ND	7.6	7.6	7.4	7.5	97	99	75-125	2	

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Seattle, WA 98108
(206)767-5060

QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511180

QC Batch: WETA/2438 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 2511180001, 2511180002

METHOD BLANK: 106531 | Matrix: Water
Associated Lab Samples: 2511180001, 2511180002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/19/12 17:52	

LABORATORY CONTROL SAMPLE: 106532

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	15	16.1	107	90-110	

MATRIX SPIKE SAMPLE: 106533

Parameter	Units	2511192001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	8.4	15	24.0	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 106534 106535

Parameter	Units	2511216002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Sulfate	mg/L	2.7	15	15	18.5	18.9	105	108	90-110	2	

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(206)767-5060

QUALIFIERS

Project: WA-00217
Pace Project No.: 2511180

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel Clean-Up

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis
PASI-S	Pace Analytical Services - Seattle

ANALYTE QUALIFIERS

1n	Matrix interference noted.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WA-00217
Pace Project No.: 2511180

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2511180001	**MW-2**	RSK 175	AIR/14447		
2511180002	**MW-6**	RSK 175	AIR/14447		
2511180001	**MW-2**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511180002	**MW-6**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511180001	**MW-2**	EPA 3010	MPRP/2870	EPA 6010	ICP/2696
2511180002	**MW-6**	EPA 3010	MPRP/2870	EPA 6010	ICP/2696
2511180001	**MW-2**	SM 4500-S-2 F	WET/3532		
2511180002	**MW-6**	SM 4500-S-2 F	WET/3532		
2511180001	**MW-2**	EPA 300.0	WETA/2438		
2511180002	**MW-6**	EPA 300.0	WETA/2438		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2511180

Page: 1 of 1

1554336

Section A Required Client Information:

Company: ARCADIS
Address: 2300 Eastlake Ave E Ste 200, Seattle, WA 98102
Email To: Alexander Lopez
Phone: (503) 964-9762 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Alexander Lopez
Copy To: Brian Mecum
Purchase Order No.:
Project Name: WA-00217
Project Number: GP03BPNAWA01.N0000

Section C Invoice Information:

Attention: Alexander Lopez
Company Name: ARCADIS
Address: Portland, OR
Pace Quote Reference:
Pace Project Manager: Andy Brownfield
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER Ecology

Site Location STATE: WA

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

#	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH + Zinc Acetate	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N): Sulfate by 300.0	Silica by 4500 S2F	Total Fe by 6010	Diss Fe by 6010	RSK 175 Methane	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-2	WT	G			3/9/12	12:55		7	2		1		1				X	X	X	X	X		
2	MW-6	WT	G			3/9/12	11:40		7	5		1		1				X	X	X	X	X		
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Ryan G Hanson Ryan Hanson	3/9/12	17:20	refrigerator Ryan Hanson	3/9/12	17:20				
	Sam Miles Arcadis	3/12/12	0925	Blue K Pace	3/12/12	0925				
	Blue K Pace	3/12/12	1200	Colette Weaver/ PACE	03/12/12	1200	1.1	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Kyle Haslam
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 03/09/12

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Container Count

2511180

Pace Analytical
www.pacelabs.com

CLIENT: Arcadis

COC PAGE 1 of 1
COC ID# 1554336

Trip Blank(s) Provided?
Y / (N)

Sample Line Item	VG9H	AG1H	AG1U	BP1U	BP2U	BP3U	BP3N	BP3S	WGKU	WGFU	WG2U	DG9M	DG9B	VG9W	VSG	BP2Z			Comments
1						2	1 +2								3	1 +12			
2						2	1 +2								3	1 +12			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

AG1H	1 liter HCL amber glass	BP2S	500mL H2SO4 plastic	JGFU	4 oz amber glass soil jar
AG1U	1liter unpreserved amber glass	BP2U	500mL unpreserved plastic	WGKU	8 oz clear glass soil jar
AG2S	500mL H2SO4 amber glass	BP2Z	500mL NaOH, Zn Ac	WGFU	4 oz clear glass soil jar
AG2U	500mL unpreserved amber glass	BP3C	250mL NaOH plastic	WG2U	2 oz clear glass soil jar
AG3S	250mL H2SO4 amber glass	BP3N	250mL HNO3 plastic	JGFM	4 oz amber glass soil jar with MeOH
BG1H	1 liter HCL clear glass	BP3S	250mL H2SO4 plastic	VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass	BP3U	250mL unpreserved plastic	VG9W	40mL clear vial pre-weighted with DI water
BP1N	1 liter HNO3 plastic	DG9B	40mL Na Bisulfate clear vial	VSG	Headspace septa vial
BP1S	1 liter H2SO4 plastic	DG9H	40mL HCL amber voa vial	VG9H	40mL HCL clear vial
BP1U	1 liter unpreserved plastic	DG9M	40mL MeOH clear vial	WGFX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac	DG9T	40mL Na Thio amber vial	VG9T	40mL Na Thio. clear vial
BP2N	500mL HNO3 plastic	DG9U	40mL unpreserved amber vial	ZPLC	Ziploc Bag
BP2O	500mL NaOH plastic	I	Wipe/Swab	U	Summa Can

F-SEA-C-014-rev.01, 10Nov2011

Sample Condition Upon Receipt

Pace Analytical

Client Name: Arcadis Project # 2511180

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☐ No

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____ Temp. Blank Yes ✓ No _____

Thermometer Used 132013 or 101731962 or 226099 Type of Ice: Wet Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 1.1°C Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 03/12/12 CW

Temp should be above freezing ≤ 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Follow Up / Hold Analysis Requested:	☐Yes ☑No ☐N/A	8.
Sufficient Volume:	☑Yes ☑No ☐N/A	9. Rcvd RSK vials almost full
Correct Containers Used:	☑Yes ☐No ☐N/A	10.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	11.
Filtered volume received for Dissolved tests	☑Yes ☐No ☐N/A	12. to be lab filtered
Sample Labels match COC:	☑Yes ☐No ☐N/A	13.
-Includes date/time/ID/Analysis Matrix: WT		
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
Exceptions: VOA, coliform, TOC, O&G	☐Yes ☐No ☑N/A	Initial when completed / Lot # of added preservative
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	15.
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	16.
Trip Blanks Present:	☐Yes ☐No ☑N/A	17.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Creation Date:		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: ARB **Date:** 3/13/12

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Pace Analytical Services, Inc.
940 South Harney
Seattle, WA 98108
(206)767-5060

March 26, 2012

Alex Lopez
Arcadis
111 SW Columbia St.
Ste. 725
Portland, OR 97201

RE: Project: WA-00217
Pace Project No.: 2511201

Dear Alex Lopez:
Enclosed are the analytical results for sample(s) received by the laboratory on March 12, 2012. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Andy Brownfield

andy.brownfield@pacelabs.com
Project Manager

Enclosures

cc: Timothy Bellis, Arcadis OR
Jonathan Flomerfelt, Arcadis U.S., Inc.
Brian Marcum, Arcadis OR
Lynne Stewart, Arcadis OR

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CERTIFICATIONS

Project: WA-00217
Pace Project No.: 2511201

Washington Certification IDs
940 South Harney Street, Seattle, WA 98108
Alaska CS Certification #: UST-025
Arizona Certification #: AZ0770
California Certification #: 01153CA
Florida/NELAP Certification #: E87617
Oregon Certification #: WA200007
Washington Certification #: C555

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SAMPLE ANALYTE COUNT

Project: WA-00217
Pace Project No.: 2511201

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
2511201001	**MW-1**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	LPM	9	PASI-S
		NWTPH-Gx	LPM	2	PASI-S
2511201002	**MW-2**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	LPM	9	PASI-S
		NWTPH-Gx	LPM	2	PASI-S
2511201003	**MW-4**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	LPM	9	PASI-S
		NWTPH-Gx	LPM	2	PASI-S
2511201004	**MW-5**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	LPM	9	PASI-S
		NWTPH-Gx	LPM	2	PASI-S
2511201005	**MW-6**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	ERB	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
2511201006	**MW-7**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	ERB	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
2511201007	**MW-8**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	ERB	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
2511201008	**MW-9**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	ERB	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
2511201009	**MW-10**	EPA 6010	BGA	1	PASI-S
		EPA 5030B/8260	ERB	9	PASI-S
		NWTPH-Gx	CC	2	PASI-S
2511201010	**Trip Blank**	EPA 5030B/8260	ERB	9	PASI-S

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ANALYTICAL RESULTS

Project: WA-00217
Pace Project No.: 2511201

Sample: MW-1 **Lab ID: 2511201001** Collected: 03/09/12 13:25 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**221**	ug/L	100	1	03/16/12 10:10	03/20/12 12:45	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/18/12 00:29	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/18/12 00:29	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/18/12 00:29	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/18/12 00:29	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/18/12 00:29	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	103	%	79-121	1		03/18/12 00:29	460-00-4	
Dibromofluoromethane (S)	104	%	81-119	1		03/18/12 00:29	1868-53-7	
1,2-Dichloroethane-d4 (S)	107	%	72-127	1		03/18/12 00:29	17060-07-0	
Toluene-d8 (S)	105	%	77-120	1		03/18/12 00:29	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 00:29		
Surrogates								
4-Bromofluorobenzene (S)	103	%	50-150	1		03/18/12 00:29	460-00-4	

Sample: MW-2 **Lab ID: 2511201002** Collected: 03/09/12 12:40 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**27500**	ug/L	100	1	03/16/12 10:10	03/20/12 12:48	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/18/12 00:47	71-43-2	
Ethylbenzene	**23.8**	ug/L	1.0	1		03/18/12 00:47	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/18/12 00:47	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/18/12 00:47	108-88-3	
Xylene (Total)	**10.7**	ug/L	3.0	1		03/18/12 00:47	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	101	%	79-121	1		03/18/12 00:47	460-00-4	
Dibromofluoromethane (S)	103	%	81-119	1		03/18/12 00:47	1868-53-7	
1,2-Dichloroethane-d4 (S)	108	%	72-127	1		03/18/12 00:47	17060-07-0	
Toluene-d8 (S)	99	%	77-120	1		03/18/12 00:47	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	**195**	ug/L	50.0	1		03/18/12 00:47		
Surrogates								
4-Bromofluorobenzene (S)	101	%	50-150	1		03/18/12 00:47	460-00-4	

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ANALYTICAL RESULTS

Project: WA-00217
Pace Project No.: 2511201

Sample: MW-4 **Lab ID: 2511201003** Collected: 03/09/12 10:50 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**957**	ug/L	100	1	03/16/12 10:10	03/20/12 12:52	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/18/12 01:05	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/18/12 01:05	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/18/12 01:05	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/18/12 01:05	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/18/12 01:05	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	104	%	79-121	1		03/18/12 01:05	460-00-4	
Dibromofluoromethane (S)	103	%	81-119	1		03/18/12 01:05	1868-53-7	
1,2-Dichloroethane-d4 (S)	106	%	72-127	1		03/18/12 01:05	17060-07-0	
Toluene-d8 (S)	105	%	77-120	1		03/18/12 01:05	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 01:05		
Surrogates								
4-Bromofluorobenzene (S)	104	%	50-150	1		03/18/12 01:05	460-00-4	

Sample: MW-5 **Lab ID: 2511201004** Collected: 03/09/12 13:55 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**2440**	ug/L	100	1	03/16/12 10:10	03/20/12 12:56	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	**0.62**	ug/L	0.20	1		03/18/12 02:02	71-43-2	
Ethylbenzene	**514**	ug/L	10.0	10		03/18/12 01:44	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/18/12 02:02	1634-04-4	
Toluene	**2.9**	ug/L	1.0	1		03/18/12 02:02	108-88-3	
Xylene (Total)	**1610**	ug/L	30.0	10		03/18/12 01:44	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	87	%	79-121	1		03/18/12 02:02	460-00-4	
Dibromofluoromethane (S)	99	%	81-119	1		03/18/12 02:02	1868-53-7	
1,2-Dichloroethane-d4 (S)	107	%	72-127	1		03/18/12 02:02	17060-07-0	
Toluene-d8 (S)	102	%	77-120	1		03/18/12 02:02	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	**14000**	ug/L	500	10		03/18/12 01:44		
Surrogates								
4-Bromofluorobenzene (S)	96	%	50-150	10		03/18/12 01:44	460-00-4	

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ANALYTICAL RESULTS

Project: WA-00217
Pace Project No.: 2511201

Sample: MW-6 **Lab ID: 2511201005** Collected: 03/09/12 11:25 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**3990**	ug/L	100	1	03/16/12 10:10	03/20/12 12:59	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/18/12 08:24	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/18/12 08:24	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/23/12 03:27	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/18/12 08:24	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/18/12 08:24	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	104	%	79-121	1		03/18/12 08:24	460-00-4	
Dibromofluoromethane (S)	103	%	81-119	1		03/18/12 08:24	1868-53-7	
1,2-Dichloroethane-d4 (S)	110	%	72-127	1		03/18/12 08:24	17060-07-0	
Toluene-d8 (S)	102	%	77-120	1		03/18/12 08:24	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 08:24		
Surrogates								
4-Bromofluorobenzene (S)	104	%	50-150	1		03/18/12 08:24	460-00-4	

Sample: MW-7 **Lab ID: 2511201006** Collected: 03/09/12 14:30 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**14000**	ug/L	100	1	03/16/12 10:10	03/20/12 13:03	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/22/12 22:23	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/22/12 22:23	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/22/12 22:23	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/22/12 22:23	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/22/12 22:23	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	122	%	79-121	1		03/22/12 22:23	460-00-4	S3
Dibromofluoromethane (S)	101	%	81-119	1		03/22/12 22:23	1868-53-7	
1,2-Dichloroethane-d4 (S)	99	%	72-127	1		03/22/12 22:23	17060-07-0	
Toluene-d8 (S)	99	%	77-120	1		03/22/12 22:23	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 08:42		
Surrogates								
4-Bromofluorobenzene (S)	104	%	50-150	1		03/18/12 08:42	460-00-4	

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ANALYTICAL RESULTS

Project: WA-00217
Pace Project No.: 2511201

Sample: MW-8 **Lab ID: 2511201007** Collected: 03/09/12 09:25 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**616**	ug/L	100	1	03/16/12 10:10	03/20/12 13:07	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/22/12 22:40	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/22/12 22:40	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/22/12 22:40	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/22/12 22:40	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/22/12 22:40	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	122	%	79-121	1		03/22/12 22:40	460-00-4	S3
Dibromofluoromethane (S)	102	%	81-119	1		03/22/12 22:40	1868-53-7	
1,2-Dichloroethane-d4 (S)	103	%	72-127	1		03/22/12 22:40	17060-07-0	
Toluene-d8 (S)	98	%	77-120	1		03/22/12 22:40	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 09:00		
Surrogates								
4-Bromofluorobenzene (S)	104	%	50-150	1		03/18/12 09:00	460-00-4	

Sample: MW-9 **Lab ID: 2511201008** Collected: 03/09/12 09:50 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**1160**	ug/L	100	1	03/16/12 10:10	03/20/12 13:11	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/22/12 22:57	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/22/12 22:57	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/22/12 22:57	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/22/12 22:57	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/22/12 22:57	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	122	%	79-121	1		03/22/12 22:57	460-00-4	S3
Dibromofluoromethane (S)	103	%	81-119	1		03/22/12 22:57	1868-53-7	
1,2-Dichloroethane-d4 (S)	102	%	72-127	1		03/22/12 22:57	17060-07-0	
Toluene-d8 (S)	101	%	77-120	1		03/22/12 22:57	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 09:18		
Surrogates								
4-Bromofluorobenzene (S)	103	%	50-150	1		03/18/12 09:18	460-00-4	

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ANALYTICAL RESULTS

Project: WA-00217
Pace Project No.: 2511201

Sample: MW-10 **Lab ID: 2511201009** Collected: 03/09/12 10:20 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron	**8520**	ug/L	100	1	03/16/12 10:10	03/20/12 13:22	7439-89-6	
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/22/12 23:14	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/22/12 23:14	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/22/12 23:14	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/22/12 23:14	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/22/12 23:14	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	124	%	79-121	1		03/22/12 23:14	460-00-4	S3
Dibromofluoromethane (S)	102	%	81-119	1		03/22/12 23:14	1868-53-7	
1,2-Dichloroethane-d4 (S)	104	%	72-127	1		03/22/12 23:14	17060-07-0	
Toluene-d8 (S)	100	%	77-120	1		03/22/12 23:14	2037-26-5	
NWTPH-Gx MSV	Analytical Method: NWTPH-Gx							
Gasoline Range Organics	ND	ug/L	50.0	1		03/18/12 09:37		
Surrogates								
4-Bromofluorobenzene (S)	103	%	50-150	1		03/18/12 09:37	460-00-4	

Sample: Trip Blank **Lab ID: 2511201010** Collected: 03/09/12 00:00 Received: 03/12/12 12:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV	Analytical Method: EPA 5030B/8260							
Benzene	ND	ug/L	0.20	1		03/22/12 22:06	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/22/12 22:06	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/22/12 22:06	1634-04-4	
Toluene	ND	ug/L	1.0	1		03/22/12 22:06	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/22/12 22:06	1330-20-7	
Surrogates								
4-Bromofluorobenzene (S)	119	%	79-121	1		03/22/12 22:06	460-00-4	
Dibromofluoromethane (S)	99	%	81-119	1		03/22/12 22:06	1868-53-7	
1,2-Dichloroethane-d4 (S)	101	%	72-127	1		03/22/12 22:06	17060-07-0	
Toluene-d8 (S)	100	%	77-120	1		03/22/12 22:06	2037-26-5	

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511201

QC Batch: MPRP/2874 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET
Associated Lab Samples: 2511201001, 2511201002, 2511201003, 2511201004, 2511201005, 2511201006, 2511201007, 2511201008, 2511201009

METHOD BLANK: 106729 Matrix: Water
Associated Lab Samples: 2511201001, 2511201002, 2511201003, 2511201004, 2511201005, 2511201006, 2511201007, 2511201008, 2511201009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron	ug/L	ND	100	03/20/12 11:53	

LABORATORY CONTROL SAMPLE: 106730

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	10000	11400	114	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 106731 106732

Parameter	Units	2511209002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Iron	ug/L	13600	10000	10000	25900	25000	122	114	75-125	3	

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511201

QC Batch: MSV/6624 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Water 10 mL Purge
Associated Lab Samples: 2511201001, 2511201002, 2511201003, 2511201004

METHOD BLANK: 106908 Matrix: Water
Associated Lab Samples: 2511201001, 2511201002, 2511201003, 2511201004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.20	03/17/12 19:56	
Ethylbenzene	ug/L	ND	1.0	03/17/12 19:56	
Methyl-tert-butyl ether	ug/L	ND	1.0	03/17/12 19:56	
Toluene	ug/L	ND	1.0	03/17/12 19:56	
Xylene (Total)	ug/L	ND	3.0	03/17/12 19:56	
1,2-Dichloroethane-d4 (S)	%	100	72-127	03/17/12 19:56	
4-Bromofluorobenzene (S)	%	104	79-121	03/17/12 19:56	
Dibromofluoromethane (S)	%	97	81-119	03/17/12 19:56	
Toluene-d8 (S)	%	102	77-120	03/17/12 19:56	

LABORATORY CONTROL SAMPLE: 106909

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	16.3	82	66-123	
Ethylbenzene	ug/L	20	16.6	83	67-122	
Methyl-tert-butyl ether	ug/L	20	13.5	67	65-138	
Toluene	ug/L	20	16.3	81	64-118	
Xylene (Total)	ug/L	60	48.5	81	68-122	
1,2-Dichloroethane-d4 (S)	%			100	72-127	
4-Bromofluorobenzene (S)	%			100	79-121	
Dibromofluoromethane (S)	%			102	81-119	
Toluene-d8 (S)	%			98	77-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 107642 107643

Parameter	Units	2511343001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	20	20	15.3	10.4	77	52	63-138	39	D6,M1
Ethylbenzene	ug/L	ND	20	20	15.9	9.6	79	47	65-135	50	D6,M1
Methyl-tert-butyl ether	ug/L	ND	20	20	10.6	11.4	52	56	59-143	8	M1
Toluene	ug/L	ND	20	20	15.2	10.0	76	50	64-128	41	D6,M1
Xylene (Total)	ug/L	ND	60	60	46.2	27.8	77	46	65-133	50	D6,M1
1,2-Dichloroethane-d4 (S)	%						96	134	72-127		S0
4-Bromofluorobenzene (S)	%						98	99	79-121		
Dibromofluoromethane (S)	%						101	111	81-119		
Toluene-d8 (S)	%						99	100	77-120		

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511201

QC Batch: MSV/6667 Analysis Method: EPA 5030B/8260
QC Batch Method: EPA 5030B/8260 Analysis Description: 8260 MSV Water 10 mL Purge
Associated Lab Samples: 2511201005, 2511201006, 2511201007, 2511201008, 2511201009, 2511201010

METHOD BLANK: 107632 Matrix: Water
Associated Lab Samples: 2511201005, 2511201006, 2511201007, 2511201008, 2511201009, 2511201010

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.20	03/22/12 21:49	
Ethylbenzene	ug/L	ND	1.0	03/22/12 21:49	
Methyl-tert-butyl ether	ug/L	ND	1.0	03/22/12 21:49	
Toluene	ug/L	ND	1.0	03/22/12 21:49	
Xylene (Total)	ug/L	ND	3.0	03/22/12 21:49	
1,2-Dichloroethane-d4 (S)	%	101	72-127	03/22/12 21:49	
4-Bromofluorobenzene (S)	%	121	79-121	03/22/12 21:49	
Dibromofluoromethane (S)	%	100	81-119	03/22/12 21:49	
Toluene-d8 (S)	%	101	77-120	03/22/12 21:49	

LABORATORY CONTROL SAMPLE: 107633

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	16.9	84	66-123	
Ethylbenzene	ug/L	20	20.6	103	67-122	
Methyl-tert-butyl ether	ug/L	20	20.6	103	65-138	
Toluene	ug/L	20	19.8	99	64-118	
Xylene (Total)	ug/L	60	58.1	97	68-122	
1,2-Dichloroethane-d4 (S)	%			93	72-127	
4-Bromofluorobenzene (S)	%			96	79-121	
Dibromofluoromethane (S)	%			97	81-119	
Toluene-d8 (S)	%			102	77-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 107995 107996

Parameter	Units	2511238002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Benzene	ug/L	ND	20	20	21.8	20.1	109	101	63-138	8	
Ethylbenzene	ug/L	ND	20	20	26.6	24.1	133	121	65-135	10	
Methyl-tert-butyl ether	ug/L	ND	20	20	24.8	22.0	124	110	59-143	12	
Toluene	ug/L	ND	20	20	25.0	22.6	125	113	64-128	10	
Xylene (Total)	ug/L	ND	60	60	73.7	67.1	123	112	65-133	9	
1,2-Dichloroethane-d4 (S)	%						92	94	72-127		
4-Bromofluorobenzene (S)	%						94	95	79-121		
Dibromofluoromethane (S)	%						95	97	81-119		
Toluene-d8 (S)	%						101	101	77-120		

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511201

QC Batch: MSV/6625 Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx Analysis Description: NWTPH-Gx MSV Water
Associated Lab Samples: 2511201001, 2511201002, 2511201003, 2511201004

METHOD BLANK: 106910 Matrix: Water
Associated Lab Samples: 2511201001, 2511201002, 2511201003, 2511201004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	ug/L	ND	50.0	03/17/12 19:56	
4-Bromofluorobenzene (S)	%	104	50-150	03/17/12 19:56	

LABORATORY CONTROL SAMPLE: 106911

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	ug/L	500	436	87	65-139	
4-Bromofluorobenzene (S)	%			103	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 107644 107645

Parameter	Units	2511343001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	ug/L	ND	500	500	463	457	88	87	48-147	1	
4-Bromofluorobenzene (S)	%						100	101	50-150		

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QUALITY CONTROL DATA

Project: WA-00217
Pace Project No.: 2511201

QC Batch: MSV/6627 Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx Analysis Description: NWTPH-Gx MSV Water
Associated Lab Samples: 2511201005, 2511201006, 2511201007, 2511201008, 2511201009

METHOD BLANK: 106914 Matrix: Water
Associated Lab Samples: 2511201005, 2511201006, 2511201007, 2511201008, 2511201009

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	ug/L	ND	50.0	03/18/12 07:11	
4-Bromofluorobenzene (S)	%	105	50-150	03/18/12 07:11	

LABORATORY CONTROL SAMPLE: 106915

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	ug/L	500	400	80	65-139	
4-Bromofluorobenzene (S)	%			102	50-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 107549 107550

Parameter	Units	2511214004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
Gasoline Range Organics	ug/L	ND	500	500	274	390	52	75	48-147	35	D6
4-Bromofluorobenzene (S)	%						105	102	50-150		

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QUALIFIERS

Project: WA-00217
Pace Project No.: 2511201

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel Clean-Up

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

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TNI - The NELAC Institute.

LABORATORIES

PASI-S	Pace Analytical Services - Seattle

ANALYTE QUALIFIERS

D6	The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
S0	Surrogate recovery outside laboratory control limits.
S3	Surrogate recovery exceeded laboratory control limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: WA-00217
Pace Project No.: 2511201

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
2511201001	**MW-1**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201002	**MW-2**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201003	**MW-4**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201004	**MW-5**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201005	**MW-6**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201006	**MW-7**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201007	**MW-8**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201008	**MW-9**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201009	**MW-10**	EPA 3010	MPRP/2874	EPA 6010	ICP/2699
2511201001	**MW-1**	EPA 5030B/8260	MSV/6624		
2511201002	**MW-2**	EPA 5030B/8260	MSV/6624		
2511201003	**MW-4**	EPA 5030B/8260	MSV/6624		
2511201004	**MW-5**	EPA 5030B/8260	MSV/6624		
2511201005	**MW-6**	EPA 5030B/8260	MSV/6667		
2511201006	**MW-7**	EPA 5030B/8260	MSV/6667		
2511201007	**MW-8**	EPA 5030B/8260	MSV/6667		
2511201008	**MW-9**	EPA 5030B/8260	MSV/6667		
2511201009	**MW-10**	EPA 5030B/8260	MSV/6667		
2511201010	**Trip Blank**	EPA 5030B/8260	MSV/6667		
2511201001	**MW-1**	NWTPH-Gx	MSV/6625		
2511201002	**MW-2**	NWTPH-Gx	MSV/6625		
2511201003	**MW-4**	NWTPH-Gx	MSV/6625		
2511201004	**MW-5**	NWTPH-Gx	MSV/6625		
2511201005	**MW-6**	NWTPH-Gx	MSV/6627		
2511201006	**MW-7**	NWTPH-Gx	MSV/6627		
2511201007	**MW-8**	NWTPH-Gx	MSV/6627		
2511201008	**MW-9**	NWTPH-Gx	MSV/6627		
2511201009	**MW-10**	NWTPH-Gx	MSV/6627		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2511201

Page: 1 of 1

1554335

Section A Required Client Information:

Company: ARCADIS
Address: 2300 Eastlake Ave E Suite 200, Seattle, WA 98102
Email To: Alexander Lopez
Phone: (503) 964-9762 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Alexander Lopez
Copy To: Brian Marcum
Purchase Order No.:
Project Name: WA-00217
Project Number: GP09BPNA.WA01.N0000

Section C Invoice Information:

Attention: Alexander Lopez
Company Name: ARCADIS
Address: Portland, OR
Pace Quote Reference:
Pace Project Manager: Andy Brownfield
Pace Profile #: 22685 L1

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☒ OTHER Ecology

Site Location STATE: WA

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N): GRO (NWTPH-Gx)	BTEX (8260)	MTBE (8260)	Total Lead (6010)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1	WT	G			3/9/2012	13:25		4	X		1	3					X	X	X	X		
2	MW-2						12:40											X	X	X	X		
3	MW-4						10:50											X	X	X	X		
4	MW-5						13:55											X	X	X	X		
5	MW-6						11:25											X	X	X	X		
6	MW-7						14:30											X	X	X	X		
7	MW-8						9:25											X	X	X	X		
8	MW-9						9:50											X	X	X	X		
9	MW-10						10:20																
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Kyle Haslam	3/9/12	17:15	Rebecca Hale	3/9/12	17:15				
	Sam Miles Arcadis	3/12/12	0925	Beck Pace	3/12/12	0925				
	Beck Pace	3/12/12	1200	Colette Weaver / PACE	03/12/12	1200	1.1	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Kyle Haslam

SIGNATURE of SAMPLER: Kyle Haslam

DATE Signed (MM/DD/YY): 03/09/2012

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Sample Container Count

2511201

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CLIENT: Arcadis

COC PAGE 1 of 1
COC ID# 1554335

Trip Blank(s) Provided? Y / N

Sample Line Item	VG9H	AG1H	AG1U	BP1U	BP2U	BP3U	BP3N	BP3S	WGKU	WGFU	WG2U	DG9M	DG9B	VG9W	VSG				Comments
1	3						1 c2												
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10	4																		
11																			
12																			

AG1H	1 liter HCL amber glass	BP2S	500mL H2SO4 plastic	JGFU	4 oz amber glass soil jar
AG1U	1liter unpreserved amber glass	BP2U	500mL unpreserved plastic	WGKU	8 oz clear glass soil jar
AG2S	500mL H2SO4 amber glass	BP2Z	500mL NaOH, Zn Ac	WGFU	4 oz clear glass soil jar
AG2U	500mL unpreserved amber glass	BP3C	250mL NaOH plastic	WG2U	2 oz clear glass soil jar
AG3S	250mL H2SO4 amber glass	BP3N	250mL HNO3 plastic	JGFM	4 oz amber glass soil jar with MeOH
BG1H	1 liter HCL clear glass	BP3S	250mL H2SO4 plastic	VG9U	40mL unpreserved clear vial
BG1U	1 liter unpreserved glass	BP3U	250mL unpreserved plastic	VG9W	40mL clear vial pre-weighted with DI water
BP1N	1 liter HNO3 plastic	DG9B	40mL Na Bisulfate clear vial	VSG	Headspace septa vial
BP1S	1 liter H2SO4 plastic	DG9H	40mL HCL amber voa vial	VG9H	40mL HCL clear vial
BP1U	1 liter unpreserved plastic	DG9M	40mL MeOH clear vial	WGFX	4oz wide jar w/hexane wipe
BP1Z	1 liter NaOH, Zn, Ac	DG9T	40mL Na Thio amber vial	VG9T	40mL Na Thio. clear vial
BP2N	500mL HNO3 plastic	DG9U	40mL unpreserved amber vial	ZPLC	Ziploc Bag
BP2O	500mL NaOH plastic	I	Wipe/Swab	U	Summa Can

F-SEA-C-014-rev.01, 10Nov2011

Sample Condition Upon Receipt

Pace Analytical

Client Name: Arcadis Project # 2511201

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace Other _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ Yes ☑ No Seals intact: ☐ Yes ☐ No

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other _____ Temp. Blank Yes ✓ No _____

Thermometer Used 132013 or 101731962 or 226099 Type of Ice: (Wet) Blue None ☐ Samples on ice, cooling process has begun

Cooler Temperature 1.1°C Biological Tissue is Frozen: Yes No

Date and Initials of person examining contents: 031212 CW

Temp should be above freezing ≤ 6°C

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☐Yes ☑No ☐N/A	7.
Follow Up / Hold Analysis Requested:	☐Yes ☑No ☐N/A	8.
Sufficient Volume:	☑Yes ☐No ☐N/A	9.
Correct Containers Used:	☑Yes ☐No ☐N/A	10.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
Containers Intact:	☑Yes ☐No ☐N/A	11.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	12.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: WT	☐Yes ☑No ☐N/A	13. Rcvd 4 vials for trip blank not listed on COC
All containers needing preservation have been checked.	☑Yes ☐No ☐N/A	14.
All containers needing preservation are found to be in compliance with EPA recommendation.	☑Yes ☐No ☐N/A	
Exceptions: VOA, coliform, TOC, O&G	☑Yes ☐No ☐N/A	Initial when completed ____ Lot # of added preservative ____
Samples checked for dechlorination:	☐Yes ☐No ☑N/A	15.
Headspace in VOA Vials (>6mm):	☐Yes ☑No ☐N/A	16.
Trip Blanks Present:	☑Yes ☐No ☐N/A	17.
Trip Blank Custody Seals Present	☑Yes ☐No ☐N/A	
Pace Trip Blank Creation Date: 030712		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: Brian Marcum Date/Time: 3/14/12 1207

Comments/ Resolution: Contacted client to ask whether or not to analyze TB not listed on COC. Please add and analyze TB for BTEX per client

Project Manager Review: ARB **Date:** 3/

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

From: "Marcum, Brian" <Brian.Marcum@arcadis-us.com>
To: Andy Brownfield <Andy.Brownfield@pacelabs.com>
Date: 3/14/2012 12:12 PM
Subject: RE: WA-00217

Hi Andy,

It must have gotten missed on the coc. Please analyze the trip blank for BTEX.

Thanks,

Brian Marcum EIT | Environmental Engineer 1 | brian.marcum@arcadis-us.com
ARCADIS U.S., Inc. | 111 SW Columbia St., Suite 670 | Portland, OR 97201
T: 503 220 8201 x 1137 | M: 971 235 7174 | F: 503 220 8209
www.arcadis-us.com

ARCADIS, Imagine the result
Please consider the environment before printing this email.

From: Andy Brownfield [mailto:Andy.Brownfield@pacelabs.com]
Sent: Wednesday, March 14, 2012 12:07 PM
To: Marcum, Brian
Subject: WA-00217
Importance: High

Hi Brian,

We received a trip blank for this project and it is not listed on the COC. Would you like us to analyze or put on hold?

Please advise.

thank you!

Andy

Andy Brownfield
Project Manager
Pace Analytical Services, Inc.
940 S. Harney Street
Seattle, WA 98108
Direct Line: 206-957-2429
Fax: 206.767.5063
www.pacelabs.com

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