INTERIM ACTION CONFIRMATIONAL GROUNDWATER MONITORING REPORT

Kimberly-Clark Worldwide Site Upland Area
Everett, Washington

Prepared for: Kimberly-Clark Worldwide, Inc.

Project No. 110207-004-10 • November 11, 2015 Final

Aspect CONSULTING

earth + water

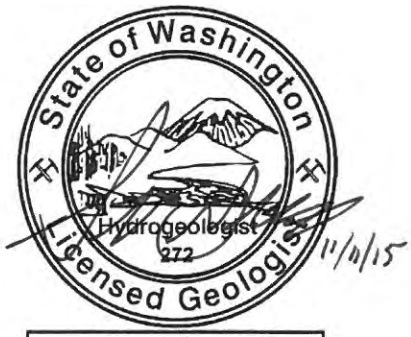
INTERIM ACTION CONFIRMATIONAL GROUNDWATER MONITORING REPORT

Kimberly-Clark Worldwide Site Upland Area
Everett, Washington

Prepared for: Kimberly-Clark Worldwide, Inc.

Project No. 110207-004-10 • November 11, 2015 Final

Aspect Consulting, LLC



Steve J. Germiat

Steve Germiat, LHG
Principal Hydrogeologist
sgermiat@aspectconsulting.com

Amy Tice, LG
Senior Staff Geologist
atice@aspectconsulting.com

V:\110207 KC Everett Mill\Deliverables\Confirmational GW Monitoring **Report\Final 11-11-15\IA Confirmational** GW Mon Report - Final.docx

Contents

List of Tables

List of Figures

List of Appendices

Acronyms

Aspect	Aspect Consulting, LLC
AST	above-ground storage tank
BA	Boiler Area
BTEX	benzene, toluene, ethylbenzene, and xylenes
COC	contaminant of concern
CN	Clark Nickerson mill
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DAST	REC2-MW-5 Area, located near Diesel AST
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management
EPH	extractable petroleum hydrocarbons
ESA	Environmental Site Assessment
FS	Feasibility Study
GF	General Fill
IA	interim action
IACL	interim action cleanup level for soil
K-C	Kimberly-Clark Worldwide Inc.
LLC	limited liability company
mg/kg	milligrams/kilograms
mg/L	milligrams per liter
MTCA	Model Toxics Control Act
NAPL	non-aqueous phase liquid
NRU	Naval Reserve Parcel UST Area
NRS	Naval Reserve Parcel South Area
Order	Agreed Order No. DE 9476
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCL	preliminary cleanup level
pH	negative log of the hydrogen ion concentration in solution
PQL	practical quantitation limit
RCD	Rail Car Dumper Area

REC	recognized environmental condition
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SHB	Small Hydraulic Barker
Site	K-C Worldwide Site
SVOC	semivolatile organic compound
TCLP	toxicity characteristic leaching procedure
TEE	terrestrial ecological evaluation
TEQ	toxic equivalent quotient/concentration
TPH	total petroleum hydrocarbons
TSS	total suspended solids
µg/L	micrograms per liter
U.S.	United States
Upland Area	Upland Area of the Kimberly-Clark Worldwide Site
UST	underground storage tank
VI	vapor intrusion
VOC	volatile organic compound
WAC	Washington Administrative Code
Work Plan	Interim Action Confirmational Groundwater Monitoring Work Plan

1 Introduction

Aspect Consulting, LLC (Aspect) has prepared this Confirmational Groundwater Monitoring Report (Monitoring Report), on behalf of Kimberly-Clark Worldwide, Inc. (K-C), to present results from the post-Interim Action confirmational groundwater monitoring activities on the Upland Area of the Kimberly-Clark Worldwide Site (herein referred to as the Upland Area; Figure 1). The confirmational groundwater monitoring was completed in accordance with the Interim Action Confirmational Groundwater Monitoring Work Plan (Work Plan; Aspect, 2014a).

As described in the Interim Action Report (Aspect, 2015a), the Upland Area interim action involved excavation and off-site disposal of approximately 38,500 tons of contaminated material, with concurrent dewatering to facilitate soil removal and handling. In addition, separate-phase petroleum encountered during excavation activities was collected and properly disposed of offsite. The 15 interim action areas and the contaminants of concern (COCs) targeted for removal in each were as follows (excavation areas are shown on Figure 1):

- **BA-MW-6 Area within the Boilers Area**
  - Oil-range total petroleum hydrocarbons (oil-range TPH)
- **Boiler/Baghouse Area**
  - Lead
- **Bunker C Aboveground Storage Tanks (ASTs) Area**
  - Oil-range TPH, gasoline-range TPH, and polycyclic aromatic hydrocarbons (PAHs) associated with the oil-range petroleum
- **CN-B-2 Area** within the former Clark-Nickerson lumber mill area
  - Oil-range TPH
- **GF-11 Area** located adjacent to the former digesters within the Pulp Mill Area
  - Lead
- **Heavy Duty Shop Sump Area** [1]
  - Oil-range TPH
- **Hydraulic Barker Vault Area**
  - Oil-range TPH

[1] Contamination of this area was inferred in the Phase 1 ESA but was not confirmed by the interim action field screening or analytical data. Therefore, no confirmational groundwater monitoring was conducted for this area in accordance with the Work Plan.

- **Naval Reserve Parcel Underground Storage Tank (UST) Area**
  - Diesel-range TPH and gasoline-range TPH
- **Naval Reserve Parcel South Area**
  - Oil-range TPH and gasoline-range TPH
- **Rail Car Dumper Area**
  - Oil-range TPH
- **REC2-MW-5 Area** (near Diesel AST)
  - Oil-range TPH
- **SHB-MW-1 Area within the Smaller Hydraulic Barker Area**
  - Oil-range TPH, gasoline-range TPH, and copper
- **UST 29/Latex Spill Area**
  - Xylene and latex
- **UST 70 Area**
  - Diesel-range TPH
- **Bunker C USTs 71, 72, 73 Area**
  - Oil-range TPH

The Interim Action Plan (Aspect, 2012) outlined the interim action's compliance monitoring program. The compliance monitoring program, in accordance with Chapter 173-340-410 of the Washington Administrative Code (WAC), included protection monitoring for on-site cleanup worker health and safety, performance monitoring in the form of excavation verification soil sampling and analysis to confirm meeting of interim action cleanup levels (IACLs) for soil, and confirmational monitoring (groundwater sampling and analysis) to confirm the effectiveness of the interim action to be protective of groundwater by removing the sources of groundwater contamination. The Work Plan (Aspect, 2014a) describes the confirmational groundwater monitoring program protocols.

This Monitoring Report describes the post-excavation groundwater confirmational monitoring activities and results for each interim action area, as well as recommendations regarding additional groundwater monitoring in each area.

Based on review of the data presented in this Monitoring Report, the Washington State Department of Ecology will determine whether preliminary cleanup levels (PCLs) have been met for the target contaminants at specific interim action cleanup areas. If Ecology determines that the data do not adequately demonstrate compliance with PCLs for specific areas, additional confirmational groundwater monitoring will be conducted for those areas as agreed to with Ecology.

2 Confirmational Monitoring Overview

The goal for post-excavation confirmational groundwater monitoring is to verify whether the completed interim action soil cleanup activities have removed sufficient contaminant source material to be protective of groundwater in each area.

Figure 1 depicts the locations of the Upland Area interim action excavations and confirmational monitoring wells. Figure 1 also depicts the interpreted water table elevation contours from the November 2013 Remedial Investigation (RI) water level measurement event. The groundwater flow directions across the Upland Area are generally toward the west, with discharge to the East Waterway, as expected, but with localized flow direction variations from northwest to southwest. However, the November 2013 water level data also demonstrate a pronounced east-west-trending groundwater mound within the footprint of the former Log Pond, as described in the Work Plan (Aspect, 2014a). Review of the collective water level and tidal monitoring data collected during the site investigations to date indicates that the bulkhead constructed around the perimeter of the former Log Pond acts as a low-permeability barrier to groundwater flow, which allows the mound within the Log Pond to be maintained; the forthcoming RI/FS will describe in detail the hydrogeology and water level data for the Upland Area including the Log Pond. The local groundwater flow directions at each interim action area are depicted on the respective Figures 2 through 15.

For this monitoring program, 36 new monitoring wells were installed, considering local groundwater flow directions, and a combination of 38 new and pre-existing monitoring wells were sampled in accordance with the Work Plan (Aspect, 2014a). Well logs for the new wells are included in Appendix A. Chemical analyses for the groundwater monitoring in each area were determined in the Work Plan based on the COCs that identified the area for soil cleanup and the results of the excavation verification soil sampling and analysis. The monitoring well locations and chemical analyses for each interim action soil cleanup area are detailed in Section 3. In accordance with the Work Plan, the confirmational groundwater monitoring was conducted on a quarterly basis for one year (May, August, November 2014 and February 2015) to assess potential seasonal variability in groundwater quality.

Aspect conducted an independent quality assurance validation for the four rounds of analytical data. All data, as qualified, are usable for their intended purposes. The validation reports for the collective data are included in Appendix B. The four rounds of validated analytical data have been uploaded to and are available from Ecology's Environmental Information Management (EIM) database. The original laboratory certificates of analysis are on file at Aspect and available upon request.

2.1 Preliminary Cleanup Levels for Groundwater

The confirmational groundwater monitoring data are compared against groundwater preliminary cleanup levels (PCLs) established for the Upland Area. Because drinking water is not a practicable future use for groundwater at the Upland Area, the established groundwater PCLs are the most stringent criteria based on protection of the adjacent marine water body (East Waterway) and protection from vapor intrusion (VI) into future

structures (indoor air) on the property assuming a future industrial use consistent with the prospective buyer's planned redevelopment as a marine terminal. The process for deriving the groundwater PCLs is detailed in the RI Data Report (Aspect, 2014c). The PCL values were updated and approved by Ecology following review and discussion of the RI Data Report, and those values are applied in this Monitoring Report. The groundwater PCLs for compounds analyzed for in the confirmational groundwater monitoring program are presented in Table 1, and are listed in the area-specific data tables referenced in Section 3.

Based on an evaluation of the metals data from unfiltered groundwater samples versus filtered groundwater samples ("total" versus "dissolved" metals data, respectively) taken during Upland Area groundwater sampling (Aspect, 2014b), Ecology, in July 2014, concurred with K-C that dissolved metals are the appropriate measurement to represent groundwater quality for the Upland Area. Consequently, the groundwater PCLs for metals apply to dissolved metals data.

During the first quarter monitoring in May 2014, prior to Ecology's determination to use dissolved metals data, samples were analyzed for total metals, and samples with total metal(s) detected at concentrations greater than the screening levels were subsequently also analyzed for dissolved metals. The concentration resulting from a total metals analysis will generally be greater than the concentration resulting from a dissolved metals analysis of the same groundwater sample. Therefore, for samples lacking a dissolved metals analysis, total metal(s) concentrations less than the PCL for that dissolved metal will be considered in compliance. There were three first quarter groundwater samples with total metals concentrations exceeding respective PCLs for which the unfiltered water samples were lost so dissolved metals analyses could not be conducted. For these samples (discussed by area in Section 3), the total metals data are used for assessment purposes.

3 Confirmational Monitoring Results by Area

This section describes the four quarters of confirmational groundwater monitoring results, organized by interim action area. It demonstrates which wells and analytes have met PCLs, and makes recommendations for wells and analytes that warrant continued monitoring as part of the interim action. It's noted that the proposed monitoring of the interim action areas may be terminated and superseded by monitoring dictated by the cleanup alternative selected for the upland portion of the Site as part of the Cleanup Action Plan. Figures 2 through 15 show, for each interim action area, the soil excavation area, monitoring well locations for confirmational groundwater monitoring, and the local groundwater flow direction. Tables 2 through 15 present the analytical data for the respective areas. Detected COC concentrations exceeding PCLs are highlighted in the data tables.

3.1 BA-MW-6 Area

Oil-range TPH was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on

Figure 2. Following the interim action soil removal and verification soil sampling, residual soil contaminant concentrations within the excavated area met soil IACLs that were based on industrial use including groundwater protection (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring well BA6-MW-101, located on the downgradient edge of the small excavation, as shown on Figure 2. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs.

The results for all four quarters were below respective groundwater PCLs. These results can be found in Table 2.

Because the petroleum source was removed and groundwater concentrations meet PCLs, Aspect recommends no further groundwater monitoring for this interim action area.

3.2 Boiler/Baghouse Area

Lead was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil samples are shown on Figure 3. Following the interim action soil removal and verification soil sampling, residual soil contaminant concentrations within the excavated area met soil IACLs based on industrial worker direct contact. However, residual soil concentrations of copper, mercury, and zinc within the excavated area exceeded their respective soil IACLs based on assumed groundwater leaching to protect the marine environment (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring wells BBH-MW-101 and BBH-MW-102 on the downgradient (west) end of the excavation, and wells BBH-MW-103 and BBH-MW-104 adjacent to the eastern portion of the excavation, as shown on Figure 3. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Arsenic
- Copper
- Lead
- Mercury
- Zinc

The results can be found in Table 3.

In the four quarters of monitoring, well BBH-MW101 had one detection (5.8 ug/L) marginally above the 5 ug/L PCL for arsenic, and two detections (up to 78 ug/L) considerably above the 3.1 ug/L PCL for copper.

Downgradient well BBH-MW102 did not have any detections above PCLs.

Adjacent to the easternmost portion of the excavation, well BBH-MW103 had exceedances for arsenic (up to 32.7 ug/L), copper (up to 269 ug/L), and mercury (up to 4.2 ug/L) in three out of four quarters of monitoring. BBH-MW103 also had a lead detection (102 ug/L) during the 4th quarter of sampling that was very anomalous relative to prior samples from that well and any well surrounding; the arsenic and copper results for that sample were also considerably above prior detected concentrations (Table 3). The well was therefore resampled in April 2015 to verify the 4th quarter results. The results of the resample had a lead detection below the PCL (1.46 ug/L), which was in line with previous results; the concentrations of the others metals were also considerably lower than detected in the 4th quarter event, but were still above their respective PCLs. As described above, the directly downgradient wells BBH-MW101 did not have lead or mercury detections above PCLs.

Also adjacent to the easternmost portion of the excavation, well BBH-MW104 had one detection above the PCL for arsenic (11.7 ug/L), and four detections (up to 356 ug/L) above the PCL for zinc during the four quarters of monitoring. As described above, the directly downgradient well BBH-MW102 did not have detections above PCLs for arsenic or zinc.

In summary, groundwater metals exceedances were more consistent and of higher magnitude along the upgradient (eastern) portion of the excavation. At the downgradient side of the excavation, copper was the only metal detected above PCLs more than once, and only in one of two wells.

Based on the data to date, Aspect recommends continuing monitoring at each of the four wells in the Boiler/Baghouse Area for the same suite of metals. We also recommend monitoring of wells REC3-MW-1R and PM-MW-8, located near the shoreline generally downgradient of this excavation area (Figure 3), so as to assess potential migration of metals downgradient to the shoreline, which is information useful for the RI/FS. The proposed frequency for additional monitoring is presented in Section 4.

3.3 Bunker C ASTs Area

Oil-range TPH (Bunker C fuel oil) and associated PAHs were the COCs targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 4. Following the interim action soil removal and verification sampling, residual soil concentrations of gasoline-range TPH, diesel-range TPH, total cPAH (TEQ[2]), copper, and mercury at one or more sample locations within the area exceeded their respective soil PCLs based on groundwater protection (Aspect, 2015a). The residual TPH exceedances were located in sidewall samples at/beneath the northern edge of the Warehouse. Petroleum-contaminated soil beneath the Warehouse was not targeted for removal during the interim action since the Warehouse may remain in the future (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at eight new monitoring wells BCT-MW-101 through BCT-MW-108, as shown on Figure 4. Wells BCT-MW-101 through BCT-MW-104 were completed along the northern edge of the

[2] Total toxicity equivalence, calculated using toxicity equivalency factor in accordance with WAC 173-340-708(8)(e) and assuming non-detected values are present at ½ the analytical reporting limit.

Warehouse to assess whether petroleum hydrocarbons are migrating in groundwater from petroleum-contaminated soils beneath the Warehouse. New wells BCT-MW-105 through BCT-MW-107 were completed along the downgradient edge of the excavation, and well BCT-MW-108 was completed on the northernwestern edge of the excavation. The four rounds of confirmational groundwater samples for this area were submitted for laboratory analysis of:

- Gasoline-range TPH
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Diesel- and oil-range TPH
- PAHs
- Copper
- Lead
- Mercury

The results for this area can be found in Table 4.

During the four quarters of sampling, seven of the eight wells had TPH results below PCLs. The sole TPH exceedance was a gasoline-range TPH concentration detected at well BCT-MW103 during sampling quarter one (1,100 ug/L, above the 1,000 ug/L PCL); this early detection may be due to mobilization of contaminants due to disturbance of soil during the recent large-scale excavation of petroleum-contaminated soil. TPH results for this well were below PCLs in the subsequent monitoring events. TPHs were not detected in wells BCT-MW-101 and BCT-MW-102, and there were no cPAH or BTEX detections above PCLs in any of the BCT wells. Notably, benzene was not detected in any of the 32 groundwater samples, consistent with prior data.

There was one exceedance of the 89 ug/L VI-based industrial land use PCL[3] detected for naphthalene at well BCT-MW-108 (130 ug/L) located along the northern edge of the excavation (Figure 4). The naphthalene exceedance in that well was detected during the first sampling event, and the detected concentrations in the subsequent three sampling events were below the PCL (Table 4).

Regarding dissolved metals, there were exceedances of the 3.1 ug/L copper PCL detected during the last two of four sampling events at wells BCT-MW-103, BCT-MW-106, and BCT-MW-107 (up to 13.3 ug/L). In addition, there was a mercury detection (0.0255 ug/L) very slightly above the 0.025 ug/L PCL in one of four samples collected from well BCT-MW-105.

In summary, following removal of roughly 9,700 tons of petroleum-contaminated material including non-aqueous phase liquid (NAPL) oil from the Bunker C ASTs Area, TPH and cPAH concentrations in groundwater met PCLs at all locations, except the one

[3] Note that the naphthalene groundwater PCLs are based on VI, and the maximum detected naphthalene concentration in groundwater is an order of magnitude below the 4,700 ug/L marine water quality standard.

TPH-gasoline exceedance detected in four samples collected from well BCT-MW-103 located along the north wall of the Warehouse. The first groundwater sample collected from well BCT-MW-108 on the north edge of the excavation contained a naphthalene concentration exceeding the VI-based PCL for industrial use. Naphthalene concentrations in that well and in adjacent well BCT-MW-107 exceeded the VI-based PCL for unrestricted use in all four monitoring quarters.

Aspect recommends continued monitoring for gasoline-range TPH with BTEX, diesel- and oil-range TPH, and PAHs at wells BCT-MW-103 through BCT-MW-108. We also recommend monitoring for these compounds plus dissolved copper at downgradient shoreline wells MW-1 and MW-2 (Figure 4), so as to assess potential migration of these constituents downgradient to the shoreline, which is information useful for the RI/FS. The proposed frequency for additional monitoring is presented in Section 4.

3.4 CN-B-2 Area

Oil-range TPH was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 5. Following the interim action soil removal and verification sampling, residual soil concentrations of total cPAH, arsenic, copper, and lead in one or more sample locations within the excavated area exceeded their respective soil PCLs based on groundwater leaching to protect the marine environment (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring wells CN-MW-101 through CN-MW-104 located along the downgradient edge of the excavation, as shown on Figure 5. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs
- Arsenic
- Copper
- Lead.

During the four quarters of sampling, the TPH, BTEX, and PAH concentrations were below respective PCLs; in fact, TPH was not detected in any of the 16 samples. There was one slight exceedance of arsenic (5.1 ug/L) detected in well CN-MW-101 during sampling quarter two; the other three samples had detected arsenic below the 5 ug/L PCL. Concentrations of dissolved copper and lead were below respective PCLs in all samples. The results can be found in Table 5.

In Summary, Aspect recommends further sampling in the CN-B-2 Area at well CN-MW-101 for dissolved arsenic. Because the petroleum source (6,560 tons of contaminated soil) was removed and groundwater TPH and PAH concentrations meet PCLs, further groundwater monitoring for those analytes is not proposed for this area. The proposed frequency for additional monitoring is presented in Section 4.

3.5 GF-11 Area

Lead was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 6. Following the interim action soil removal and verification sampling, residual soil contaminant concentrations within the excavated area meet soil PCLs based on industrial worker direct contact. However, residual soil concentrations of copper and mercury within the excavated area exceeded soil PCLs based on groundwater leaching to protect the marine environment (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring well GF11-MW-101 located on the downgradient edge of the excavation, as shown on Figure 6. The four rounds of confirmational groundwater samples were submitted for laboratory analysis of:

- Copper
- Lead
- Mercury

The detected dissolved lead and copper concentrations for all four quarters were below their PCLs. The mercury results were below PCLs during sampling quarters one and two, but were slightly above PCLs for sampling quarters three and four (up to 0.044 ug/L). The results can be found in Table 6.

In summary, Aspect recommends to continue sampling in the GF-11 Area at well GF11-MW-101 for analysis of dissolved mercury. Because the lead source (224 tons of hazardous lead soil) was removed and groundwater lead concentrations meet PCLs, further groundwater monitoring for lead is not proposed for this area. The proposed frequency for additional monitoring is presented in Section 4.

3.6 Hydraulic Barker Vault Area

Oil-range TPH was the COC targeted in the interim action for this area based on observed oily material in a small subsurface vault encountered during mill demolition. The interim action excavation area and excavation verification soil samples are shown on Figure 7. Following the interim action soil removal and verification sampling, residual soil contaminant concentrations within the excavated area met soil PCLs based on industrial use including groundwater protection (Aspect, 2015a)

Confirmational groundwater monitoring for this area was completed at new monitoring well HBV-MW-101 located on the downgradient edge of the excavation, as shown on Figure 7. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs

The results for all four quarters were below PCLs. These results can be found in Table 7.

In Summary, because the petroleum source was removed and groundwater TPH and PAH concentrations meet PCLs, Aspect recommends no further groundwater monitoring for the Hydraulic Barker Vault Area.

3.7 Naval Reserve Parcel UST Area

Diesel-range and gasoline-range TPH, left in place following the Navy's removal of gasoline and diesel USTs (Foster Wheeler, 1998), were the COCs targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 8. Following the interim action soil removal and verification sampling, residual soil contaminant concentrations within the excavated area met soil PCLs based on industrial use including groundwater protection, with the exception of one sample containing 0.53 mg/kg total cPAH (TEQ) concentration, which exceeds the PCL based on groundwater leaching for marine protection (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at existing monitoring well NRP-MW-2 and new monitoring wells NRU-MW-101 and NRU-MW-102, located along the downgradient edge of the excavation, as shown on Figure 8. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Gasoline-range TPH
- BTEX
- Diesel- and oil-range TPH
- PAHs

The TPH, BTEX, and PAH results for all four quarters were below respective PCLs; in fact, TPH was not detected in any of the samples. These results can be found in Table 8.

In Summary, because the petroleum source (2,280 tons of petroleum-contaminated soil) was removed and groundwater concentrations meet PCLs, Aspect recommends no further groundwater monitoring for Naval Reserve Parcel UST Area.

3.8 Naval Reserve Parcel South Area

Gasoline-range and oil-range TPH were the COCs targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 9. Following the interim action soil removal and verification sampling, residual soil contaminant concentrations within the excavated area met soil PCLs based on industrial use including groundwater protection (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring wells NRS-MW-101 and NRS-MW-102, as shown on Figure 9. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Gasoline-range TPH
- BTEX
- Diesel- and oil-range TPH

- PAHs

The TPH, BTEX, and PAH results for all four quarters were below the PCL. TPH, BTEX, and cPAHs were not detected in any of the samples. These results can be found in Table 9.

In summary, because the petroleum source (1,710 tons of petroleum-contaminated soil) was removed and groundwater concentrations meet PCLs, Aspect recommends no further groundwater monitoring for the Naval Reserve Parcel South Area.

3.9 Rail Car Dumper Area

Oil-range TPH was the COC targeted in the interim action for this area, based on oil staining observed on the structure (REC 4) during the Phase 1 environmental site assessment (AECOM, 2011). The interim action excavation area and excavation verification soil sample locations are shown on Figure 10. Following the interim action soil removal and verification sampling, residual soil contaminant concentrations within the excavated area met soil PCLs based on industrial use including groundwater protection (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring well RCD-MW-101 located near the downgradient edge of the excavation, as shown on Figure 10. The four rounds of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs
- Arsenic
- Copper
- Mercury
- Nickel

During the four quarters of groundwater monitoring, there were no detections of TPH or PAHs. There were, however, one or more detections of dissolved copper and nickel exceeding PCLs, even though they were not targeted COCs. The copper exceedance (4.52 ug/L) was detected in sampling quarter two only. The detected nickel concentrations (up to 159 ug/L) exceeded the PCL during all four quarters, with relatively lower concentrations detected in quarters three and four. These results can be found in Table 10.

In summary, Aspect recommends continued sampled of the Rail Car Dumper Area at well RCD-MW-101 for dissolved copper and nickel. The proposed frequency for additional monitoring is presented in Section 4.

3.10 REC2-MW-5 Area (near Diesel AST)

Oil-range TPH was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 11. Following the interim action soil removal and verification sampling, contaminant concentrations within the excavated area met soil PCLs based on industrial worker direct contact, and petroleum concentrations met PCLs. However, residual soil concentrations of copper and mercury within the excavated area exceeded the soil PCLs based on groundwater leaching to protect the marine environment (Aspect, 2015a). In addition, residual PCB concentrations exceeded soil PCLs for unrestricted soil direct contact (but not industrial direct contact), and exceeded a MTCA-default, soil screening level based on groundwater leaching to protect the marine environment.

Confirmational groundwater monitoring for this area was completed at new monitoring well DAST-MW-101 located on the downgradient edge of the excavation, as shown on Figure 11. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs
- Copper
- Mercury

The results for all four quarters were below the respective PCLs. These results can be found in Table 11.

However, because residual soil concentrations within the excavation exceeded the leachability-based screening level, groundwater from well DAST-MW-101 in the REC2-MW-5 Area will be sampled and analyzed for PCBs in accordance with the RI/FS Work Plan (Aspect, 2015b).

3.11 SHB-MW-1 Area

Gasoline-range TPH, oil-range TPH, and copper were the COCs targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 12. Following the interim action soil removal and verification sampling, COC concentrations within the excavated area met soil PCLs based on industrial worker direct contact, and petroleum concentrations met PCLs. However, residual soil concentrations of copper and mercury within the excavated area exceeded the soil PCLs based on groundwater leaching to protect the marine environment (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring well SHB-MW-101 and SHB-MW-102, as shown on Figure 12. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Gasoline-range TPH
- BTEX

- Diesel- and oil-range TPH
- PAHs
- Copper
- Mercury

The results can be found in Table 12.

Neither well had detections of TPH above PCLs during the four quarters of monitoring. Well SHB-MW-102 also did not have any detections of metals or cPAHs above PCLs during the four quarters of monitoring. Well SHB-MW-101 had one low-level exceedance for cPAH (0.026 ug/L) during sampling quarter one, but subsequent sampling events were below the PCL. SHB-MW-101 also had one low-level copper exceedance during quarter one (3.5 ug/L) and mercury exceedances during quarters one and three (up to 0.064 ug/L), but the detections were inconsistent and do not exhibit a pattern.

In summary, Aspect recommends continued sampling of SHB-MW-1 Area at well SHB-MW-101 for dissolved copper and mercury, and PAHs. The proposed frequency for additional monitoring is presented in Section 4.

3.12 UST 29/Latex Spill Area

Total xylenes were the COCs targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 13. While the latex product spilled in this area contained trace concentrations of formaldehyde, vinyl acetate, and 1,4-dioxane, those compounds were not detected at concentrations greater than analytical reporting limits in soil or groundwater during the Phase 2 ESA (Aspect, 2013a). Following the interim action soil removal and verification sampling, contaminant concentrations within the excavated area met soil PCLs based on industrial use including groundwater protection (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring wells UST29-MW-101 and UST29-MW-102, located on the downgradient edge of the excavation, and at new monitoring well UST29-MW-103, located within the footprint of the former xylene UST 29, as shown on Figure 13. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Gasoline-range TPH
- BTEX
- Diesel- and Oil-range TPH
- PAHs

The gasoline-range TPH, BTEX, and diesel- and oil-range TPH results for each of the three wells during all four quarters were below the PCLs. Gasoline-range TPH and xylenes were not detected within the footprint of the former UST (UST29-MW-103), but were detectable at concentrations well below PCLs at downgradient well UST29-MW-102. In addition, there were detections of cPAHs (up to 0.051 ug/L) above the PCL

during three out of four quarters in well UST29-MW101. The results can be found in Table 13.

The confirmational groundwater data confirm that the xylene contaminant source (5,440 tons of xylene-contaminated soil) was successfully removed during the interim action, and groundwater concentrations for that COC meet PCLs.

In summary, Aspect recommends to continue sampling of the UST 29/Latex Spill Area at well UST29-MW-101 for analysis of PAHs. The proposed frequency for additional monitoring is presented in Section 4.

3.13 UST 70 Area

Diesel-range TPH was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 14. Following the interim action soil removal and verification soil sampling, contaminant concentrations within the excavated area met soil PCLs based on industrial use including groundwater protection (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at existing monitoring well UST70-MW-2 and new monitoring wells UST70-MW-101 and UST70-MW-102 located on the downgradient side of the excavation, as shown on Figure 14. The four quarters of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs
- Arsenic
- Copper
- Nickel
- Zinc

During the four quarters of sampling, there were no detections of TPH or PAHs above PCLs. Dissolved copper exceeded its PCL in three[4] of four samples from well UST70-MW-2 (up to 11.9 ug/L), in one of four samples from well UST70-MW-101 (6.47 ug/L), and in one of four samples from well UST70-MW-102 (9.35 ug/L). Dissolved nickel exceeded its PCL in three[5] of four samples collected from well UST-MW-2 (up to 35.4 ug/L). These results can be found in Table 14.

In summary the confirmational groundwater data confirm that the petroleum source was successfully removed and groundwater concentrations for TPH and PAHs meet PCLs. Aspect recommends continued sampling in the three UST 70 Area wells for dissolved

[4] The first-quarter exceedance is based on the total copper concentration since a dissolved metals analysis could not be performed (filtered bottle did not arrive at lab).
[5] The first-quarter exceedance is based on the total nickel concentration since a dissolved metals analysis could not be performed (filtered bottle did not arrive at lab).

copper, and in well UST70-MW-2 for dissolved nickel. The proposed frequency for additional monitoring is presented in Section 4.

3.14 USTs 71, 72, 73 Area

Oil-range TPH (Bunker C oil) was the COC targeted in the interim action for this area. The interim action excavation area and excavation verification soil sample locations are shown on Figure 15. Following the interim action soil removal, residual soil contaminant concentrations within the excavated area met soil PCLs based on industrial direct contact. However, residual soil concentrations of oil-range TPH, cPAHs, copper, and mercury within the excavated area exceeded the soil PCLs based on groundwater protection. Small quantities of petroleum-contaminated soil were left in place beneath monolithic foundation elements, since it was deemed impracticable to remove the foundations (Aspect, 2015a).

Confirmational groundwater monitoring for this area was completed at new monitoring wells UST71-MW-101 through UST71-MW-103 located along the downgradient edge of the excavation (UST-MW-103 is immediately downgradient of residual Bunker C-contaminated soil left in place on the southern edge of the excavation). Confirmational groundwater monitoring was also completed at UST71-MW-104 located downgradient of residual Bunker C-contaminated soil left in place in the northeastern edge of the excavation, as shown on Figure 16.

During drilling of wells UST71-MW-102 and UST71-MW-103, an obstruction was encountered below ground surface. Several drilling locations were attempted with similar refusal at each. Ultimately, these two wells were completed approximately 3 to 4 feet shallower than planned based on water table depth at time of drilling. Because of the limited saturated thickness in these two wells, they went dry during well development, limiting development effectiveness, and they continue to provide poor yield during groundwater sampling. Wells UST71-MW-102 and UST71-MW-103 were sampled with normal low-flow sampling techniques; however, the turbidity has been high at each well throughout the four quarters of monitoring. Well UST71-MW-103 has pumped dry during each round of sampling and must be sampled after the well has been given time to recharge.

The four rounds of confirmational groundwater samples were submitted for laboratory analysis of:

- Diesel- and oil-range TPH
- PAHs
- Copper
- Zinc[6]

[6] Mercury rather than zinc should have been included in groundwater compliance monitoring for the USTs 71, 72, 73 IA area (see description in the text).

The fourth-round sample from well UST71-MW-103 was also submitted for laboratory analysis of extractable petroleum hydrocarbons (EPH) to more accurately characterize the nature of hydrocarbons present. These results are shown in Table 15.

Because of a reporting mistake in Table 1 of the Work Plan (Aspect, 2014a), copper and zinc are displayed as groundwater analytes for this area and were subsequently analyzed as part of quarterly conformational monitoring events. However, copper and mercury are the correct groundwater analytes that should have been analyzed as part of conformational monitoring.

The Work Plan text correctly described this, but Table 1 of the Work Plan does not. All detected groundwater zinc concentrations met PCLs for the area, and there were copper exceedances detected in each of the four wells as outlined below.

On the north end of the excavation, no groundwater TPH or PAH exceedances were detected at well UST71-MW-104, which is positioned immediately downgradient of the residual soil left in place containing the highest diesel– and oil-range TPH concentrations (up to 28,000 mg/kg). Copper exceedances were also detected in two of four samples from well UST71-MW-104 (up to 7.6 ug/L).

Downgradient of UST71-MW-104, no TPH or PAH exceedances were detected at well UST71-MW-101 during the four rounds of sampling. A copper exceedance (8.73 ug/L) was detected in the first of four samples collected from this well. This exceedance was a total copper result because the corresponding filtered sample bottle did not arrive at the laboratory, and the three subsequent dissolved copper results from this well were below the PCL.

On the south end of the excavation, no groundwater TPH exceedances were detected at well UST71-MW-103, which is positioned immediately downgradient of the residual soil containing oil-range TPH concentrations of up to 8,400 mg/kg. However, in each of the four monitoring quarters, well UST71-MW-103 had detected exceedances for total cPAHs (up to 0.19 ug/L) and, assuming VI for an unrestricted land use, naphthalene in two of four samples (up to 53 ug/L). The detected naphthalene concentrations in each sample comply with the VI-based PCL for industrial use. The detected cPAH and naphthalene concentrations show no apparent trends over the four quarters.

There were also copper exceedances detected during each of the four quarters of sampling at well UST71-MW-103 (6.3 to 47.4 ug/L), with no apparent trend in concentrations. The EPH data confirm the detected hydrocarbons are within the diesel range (detectable aliphatic hydrocarbons in the C16-C21 range, and detectable aromatic hydrocarbons in the C12-C16 and C16-C21 ranges).

At well UST71-MW-102, located downgradient of the central portion of the excavation, diesel-range TPH exceedances (up to 890 ug/L) and total cPAH exceedances (up to 0.14 ug/L) were each detected in 2 of 4 samples collected; however, the TPH and cPAH exceedances occurred in different sampling rounds. The TPH exceedance occurs because of elevated oil-range TPH concentrations in the two samples (Table 15); this is the only well in the confirmational monitoring program that has had detectable oil-range TPH. No naphthalene exceedances were detected in this well. Copper exceedances were detected in each of the four samples collected from well UST71-MW-102—the maximum

detection (20.2 ug/L) was a total copper result because the corresponding filtered sample bottle did not arrive at the laboratory. The detected dissolved copper concentrations in the subsequent three samples were below 7 ug/L.

In summary, following removal of more than 8,000 tons of petroleum-contaminated material from the UST 71 Area, groundwater TPH concentrations are typically below PCLs, except during the last 2 of 4 quarters from well UST-MW-102 located on the downgradient edge of the excavation's center; cPAH exceedances were also detected in 2 of 4 quarters from this well. No groundwater TPH exceedances are detected in the wells located immediately downgradient of the two locations where residual petroleum-contaminated soil was left in place beneath very large foundation structures during the interim action; however, cPAH exceedances were consistently detected in well UST71-MW-103 located downgradient of the southern occurrence of residual contaminated soil.

As discussed in the preceding section, no cPAH exceedances were detected in monitoring wells for the UST 70 area, located generally downgradient of the UST 71 Area (Figure 15). Consistent copper exceedances were detected in wells UST71-MW-102 and UST71-MW-103. As stated above, mercury was inadvertently not analyzed for in this area's groundwater samples as had been originally intended based on residual soil concentrations following the interim action.

Aspect recommends continued sampling of wells UST71-MW-101, UST71-MW-102, and UST-MW-103 located along the downgradient edge of the excavation for diesel-range TPH, PAHs, dissolved copper, and dissolved mercury. We also recommend monitoring of downgradient shoreline well REC3-MW-1R (Figure 15) to assess potential migration of PAHs to the shoreline, which is information useful for the RI/FS. The proposed frequency for additional monitoring is presented in Section 4.

4 Summary of Recommendations

Based on the data collected during the four rounds of quarterly monitoring, Aspect proposes that no further monitoring is required for the following interim action areas:

- BA-MW-6 Area
- Hydraulic Barker Vault Area
- Naval Reserve Parcel UST Area
- Naval Reserve Parcel South Area

Aspect further recommends that additional sampling and analysis be completed for wells and analytes as outlined for each area in Section 3, which are summarized in Table 16. Figure 16 depicts locations of the monitoring wells recommended for continued monitoring.

We recommend that the monitoring be conducted quarterly for another year (4 additional events; e.g., November 2015, and February, May, and August 2016), by which time any additional groundwater monitoring would be conducted in accordance with the Cleanup

Action Plan for the Upland Area. The proposed monitoring could be terminated and superseded by monitoring dictated by the Cleanup Action Plan.

The results from the subsequent four quarters groundwater monitoring would be evaluated with existing data, and presented to Ecology at the end of the year of monitoring. The additional data will also be submitted to Ecology's Environmental Information Management (EIM) database in accordance with the Agreed Order.

5 References

AECOM, 2011, Phase I Environmental Site Assessment, Everett Pulp and Paper Mill, Everett Washington, April 2011.

Aspect, 2012, Interim Action Plan, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, September 20, 2012, Exhibit C to Agreed Order No. DE 9476.

Aspect 2013a, Data Report for Phase 2 Environmental Site Assessment, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, March 15, 2013.

Aspect, 2013b, RI/FS Work Plan, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013.

Aspect, 2014a, Interim Action Confirmational Groundwater Monitoring Work Plan, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, June 12, 2014.

Aspect, 2014b, Comparison of Total and Dissolved Metals Data for Groundwater Site Upland Area, Everett, Washington, July 8, 2014.

Aspect, 2014c, Remedial Investigation Data Report, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, September 29, 2014.

Aspect, 2015a, Interim Action Report, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, April 8, 2015.

Aspect, 2015b, RI/FS Work Plan Addendum for Additional Focused Data Collection, Kimberly-Clark Worldwide Site Upland Area RI/FS, June 2015.

Foster Wheeler, 1998, Independent Remedial Action Closure Report, Old Naval Reserve Center, Everett, Washington, December 16, 1998.

Limitations

Work for this project was performed for the Kimberly-Clark Worldwide, Inc. (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

TABLES

Table 1 - Preliminary Cleanup Levels for Confirmational Groundwater Monitoring Analytes

Project No. 110207-K-C Worldwide Site Upland Area
Everett,WA

	APPLICABLE GROUNDWATER CRITERIA												
	Marine Surface Water Criteria for Establishing Method B Surface Water Cleanup Levels[a]												
	Aquatic Protection			Human Health Protection									
ANALYTE (BY GROUP)	Surface Water ARAR - Aquatic Life - Marine, Most Restrictive - Ch. 173-201A WAC *(ma-wac)*	Surface Water ARAR - Aquatic Life - Marine, Most Restrictive - Clean Water Act §304 *(ma-cwa)*	Surface Water ARAR - Aquatic Life - Marine, Most Restrictive - National Toxics Rule, 40 CFR 131 *(ma-ntr)*	Surface Water ARAR - Human Health - Marine - Clean Water Act §304 *(hh-cwa)*	Surface Water ARAR - Human Health - Marine - National Toxics Rule, 40 CFR 131 *(hh-ntr)*	Surface Water, Method B Human Health, Most Restrictive, Standard Formula *(sw-b)*	Surface Water, Method B Human Health, Most Restrictive, Adjusted for ARARs[b] *(hh)*	**Surface Water Screening Level for Marine Protection** *(marine)*		**Potable Groundwater Screening Level[c]** *(pot)*	**Protective of Vapor Intrusion for Industrial Use (Method C)[d]** *(vi-c)*	**Applicable Practical Quantitation Level (PQL)[e]** *(pql)*	**Most Stringent Groundwater Screening Level for Industrial Land Use**	
Total Petroleum Hydrocarbons													
Gasoline Range Hydrocarbons in ug/L										1000		100	1000	*(pot)*
Diesel Range Hydrocarbons in ug/L										500		50	500	*(pot)*
Oil Range Hydrocarbons in ug/L										500		250	500	*(pot)*
Total TPH (D+O) in ug/L										500		250	500	*(pot)*
Dissolved Metals														
Arsenic in ug/L	36	36	36	0.14	0.14	0.098	0.14	5	*footnote f*			0.5	5	*(marine)*
Copper in ug/L	3.1	3.1				2900	2900	3.1	*(ma-wac)*			0.1	3.1	*(marine)*
Lead in ug/L	8.1	8.1	8.1					8.1	*(ma-wac)*			0.02	8.1	*(marine)*
Mercury in ug/L	0.025	0.94	0.025	0.3	0.15		0.15	0.025	*(ma-wac)*		1.9	0.0005	0.025	*(marine)*
Nickel in ug/L	8.2	8.2	8.2	4600	4600	1100	1100	8.2	*(ma-wac)*			0.2	8.2	*(marine)*
Zinc in ug/L	81	81	81	26000		17000	17000	81	*(ma-wac)*			0.5	81	*(marine)*
Volatile Organic Compounds (BTEX)														
Benzene in ug/L				51	71	23	51	51	*(hh)*		24	1	24	*(vi-c)*
Ethylbenzene in ug/L				2100	29000	6800	2100	2100	*(hh)*		6100	1	2100	*(marine)*
Toluene in ug/L				15000	200000	19000	15000	15000	*(hh)*		34000	1	15000	*(marine)*
Xylenes, total										1000	680	3	680	*(vi-c)*
Polycyclic Aromatic Hydrocarbons (PAHs)														
Acenaphthene in ug/L				990		650	650	650	*(hh)*			0.012	650	*(marine)*
Acenaphthylene in ug/L				990		650	650	650	*(hh)*			0.012	650	*(marine)*
Anthracene in ug/L				40000	110000	26000	26000	26000	*(hh)*			0.012	26000	*(marine)*
Benzo(g,h,i)perylene in ug/L												0.012		
Fluoranthene in ug/L				140	370	86	86	86	*(hh)*			0.012	86	*(marine)*
Fluorene in ug/L				5300	14000	3500	3500	3500	*(hh)*			0.012	3500	*(marine)*
Phenanthrene in ug/L												0.012		
Pyrene in ug/L				4000	11000	2600	2600	2600	*(hh)*			0.012	2600	*(marine)*
1-Methylnaphthalene in ug/L										1.5		0.05	1.5	*(pot)*
2-Methylnaphthalene in ug/L										32		0.05	32	*(pot)*
Naphthalene in ug/L						4700	4700	4700	*(hh)*		89	0.012	89	*(vi-c)*
Benz(a)anthracene in ug/L				0.018	0.031	0.30	0.018					0.01		
Benzo(a)pyrene in ug/L				0.018	0.031	0.03	0.018					0.01		
Benzo(b)fluoranthene in ug/L				0.018	0.031	0.30	0.018					0.01		
Benzo(k)fluoranthene in ug/L				0.018	0.031	3.0	0.018					0.01		
Chrysene in ug/L				0.018	0.031	30	0.018					0.01		
Dibenzo(a,h)anthracene in ug/L				0.018	0.031	0.03	0.018					0.01		
Indeno(1,2,3-cd)pyrene in ug/L				0.018	0.031	0.30	0.018					0.01		
Total cPAHs TEQ in ug/L				0.018	0.031	0.03	0.018	0.018	*(hh)*			0.015	0.018	*(marine)*

Notes:

a Criteria values taken from Ecology's online CLARC database.

b Surface water Method B human health levels established using the standard Method B formula in MTCA were compared to state and federal human-health-based ARARs. The most stringent ARAR that is sufficiently protective under MTCA (i.e. less than a risk of 10^{-5} and a hazard quotient of 1) is selected as the screening level for human health protection (*hh*). If there are multiple contaminants, then the cumulative risk and HI must not exceed a risk of 10^{-5} or a hazard index of 1.

c Upland Area groundwater is not a practicable source of potable groundwater, but potable groundwater screening levels are applied for those compounds without a marine surface water screening level,.

d Updated values based on vapor intrusion provided by Andy Kallus, Ecology (3/31/15).

e Analytical method reporting limits. PQL for total cPAH (TEQ) is adjusted for toxicity equivalency factors (TEFs). TEQ = toxic equivalent concentration calculated in accordance with WAC 173-340-708(e).

f Based on background concentrations in Washington state (WAC 173-340-900, Table 720-1).

Table 2 - Confirmational Groundwater Monitoring Data for BA-MW6 Area

Project #110207 - K-C Worldwide Site Upland Area

Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	BA6-MW-101			
		5/13/14	8/11/14	11/5/14	2/18/15
Total Petroleum Hydrocarbons (TPH)					
Diesel Range Hydrocarbons in ug/L	500	98 x	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	98	ND	ND	ND
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene in ug/L	650	3.7	4.9	1.6	1.1
Acenaphthylene in ug/L	650	0.05 U	0.044	0.018	0.014
Anthracene in ug/L	26,000	0.05 U	0.026	0.01 U	0.014
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.24	0.32	0.14	0.092
Fluorene in ug/L	3,500	1.9	3	0.63	0.55
Phenanthrene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U
Pyrene in ug/L	2,600	0.15	0.22	0.089	0.062
Naphthalene in ug/L	89	0.05 U	0.044	0.02	0.012
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND
Field Parameters					
Dissolved Oxygen in mg/L		0.1	0.3	0.1	0.1
ORP in mVolts		-60	-4	-55	9
pH in pH Units		6.8	6.8	7.0	7.1
Specific Conductance in us/cm		2145	2357	1767	1570
Temperature in deg C		13.3	19.1	17.7	12.6
Turbidity in NTU		4	3	13	7

Notes

U - Analyte was not detected at or above the reported result.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Table 3 - Confirmational Groundwater Monitoring Data for Boiler-Baghouse Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	BBH-MW-101				BBH-MW-102				BBH-MW-103					BBH-MW-104			
		5/12/14	8/12/14	11/3/14	2/18/15	5/12/14	8/12/14	11/3/14	2/17/15	5/13/14	8/13/14	11/3/14	2/17/15	4/20/15	5/13/14	8/13/14	11/3/14	2/17/15
Dissolved Metals																		
Dissolved Arsenic in ug/L	5	4.4	4.5	5.8	3.4		2.7	1	1.6	9.1	4.7	17.6	32.7	12.0	11.7	0.6	1.1	1.3
Dissolved Copper in ug/L	3.1	1.41	1.23	78.4	20.9	1.31	1.57	0.96	1.11	4.69	1.87	49.1	269	15.6	1.18	1.78	1.29	1.12
Dissolved Lead in ug/L	8.1		0.011 J	0.156	0.207		0.049	0.116	0.166		0.013 J	2.23	102	1.46		0.026	0.277	0.023
Dissolved Mercury in ug/L	0.025		0.00205	0.011	0.0145		0.00196	0.00387	0.00333	0.0749	0.00577	3.86	4.24	0.288		0.00131	0.00069	0.0035
Dissolved Zinc in ug/L	81		1.7	0.6	0.6		4.5	4.8	5.9		2.6	1.3	2.5	1.28	240	83.1	356	204
Total Metals																		
Total Arsenic in ug/L		6				2.1				10.1					15.5			
Total Copper in ug/L		3.88				3.5				34.8					4.31			
Total Lead in ug/L		1.25				2.49				1.36					0.307			
Total Mercury in ug/L		0.0107				0.0188				0.861					0.0034			
Total Zinc in ug/L		6.6				5.1				7.4					246			
Field Parameters																		
Dissolved Oxygen in mg/L		0.2	1.2	1.9	2.0	0.1	206.0	0.1	0.4	0.3	0.5	0.1	0.1	0.3	0.5	0.5	0.1	0.1
ORP in mVolts		-40	204	1	-103	-80	204	27	-33	21	-23	38	-76	78	89	62	71	0
pH in pH Units		7.5	7.2	12.1	9.5	5.8	5.5	6.1	6.1	6.9	6.8	7.1	9.3	8.4	6.1	6.0	5.4	5.9
Specific Conductance in us/cm		1713	2150	1698	1126	3013	2754	3448	2909	2663	1807	1582	1021	1397	2735	2365	2390	2499
Temperature in deg C		14.8	15.5	15.9	12.1	13.9	16.1	15.8	11.4	12.7	15.6	15.5	11.6	12.6	12.1	15.9	15.5	11.2
Turbidity in NTU		11	4	1	18	10	39	7	30	4	3	2	26	13	13	16	3	431

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)

J - Analyte was positively identified. The reported result is an estimate.

Table 4 - Confirmational Groundwater Monitoring Data for Bunker C ASTs Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	BCT-MW-101								BCT-MW-102				BCT-MW-103			
		5/13/14	5/13/14 FD	8/14/14	8/14/14 FD	11/3/14	11/3/14 FD	2/19/15	2/19/15 FD	5/15/14	8/14/14	11/3/14	2/19/15	5/15/14	8/12/14	11/3/14	2/19/15
Total Petroleum Hydrocarbons (TPH)																	
Gasoline Range Hydrocarbons in ug/L	1,000	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	1,100	830	100 U	220
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 UJ	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	400	460 x	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	400	460	ND	ND
Dissolved Metals																	
Dissolved Copper in ug/L	3.1			1.16	0.97	1.21	0.91	0.90	0.67		0.43	0.18	0.80		0.22	3.96	5.43
Dissolved Lead in ug/L	8.1			0.037	0.042	0.045	0.049	0.051	0.054		0.011 J	0.056	0.167		0.338	0.516	1.13
Dissolved Mercury in ug/L	0.025			0.00134	0.00102	0.00111	0.00106	0.00132	0.00121		0.00107	0.00034 J	0.00048 J		0.001	0.00548	0.00818
Total Metals																	
Total Copper in ug/L		1.47	1.32							1.69				0.86			
Total Lead in ug/L		0.166	0.183							0.596				0.419			
Total Mercury in ug/L		0.00162	0.00171							0.00174				0.00169			
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Acenaphthene in ug/L	650	0.05 U	0.05 U	0.012	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.25	0.17	0.2	0.12	4.2	3.7	0.01 U	0.21
Acenaphthylene in ug/L	650	0.05 U	0.05 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.012
Anthracene in ug/L	26,000	0.05 U	0.05 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.25	0.29	0.01 U	0.01 U
Benzo(g,h,i)perylene in ug/L		0.05 U	0.05 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.05 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.56	0.68	0.01 U	0.01 U
Fluorene in ug/L	3,500	0.05 U	0.05 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.05 U	0.029	0.022	0.01 U	1.8	1.8	0.01 U	0.049
Phenanthrene in ug/L		0.05 U	0.05 U	0.017	0.012	0.01 UJ	0.011	0.01 J	0.01 U	0.05 U	0.012	0.01 U	0.01 U	1.3	1.7	0.01 U	0.01 U
Pyrene in ug/L	2,600	0.05 U	0.05 U	0.01	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.41	0.55	0.01 U	0.014
Naphthalene in ug/L	89	0.05 U	0.05 U	0.015	0.011	0.01 UJ	0.014	0.01 U	0.01 U	0.05 U	0.01	0.01	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.038	0.033	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.046	0.04	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0113	0.011	ND	ND
Volatile Organic Compounds (VOC)																	
Benzene in ug/L	24	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene in ug/L	2,100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.3	2.2	1 U	1 U
Toluene in ug/L	15,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	6.9	1 U	1 U	1.7
Xylenes (total) in ug/L	680	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	5.6	3.1	3 U	3 U
Field Parameters																	
Dissolved Oxygen in mg/L		0.04		0.2		0.2		0.1		0.1	0.2	0.3	0.1	0.1	0.1	3.4	0.1
ORP in mVolts		-7		-5		38		-20		-108	-46	-105	89	-34	-100	-64	120
pH in pH Units		6.8		6.6		7.1		7.0		7.0	6.8	7.2	6.8	7.8	7.2	8.5	7.1
Specific Conductance in us/cm		389		828		405		409		328	421	424	380	299	659	346	321
Temperature in deg C		10.8		15.9		15.2		9.9		11.4	14.2	13.8	11.5	11.4	14.4	11.8	9.4
Turbidity in NTU		9		2		2		1		8	4	1	1	8	1	4	11

Notes

Concentrations within bold border indicate value exceeds
Groundwater Screening Level (Unrestricted Land Use)
J - Analyte was positively identified. The
reported result is an estimate.
U - Analyte was not detected at or above the reported result.
UJ - Analyte was not detected at or above the reported estimate

x - The sample chromatographic pattern does not
resemble the fuel standard used for quantitation.

Table 4 - Confirmational Groundwater Monitoring Data for Bunker C ASTs Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	BCT-MW-104				BCT-MW-105				BCT-MW-106				BCT-MW-107				BCT-MW-108			
		5/13/14	8/12/14	11/3/14	2/17/15	5/14/14	8/13/14	11/4/14	2/17/15	5/14/14	8/13/14	11/4/14	2/18/15	5/15/14	8/14/14	11/4/14	2/19/15	5/15/14	8/14/14	11/4/14	2/19/15
Total Petroleum Hydrocarbons (TPH)																					
Gasoline Range Hydrocarbons in ug/L	1,000	320	710	100	170	180	100 U	100 U	100 U	100 U	100 U	100 U	100 U	110	140	120	150	260	130	120	160
Diesel Range Hydrocarbons in ug/L	500	280	500 x	130	160 x	130 x	68 x	50 U	81 x	83	140 x	50	50 U	220	230	240	230	310 x	150 x	170	190
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	280	500	130	160	130	68	ND	81	83	140	50	ND	220	230	240	230	310	150	170	190
Dissolved Metals																					
Dissolved Copper in ug/L	3.1		0.51	0.72	1.43		2.16	2.92	2.43	1.42	1.77	13.3	5.48		2.16	5.38	4.39	0.89	1.15	1.61	2.80
Dissolved Lead in ug/L	8.1		0.137	0.084	0.286		0.116	0.73	0.403		0.071	2.22	0.140		0.277	1.38	1.55		0.232	1.29	1.37
Dissolved Mercury in ug/L	0.025		0.0018	0.00205	0.00601		0.00534	0.0255	0.00481		0.00234	0.00582	0.00402		0.0046	0.0043	0.00568		0.00773	0.00337	0.0041
Total Metals																					
Total Copper in ug/L		2.01				1.6				4.83				2.46				5.09			
Total Lead in ug/L		0.48				0.504				1.45				0.896				3.03			
Total Mercury in ug/L		0.00547				0.00171				0.00768				0.00374				0.0159			
Polycyclic Aromatic Hydrocarbons (PAHs)																					
Acenaphthene in ug/L	650	0.67	1.1	0.54	0.45	2.6	1.1	0.29	0.55	0.21	1.3	0.15	0.022	5.7	8.4	14	14	19	11	8.7	7.4
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.079	0.04	0.05 U	0.016	0.011	0.014	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.072	0.093	0.11	0.05 U	0.01 U	0.075	0.055
Anthracene in ug/L	26,000	0.083	0.077	0.032	0.036	0.17	0.13	0.02	0.1	0.05 U	0.15	0.033	0.01 U	0.05 U	0.055	0.053	0.058	0.14	0.084	0.09	0.087
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.038	0.015	0.03	0.15	0.078	0.028	0.11	0.05 U	0.041	0.018	0.01 U	0.057	0.073	0.06	0.048	0.28	0.12	0.073	0.099
Fluorene in ug/L	3,500	0.93	1.8	0.76	0.5	1.1	0.85	0.14	0.31	0.085	1.1	0.15	0.021	0.91	1.7	3.3	3.3	6.3	4.3	2.7	2.3
Phenanthrene in ug/L		0.05 U	0.013	0.01 U	0.017	0.05 U	0.01 U	0.01 U	0.018	0.05 U	0.19	0.018	0.01 U	0.42	0.51	0.47	0.36	1.1	0.43	0.55	0.58
Pyrene in ug/L	2,600	0.054	0.041	0.019	0.036	0.12	0.064	0.03	0.083	0.05 U	0.048	0.03	0.011	0.059	0.07	0.076	0.052	0.23	0.1	0.064	0.092
Naphthalene in ug/L	89	0.87	0.01 U	0.11	0.01 U	0.22	0.01 U	0.017	0.01 U	0.05 U	0.01 U	0.029	0.01 U	28	33	38	42	130	7.3	36	30
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.018	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.011	0.01 U	0.015	0.011	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND	ND	ND	0.013	ND	ND	ND	ND	ND	ND	ND	0.0076	ND	0.00895	0.0076	ND	ND
Volatile Organic Compounds (VOC)																					
Benzene in ug/L	24	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene in ug/L	2,100	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene in ug/L	15,000	1.6	2.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total) in ug/L	680	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3.5	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Field Parameters																					
Dissolved Oxygen in mg/L		0.3	0.3	0.3	0.2	0.1	0.8	0.6	0.7	0.0	0.5	0.2	0.7	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.4
ORP in mVolts		-64	-94	-80	76	-137	-22	120	54	-85	81	-84	-51	-172	-87	-24	15	-201	-48	-353	25
pH in pH Units		7.3	7.3	7.7	7.2	7.8	8.1	7.9	7.4	7.5	7.1	7.4	7.4	10.4	10.6	10.9	10.6	9.9	10.2	10.6	10.6
Specific Conductance in us/cm		736	685	585	404	390	480	533	411	1123	691	1431	1029	1492	1371	149	1136	848	880	837	732
Temperature in deg C		11.1	16.0	14.6	8.8	11.8	17.1	13.8	9.1	12.0	16.7	15.6	9.9	12.4	16.5	16.1	11.7	12.4	15.7	15.0	11.6
Turbidity in NTU		1	3	5	3	8	8	5	10	8	4	9	2	8	4	4	2		19	8	8

Notes

Concentrations within bold border indicate value exceeds
Groundwater Screening Level (Unrestricted Land Use)
J - Analyte was positively identified. The
reported result is an estimate.
U - Analyte was not detected at or above the reported result.
UJ - Analyte was not detected at or above the reported estimate

x - The sample chromatographic pattern does not
resemble the fuel standard used for quantitation.

Table 5 - Confirmational Groundwater Monitoring Data for CN-B2 Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	CN-MW-101				CN-MW-102				CN-MW-103				CN-MW-104			
		5/14/14	8/12/14	11/6/14	2/19/15	5/14/14	8/12/14	11/6/14	2/19/15	5/14/14	8/12/14	11/6/14	2/19/15	5/14/14	8/12/14	11/6/14	2/19/15
Total Petroleum Hydrocarbons (TPH)																	
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Metals																	
Dissolved Arsenic in ug/L	5		5.1	1.2	3.4		1.4	0.6	0.9		0.9	0.4 J	0.5 J		1.9	2.2	4.8
Dissolved Copper in ug/L	3.1	2.74	2.85	0.53	1.93		1.2	0.73	1.20		0.54	0.44	0.59	2.82	2.13	2.72	2.54
Dissolved Lead in ug/L	8.1		4.19	0.909	3.43		0.135	0.153	0.278		0.028	0.037	0.034		0.056	0.036	0.148
Total Metals																	
Total Arsenic in ug/L		4.5				0.9				0.9				2.3			
Total Copper in ug/L		3.48				1.58				0.83				3.9			
Total Lead in ug/L		7.22				0.34				0.332				4.37			
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Acenaphthene in ug/L	650	0.05 U	0.034	2.2	0.45	0.17	0.046	0.12	0.037	0.22	0.12	0.16	0.12	0.05 U	0.012	0.01 U	0.01 U
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.05 U	0.01 U	0.031	0.01 U	0.05 U	0.01 U	0.012	0.01 U	0.05 U	0.011	0.014	0.014	0.05 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.016	0.068	0.025	0.052	0.019	0.031	0.012	0.061	0.03	0.031	0.025	0.05 U	0.01 U	0.01 U	0.01 U
Fluorene in ug/L	3,500	0.05 U	0.01 U	0.56	0.11	0.062	0.019	0.059	0.02	0.12	0.081	0.11	0.079	0.05 U	0.01 U	0.01 U	0.01 U
Phenanthrene in ug/L		0.05 U	0.017	0.22	0.052	0.059	0.034	0.043	0.021	0.14	0.073	0.1	0.035	0.05 U	0.013	0.01 U	0.01 U
Pyrene in ug/L	2,600	0.05 U	0.016	0.051	0.026	0.051	0.023	0.03	0.012	0.063	0.029	0.03	0.022	0.05 U	0.012	0.01 U	0.01 U
Naphthalene in ug/L	89	0.066	0.035	6.9	1.2	0.12	0.033	0.026	0.02	0.19	0.03	0.01 U	0.021	0.05 U	0.01 U	0.01 U	0.01 U
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.019	0.011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.014	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	0.00829	0.0076	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00764	ND	ND	ND
Field Parameters																	
Dissolved Oxygen in mg/L		0.04	0.2	0.2	0.5	0.2	0.5	0.1	0.1	0.2	0.1	0.1	0.04	4.8	0.9	0.8	3.7
ORP in mVolts		-99	-80	-45	18	-72	189	-117	-80	-83	-96	-111	-133	-5	196	-42	-48
pH in pH Units		6.4	6.3	6.6	6.5	6.8	6.4	6.6	6.5	6.9	6.6	7.2	7.2	6.7	7.1	7.4	7.5
Specific Conductance in us/cm		2147	2040	918	1468	1130	1344	1005	1309	1071	1360	723	677	862	746	479	128
Temperature in deg C		13.4	15.8	15.2	12.1	13.0	16.1	14.6	11.7	12.8	15.9	14.2	10.8	14.1	20.3	13.6	10.0
Turbidity in NTU		9	8	2	2	4	8	7	4	4	3	4	2	7	2	7	64

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

Table 6 - Confirmational Groundwater Monitoring Data for GF11 Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	GF11-MW-101			
		5/14/14	8/13/14	11/3/14	2/18/15
Dissolved Metals					
Dissolved Copper in ug/L	3.1		1.69	1.86	2.22
Dissolved Lead in ug/L	8.1		1.12	3.86	3.82
Dissolved Mercury in ug/L	0.025		0.0101	0.0289	0.0442
Total Metals					
Total Copper in ug/L		2.48			
Total Lead in ug/L		2.98			
Total Mercury in ug/L		0.0161			
Field Parameters					
Dissolved Oxygen in mg/L		0.3	0.2	0.1	0.1
ORP in mVolts		-203	-122	-205	-230
pH in pH Units		7.2	7.0	7.4	7.1
Specific Conductance in us/cm		1659	1336	1330	1326
Temperature in deg C		11.9	14.8	14.9	11.4
Turbidity in NTU		12	3	5	3

Notes
Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)

Table 7 - Confirmational Groundwater Monitoring Data for Hydraulic Barker Vault Area

Project #110207 - K-C Worldwide Site Upland Area

Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	HBV-MW-101			
		5/14/14	8/13/14	11/4/14	2/18/15
Total Petroleum Hydrocarbons (TPH)					
Diesel Range Hydrocarbons in ug/L	500	75 x	220 x	110	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	75 U	220	110	ND
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene in ug/L	650	0.19	0.26	0.15 J	0.052
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.05 U	0.039	0.027 J	0.01 U
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.049	0.015	0.01 U
Fluorene in ug/L	3,500	0.088	0.15	0.068 J	0.032
Phenanthrene in ug/L		0.11	0.19	0.084 J	0.041
Pyrene in ug/L	2,600	0.05 U	0.047	0.02 J	0.01 U
Naphthalene in ug/L	89	0.35	0.18	0.094 J	0.034
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND
Field Parameters					
Dissolved Oxygen in mg/L		0.2	0.7	0.2	0.3
ORP in mVolts		-41	89	20	25
pH in pH Units		6.5	6.1	6.6	6.3
Specific Conductance in us/cm		907	826	869	1120
Temperature in deg C		11.7	14.2	14.7	11.6
Turbidity in NTU		17	86	71	47

Notes

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Table 8 - Confirmational Groundwater Monitoring Data for Naval Reserve UST Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	NRP-MW-2				NRU-MW-101				NRU-MW-102			
		5/13/14	8/12/14	11/5/14	2/17/15	5/13/14	8/12/14	11/5/14	2/17/15	5/13/14	8/12/14	11/5/14	2/17/15
Total Petroleum Hydrocarbons (TPH)													
Gasoline Range Hydrocarbons in ug/L	1,000	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene in ug/L	650	0.05 U	0.03	0.016	0.032	0.073	0.092	0.16	0.1	1.3	1.3	1.4	5.7
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.012	0.018	0.058
Anthracene in ug/L	26,000	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.047	0.048	0.14
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.01 U	0.01 U	0.014	0.05 U	0.01 U	0.01 U	0.01 U	0.2	0.095	0.17	0.36
Fluorene in ug/L	3,500	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.034	0.056	0.03	0.23	0.31	0.52	2.1
Phenanthrene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.2	0.11	0.068	0.88
Pyrene in ug/L	2,600	0.05 U	0.01 U	0.01 U	0.029	0.05 U	0.01 U	0.01 U	0.01 U	0.16	0.067	0.15	0.24
Naphthalene in ug/L	89	0.05 U	0.03	0.011	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	1.3	0.017	0.024	0.056
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.013	0.011
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.012	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0084	0.0082
Volatile Organic Compounds (VOC)													
Benzene in ug/L	24	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene in ug/L	2,100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene in ug/L	15,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total) in ug/L	680	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Field Parameters													
Dissolved Oxygen in mg/L		0.3	0.5	0.2	0.1	0.7	0.2	0.2	0.2	0.3	0.6	0.1	0.1
ORP in mVolts		16	199	-36	-110	21	-32	23	-43	10	196	-121	-124
pH in pH Units		6.6	6.5	6.6	6.8	6.5	6.4	6.9	7.0	6.9	6.7	7.6	7.3
Specific Conductance in us/cm		4595	14937	6435	3328	4631	16023	10880	3988	7905	15609	966	1430
Temperature in deg C		12.0	16.2	16.7	10.7	12.3	16.7	16.7	10.7	12.2	17.1	15.9	9.8
Turbidity in NTU		1	1		1	2	13	6	12	2	3	26	2

Notes

U - Analyte was not detected at or above the reported result.

Table 9 - Confirmational Groundwater Monitoring Data for Naval Reserve South Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	NRS-MW-101				NRS-MW-102			
		5/13/14	8/12/14	11/4/14	2/17/15	5/13/14	8/12/14	11/4/14	2/17/15
Total Petroleum Hydrocarbons (TPH)									
Gasoline Range Hydrocarbons in ug/L	1,000	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	ND	ND	ND	ND
Polycyclic Aromatic Hydrocarbons (PAHs)									
Acenaphthene in ug/L	650	0.054	0.077	0.1	0.067	0.2	0.11	0.098	0.092
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.017	0.015	0.01 U
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.01 U	0.01 U	0.01 U	0.087	0.047	0.06	0.059
Fluorene in ug/L	3,500	0.05 U	0.01 U	0.01 U	0.01 U	0.15	0.085	0.075	0.072
Phenanthrene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.42	0.18	0.031	0.01 U
Pyrene in ug/L	2,600	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.023	0.032	0.039
Naphthalene in ug/L	89	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOC)									
Benzene in ug/L	24	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene in ug/L	2,100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene in ug/L	15,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total) in ug/L	680	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Field Parameters									
Dissolved Oxygen in mg/L		0.2	0.2	0.2	0.6	0.1	0.2	0.1	0.6
ORP in mVolts		-99	-34	-72	46	-88	-86	-67	-17
pH in pH Units		6.5	6.2	6.5	6.7	7.0	6.7	6.9	7.2
Specific Conductance in us/cm		9021	19547	14564	6721	1829	1995	2279	1176
Temperature in deg C		12.3	16.9	15.9	10.8	12.1	16.4	16.3	10.7
Turbidity in NTU		5	25	42	316	7	2	2	2

Notes

U - Analyte was not detected at or above the reported result.

Table 10 - Confirmational Groundwater Monitoring Data for Rail Car Dumper Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	RCD-MW-101			
		5/12/14	8/11/14	11/4/14	2/18/15
Total Petroleum Hydrocarbons (TPH)					
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND
Dissolved Metals					
Dissolved Arsenic in ug/L	5		0.99	1.1	1.11
Dissolved Copper in ug/L	3.1	2.07	4.52	1.55	1.080
Dissolved Mercury in ug/L	0.025		0.0027	0.00083	0.00079
Dissolved Nickel in ug/L	8.2	92.4	159	85.4	19.0
Total Metals					
Total Arsenic in ug/L		0.68			
Total Copper in ug/L		2.6			
Total Mercury in ug/L		0.00162			
Total Nickel in ug/L		93.9			
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.05 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.01 U	0.01 U	0.01 U
Fluorene in ug/L	3,500	0.05 U	0.01 U	0.01 U	0.01 U
Phenanthrene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U
Pyrene in ug/L	2,600	0.05 U	0.01 U	0.01 U	0.01 U
Naphthalene in ug/L	89	0.05 U	0.01 U	0.01 U	0.01 U
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND
Field Parameters					
Dissolved Oxygen in mg/L		7.9	5.8	7.2	9.8
ORP in mVolts		69	89	65	59
pH in pH Units		7.0	6.9	7.2	7.3
Specific Conductance in us/cm		27189	36189	36302	25430
Temperature in deg C		12.2	19.5	13.9	9.0
Turbidity in NTU		5	5	29	30

Notes
Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)
U - Analyte was not detected at or above the reported result.

Table 11 - Confirmational Groundwater Monitoring Data for REC2-MW-5 Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	DAST-MW-101			
		5/14/14	8/13/14	11/5/14	2/19/15
Total Petroleum Hydrocarbons (TPH)					
Diesel Range Hydrocarbons in ug/L	500	82 x	50 U	67	70 x
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	82	ND	67	70
Dissolved Metals					
Dissolved Copper in ug/L	3.1		0.47	0.3	0.77
Dissolved Mercury in ug/L	0.025		0.00178	0.00189	0.00207
Total Metals					
Total Copper in ug/L		0.98			
Total Mercury in ug/L		0.00437			
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene in ug/L	650	11	13	13	14
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.058
Anthracene in ug/L	26,000	0.069	0.06	0.056	0.063
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.26	0.42	0.26	0.27
Fluorene in ug/L	3,500	3.8	3.6	4.1	3.4
Phenanthrene in ug/L		0.23	0.058	0.06	0.067
Pyrene in ug/L	2,600	0.21	0.24	0.19	0.2
Naphthalene in ug/L	89	0.1	0.056	0.046	0.04
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.012	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	0.00762	ND	ND	ND
Field Parameters					
Dissolved Oxygen in mg/L		0.2	0.2	0.2	0.5
ORP in mVolts		-128	-125	-139	39
pH in pH Units		7.4	7.1	7.3	7.5
Specific Conductance in us/cm		558	612	445	440
Temperature in deg C		12.2	15.0	13.7	11.1
Turbidity in NTU		12	3	9	2

Notes

U - Analyte was not detected at or above the reported result.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Table 12 - Confirmational Groundwater Monitoring Data for Small Hydraulic Barker Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	SHB-MW-101				SHB-MW-102			
		5/12/14	8/11/14	11/5/14	2/18/15	5/12/14	8/11/14	11/5/14	2/18/15
Total Petroleum Hydrocarbons (TPH)									
Gasoline Range Hydrocarbons in ug/L	1,000	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Diesel Range Hydrocarbons in ug/L	500	100 x	50 U	86	56 J	50 U	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs in ug/L	500	100	ND	86	56	ND	ND	ND	ND
Dissolved Metals									
Dissolved Copper in ug/L	3.1	3.5	1.19	1.49	0.51		0.65	0.67	0.70
Dissolved Mercury in ug/L	0.025	0.0637	0.00253	0.0253	0.00528		0.00302	0.0018	0.00315
Total Metals									
Total Copper in ug/L		16.1				1.6			
Total Mercury in ug/L		0.0832				0.00264			
Polycyclic Aromatic Hydrocarbons (PAHs)									
Acenaphthene in ug/L	650	0.85	4.8	0.46	4.3	0.05 U	0.064	0.15	0.3
Acenaphthylene in ug/L	650	0.05 U	0.045	0.01 U	0.028	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.11	0.39	0.021	0.093	0.05 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.38	0.89	0.039	0.17	0.05 U	0.01 U	0.01 U	0.01 U
Fluorene in ug/L	3,500	0.53	2.5	0.24	0.73	0.05 U	0.01 U	0.01 U	0.01 U
Phenanthrene in ug/L		0.5	1.9	0.12	0.63	0.05 U	0.01 U	0.01 U	0.01 U
Pyrene in ug/L	2,600	0.3	0.51	0.032	0.13	0.05 U	0.01 U	0.01 U	0.01 U
Naphthalene in ug/L	89	0.61	5.7	0.3	3.7	0.05 U	0.01 U	0.014	0.01 U
Benz(a)anthracene in ug/L		0.079	0.048	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.013	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.026	0.013	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.059	0.045	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	0.0256	0.013	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (VOC)									
Benzene in ug/L	24	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene in ug/L	2,100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene in ug/L	15,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total) in ug/L	680	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Field Parameters									
Dissolved Oxygen in mg/L		0.1	0.2	0.1	0.5	0.7	0.7	0.1	0.9
ORP in mVolts		-192	-1400	-145	-80	34	60	66	20
pH in pH Units		11.7	7.4	8.4	7.6	6.8	6.8	6.9	7.0
Specific Conductance in us/cm		1535	1159	1005	752	1319	989	711	722
Temperature in deg C		13.9	17.5	16.4	13.5	12.5	16.2	16.4	12.2
Turbidity in NTU		11	4	83	1	6	4	3	4

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Table 13 - Confirmational Groundwater Monitoring Data for UST 29/Latex Spill Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	UST29-MW-101				UST29-MW-102				UST29-MW-103			
		5/14/14	8/13/14	11/5/14	2/18/15	5/14/14	8/13/14	11/6/14	2/18/15	5/14/14	8/13/14	11/6/14	2/18/15
Total Petroleum Hydrocarbons (TPH)													
Gasoline Range Hydrocarbons in ug/L	1,000	100 U	100 U	100 U	100 U	290	130	200	100 U	100 U	100 U	100 U	100 U
Diesel Range Hydrocarbons in ug/L	500	58 x	50 U	50 U	50 U	140 x	71 x	190	50 U	50 U	50 U	50 U	70 J
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	58	ND	ND	ND	140	71.0	190	ND	ND	ND	ND	70
Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene in ug/L	650	0.22	0.21	0.034	0.067	1.6	1.3	3.1	0.78	0.55	0.26	0.32	0.45
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.13	0.15	0.01 U	0.022	0.054	0.027	0.056	0.022	0.16	0.093	0.12	0.13
Benzo(g,h,i)perylene in ug/L		0.05 U	0.019	0.01 U	0.013	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.33	0.24	0.014	0.077	0.061	0.036	0.078	0.029	0.21	0.12	0.15	0.24
Fluorene in ug/L	3,500	0.12	0.17	0.01 U	0.01 U	0.58	0.54	1.3	0.29	0.21	0.14	0.22	0.22
Phenanthrene in ug/L		0.39	0.63	0.01 U	0.078	0.18	0.14	0.13	0.058	0.13	0.37	0.49	0.52
Pyrene in ug/L	2,600	0.34	0.31	0.034	0.14	0.053	0.033	0.066	0.031	0.21	0.13	0.21	0.26
Naphthalene in ug/L	89	0.3	0.33	0.01 U	0.04	0.05 U	0.01 U	0.01 U	0.01 U	0.22	0.14	0.13	0.14
Benz(a)anthracene in ug/L		0.11	0.061	0.01 U	0.031	0.01 U	0.01 U	0.01 U	0.01 U	0.022	0.01 U	0.01 U	0.015
Benzo(a)pyrene in ug/L		0.031	0.035	0.01 U	0.035	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.034	0.043	0.01 U	0.037	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.013	0.014	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.12	0.081	0.01 U	0.039	0.01 U	0.01 U	0.01 U	0.01 U	0.027	0.01	0.016	0.017
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.027	0.01 U	0.011	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	0.0489	0.051	ND	0.044	ND	ND	ND	ND	0.00947	0.0076	0.0077	0.0087
Volatile Organic Compounds (VOC)													
Benzene in ug/L	24	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene in ug/L	2,100	1 U	1 U	1 U	1 U	1.3	2.2	2.6	1 U	1.2	1 U	1 U	1 U
Toluene in ug/L	15,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes (total) in ug/L	680	3 U	3 U	3 U	3 U	9	3 U	10	4.6	3 U	3 U	3 U	3 U
Field Parameters													
Dissolved Oxygen in mg/L		0.03	0.6	0.1	0.5	0.1	0.7	0.1	0.5	0.1	0.8	0.2	0.4
ORP in mVolts		9	94	-32	-147	-93	90	-39	-56	-174	96	30	-153
pH in pH Units		9.2	7.8	8.3	10.6	6.8	6.5	7.1	7.0	9.3	9.0	10.3	10.9
Specific Conductance in us/cm		1027	1078	831	992	1152	826	665	655	642	802	708	728
Temperature in deg C		13.5	16.6	15.6	11.2	13.6	15.4	15.2	12.2	11.6	15.1	15.1	11.0
Turbidity in NTU		29	10	71	46	7	2	2	3	11	2	7	1

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Table 14 - Confirmational Groundwater Monitoring Data for UST 70 Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	UST70-MW-2				UST70-MW-101				UST70-MW-102			
		5/12/14	8/11/14	11/4/14	2/19/15	5/12/14	8/11/14	11/4/14	2/18/15	5/12/14	8/11/14	11/4/14	2/18/15
Total Petroleum Hydrocarbons (TPH)													
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dissolved Metals													
Dissolved Arsenic in ug/L	5		0.76	1.5	1.25		2.4	1.9	1.1		2.8	3.6	3.1
Dissolved Copper in ug/L	3.1		2.66	11.9	7.640		1.21	6.47	3.05		9.35	0.59	0.67
Dissolved Nickel in ug/L	8.2		19.1	35.4	6.85		4.8	3.92	3.40		3.44	2.24	1.92
Dissolved Zinc in ug/L	81		51.5	8.9	31.3		6.9	7.3	4.1		6.5	0.9	0.9
Total Metals													
Total Arsenic in ug/L		1.2				2.2				2.4			
Total Copper in ug/L		7.11				2.59				0.82			
Total Nickel in ug/L		19.2				4.23				3.21			
Total Zinc in ug/L		12.3				3.7				1.6			
Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene in ug/L	650	0.05 U	0.013	0.01 U	0.011	0.64	1.4	0.091	0.019	6.6	2	2.6	2.7
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.041	0.032	0.033
Anthracene in ug/L	26,000	0.05 U	0.01 U	0.012	0.014	0.05 U	0.01 U	0.01 U	0.01 U	0.44	0.3	0.042	0.049
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.12	0.01 U	0.011	0.54	1	0.7	0.84
Fluorene in ug/L	3,500	0.05 U	0.01 U	0.01 U	0.01 U	0.21	0.25	0.018	0.015	3	2.6	1.3	0.27
Phenanthrene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.024	0.01 U	0.01 U	0.05 U	0.01 U	0.014	0.017
Pyrene in ug/L	2,600	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.1	0.01 U	0.016	0.38	0.58	0.39	0.49
Naphthalene in ug/L	89	0.05 U	0.015	0.01 U	0.01 U	0.05 U	0.02	0.01 U	0.01 U	0.05 U	0.019	0.025	0.03
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.018	0.016	0.01 U	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.013	0.012	0.01 U	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND	ND	ND	ND	ND	0.00893	0.0087	ND	ND
Field Parameters													
Dissolved Oxygen in mg/L		1.7	0.6	2.6	1.7	0.2	0.7	1.4	0.2	0.4	0.6	0.2	0.5
ORP in mVolts		1	33	77	34	26	40	99	74	-142	56	38	-54
pH in pH Units		7.3	6.9	7.4	7.4	7.1	7.1	6.9	7.2	7.5	7.2	7.5	7.5
Specific Conductance in us/cm		11812	26580	8234	15307	1705	2234	2044	1401	1717	1970	2019	1394
Temperature in deg C		13.3	19.5	16.9	11.9	14.4	18.8	17.9	13.0	14.5	19.2	18.4	13.4
Turbidity in NTU		24	7	15	9	11	5	2	4	2	4	6	3

Notes
Concentrations within bold border indicate value exceeds Groundwater Screening Level (Unrestricted Land Use)
U - Analyte was not detected at or above the reported result.

Table 15 - Confirmational Groundwater Monitoring Data for UST 71 Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	UST71-MW-101				UST71-MW-102				UST71-MW-103			
		5/12/14	8/12/14	11/5/14	2/17/15	5/12/14	8/11/14	11/4/14	2/17/15	5/13/14	8/12/14	11/5/14	2/18/15
Total Petroleum Hydrocarbons (TPH)													
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U	200 x	53 x	50 U	84 x	370	220 x	200	190 J
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	660	890	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	200	53	685	974	370	220	200	190
Extractable Petroleum Hydrocarbons													
Aliphatics C10-C12 (EPH) in ug/L													80.0 U
Aliphatics C12-C16 (EPH) in ug/L													80.0 U
Aliphatics C16-C21 (EPH) in ug/L													91.6
Aliphatics C21-C34 (EPH) in ug/L													80.0 U
Aliphatics C8-C10 (EPH) in ug/L													80.0 U
Aromatics C10-C12 (EPH) in ug/L													80.0 U
Aromatics C12-C16 (EPH) in ug/L													81.7
Aromatics C16-C21 (EPH) in ug/L													115
Aromatics C21-C34 (EPH) in ug/L													80.0 U
Aromatics C8-C10 (EPH) in ug/L													80.0 U
Dissolved Metals													
Dissolved Copper in ug/L	3.1		0.579	1.04	0.89		4.99	3.9	6.86	9.76	31.9	47.4	6.31
Dissolved Zinc in ug/L	81		2.8	1.7	3.0		4.7	2.4	4.8	18.4	39.6	25.5	7.7
Total Metals													
Total Copper in ug/L		8.73				20.2				56.9			
Total Zinc in ug/L		2.6				12				97.7			
Polycyclic Aromatic Hydrocarbons (PAHs)													
Acenaphthene in ug/L	650	0.05 U	0.018	0.061	0.067	0.91	0.15	0.01 U	0.01 U	3	1.9	8.3	6.7
Acenaphthylene in ug/L	650	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.05 U	0.012	0.019	0.024	0.54	0.15	0.01 U	0.037	0.6	0.51	1.6	0.99
Benzo(g,h,i)perylene in ug/L		0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01	0.01 U	0.01 U	0.05 U	0.086	0.03	0.027
Fluoranthene in ug/L	86	0.05 U	0.043	0.016	0.013	2	0.73	0.021	0.01 U	1.1	1.3	2	1.4
Fluorene in ug/L	3,500	0.05 U	0.048	0.049	0.038	0.12	0.021	0.01 U	0.01 U	1.6	1.2	5.4	4
Phenanthrene in ug/L		0.05 U	0.021	0.01 U	0.01 U	0.14	0.026	0.01 U	0.01 U	3.5	2.7	8.5	6.2
Pyrene in ug/L	2,600	0.054	0.043	0.037	0.024	1.8	0.66	0.089	0.034	0.96	1.3	1.6	1.1
Naphthalene in ug/L	89	0.05 U	0.01 U	0.01 U	0.011	0.2	0.01 U	0.01 U	0.01 U	24	6	1.8	53
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.28	0.077	0.01 U	0.01 U	0.15	0.21	0.19	0.16
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.084	0.025	0.01 U	0.01 U	0.059	0.13	0.07	0.06
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.16	0.043	0.01 U	0.01 U	0.1	0.22	0.13	0.11
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.029	0.011	0.01 U	0.01 U	0.028	0.057	0.029	0.023
Chrysene in ug/L		0.014	0.01 U	0.01 U	0.01 U	0.24	0.08	0.013	0.011	0.2	0.36	0.25	0.22
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.017	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.023	0.01 U	0.01 U	0.01 U	0.027	0.072	0.023	0.021
Total cPAHs TEQ in ug/L	0.018	0.00764	ND	ND	ND	0.136	0.04	0.0076	0.0076	0.092	0.19	0.11	0.094
Field Parameters													
Dissolved Oxygen in mg/L		0.3	0.7	0.2	0.6	0.3	1.9	0.6	0.3	0.2	0.5	0.2	0.7
ORP in mVolts		-7	205	87	115	43	68	-16	51	-232	62	36	44
pH in pH Units		6.5	6.6	7.0	7.1	6.7	6.8	7.2	6.4	8.3	7.7	9.8	8.5
Specific Conductance in us/cm		1792	11535	1982	1405	3118	3381	259	194	3189	3205	2423	2184
Temperature in deg C		13.5	17.3	17.0	13.1	14.3	18.4	14.8	11.7	15.0	19.5	17.6	13.1
Turbidity in NTU		36	3	5	4	13	7	57	95	134		29	75

Notes

Concentrations in shaded cells indicate value exceeds Groundwater Screening Level (Industrial Land Use)

J - Analyte was positively identified. The reported result is an estimate.

U - Analyte was not detected at or above the reported result.

UJ - Analyte was not detected at or above the reported estimate

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Table 15 - Confirmational Groundwater Monitoring Data for UST 71 Area

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

Chemical Name	Groundwater Screening Level (Industrial Land Use)	UST71-MW-104							
		5/12/14	5/12/14 FD	8/11/14	8/11/14 FD	11/5/14	11/5/14 FD	2/18/15	2/18/15 FD
Total Petroleum Hydrocarbons (TPH)									
Diesel Range Hydrocarbons in ug/L	500	50 U	50 U	50 U	50 U	50 U	50 U	59 J	50 U
Oil Range Hydrocarbons in ug/L	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total TPHs (D+O Range) in ug/L	500	ND	ND	ND	ND	ND	ND	59	ND
Extractable Petroleum Hydrocarbons									
Aliphatics C10-C12 (EPH) in ug/L									
Aliphatics C12-C16 (EPH) in ug/L									
Aliphatics C16-C21 (EPH) in ug/L									
Aliphatics C21-C34 (EPH) in ug/L									
Aliphatics C8-C10 (EPH) in ug/L									
Aromatics C10-C12 (EPH) in ug/L									
Aromatics C12-C16 (EPH) in ug/L									
Aromatics C16-C21 (EPH) in ug/L									
Aromatics C21-C34 (EPH) in ug/L									
Aromatics C8-C10 (EPH) in ug/L									
Dissolved Metals									
Dissolved Copper in ug/L	3.1			1.06	1.12	3.23	3.16	6.20	7.62
Dissolved Zinc in ug/L	81			3.5	2.5	2.1	1.8	1.9	2.4
Total Metals									
Total Copper in ug/L		1.65	1.67						
Total Zinc in ug/L		1.4	1.7						
Polycyclic Aromatic Hydrocarbons (PAHs)									
Acenaphthene in ug/L	650	0.05 U	0.05 U	0.01 U	0.017	0.066	0.051	0.23	0.21
Acenaphthylene in ug/L	650	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Anthracene in ug/L	26,000	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.026	0.022
Benzo(g,h,i)perylene in ug/L		0.05 U	0.05 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U
Fluoranthene in ug/L	86	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Fluorene in ug/L	3,500	0.05 U	0.05 U	0.026	0.029	0.045	0.04	0.15	0.13
Phenanthrene in ug/L		0.05 U	0.05 U	0.014	0.012	0.01 U	0.01 U	0.077	0.057
Pyrene in ug/L	2,600	0.05 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.011	0.01
Naphthalene in ug/L	89	0.05 U	0.05 U	0.01 U	0.01 U	0.026	0.024	0.099	0.092
Benz(a)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Benzo(a)pyrene in ug/L		0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Benzo(b)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Benzo(k)fluoranthene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Chrysene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U
Dibenzo(a,h)anthracene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U
Indeno(1,2,3-cd)pyrene in ug/L		0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	0.01 U	0.01 UJ	0.01 U
Total cPAHs TEQ in ug/L	0.018	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters									
Dissolved Oxygen in mg/L		0.2		0.2		0.1		0.1	
ORP in mVolts		-19		24		123		-194	
pH in pH Units		7.7		7.6		7.5		8.6	
Specific Conductance in us/cm		1549		2174		1143		806	
Temperature in deg C		12.7		17.5		16.8		12.3	
Turbidity in NTU		16		5		2		6	

Notes
Concentrations in shaded cells indicate value exceeds Groundwater
J - Analyte was positively identified. The reported result is an estima
U - Analyte was not detected at or above the reported result.
UJ - Analyte was not detected at or above the reported estimate
x - The sample chromatographic pattern does not resemble the fue

Table 16 - Recommended Additional Groundwater Monitoring for Interim Action Areas

Project #110207 - K-C Worldwide Site Upland Area
Everett, WA

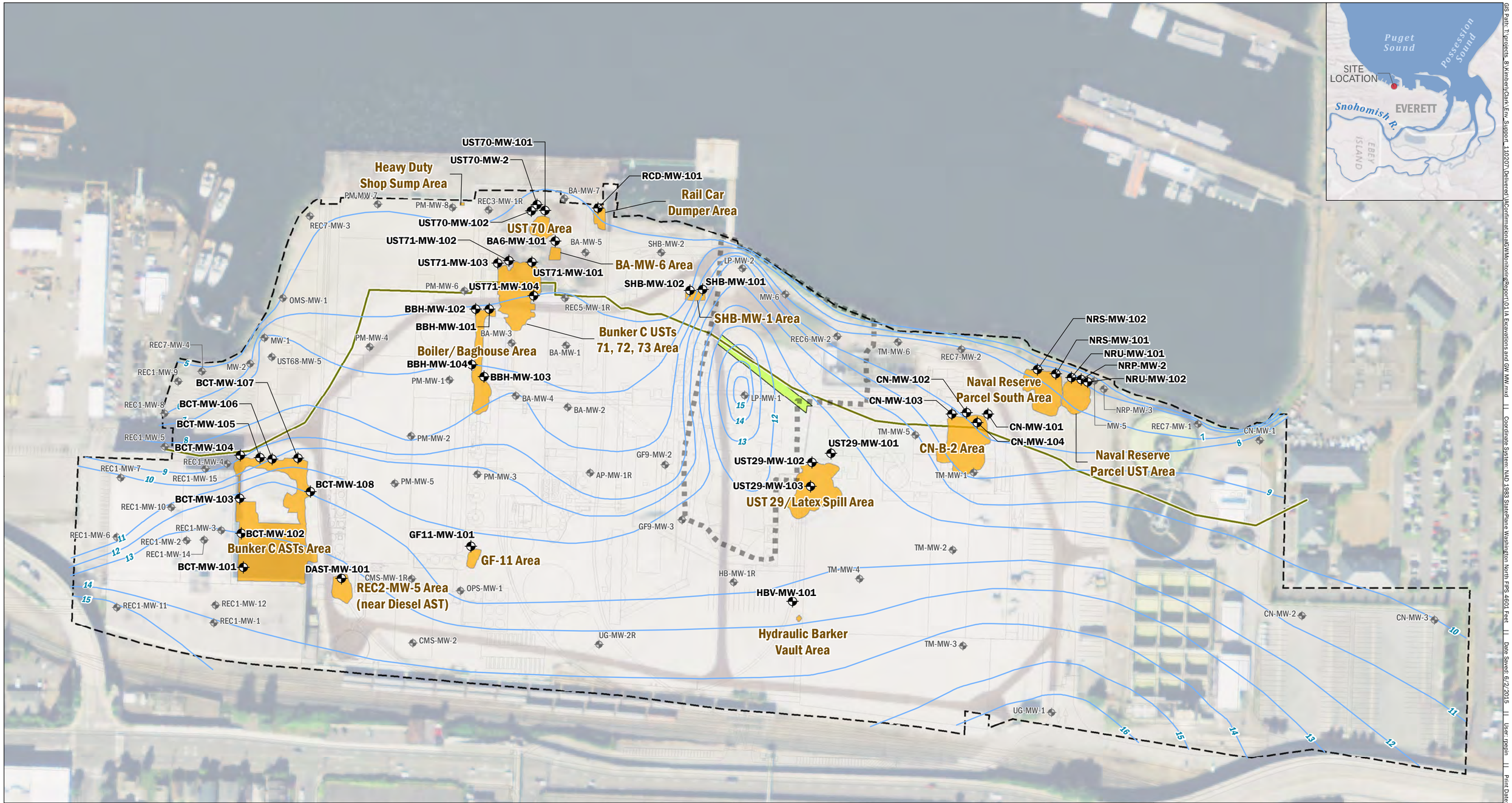
Interim Action Area and Monitoring Wells	TPH		PAHs	Dissolved Metals					
	Diesel- + Oil-Range	Gasoline-Range +BTEX		Arsenic	Copper	Lead	Nickel	Mercury	Zinc
Boiler/Baghouse Area									
BBH-MW-101				x	x	x		x	x
BBH-MW-102				x	x	x		x	x
BBH-MW-103				x	x	x		x	x
BBH-MW-104				x	x	x		x	x
PM-MW-8				x	x	x		x	x
REC3-MW1R*			x	x	x	x		x	x
Bunker C ASTs Area									
BCT-MW-103	x	x	x						
BCT-MW-104	x	x	x						
BCT-MW-105	x	x	x						
BCT-MW-106	x	x	x						
BCT-MW-107	x	x	x						
BCT-MW-108	x	x	x						
MW-1	x	x	x		x				
MW-2	x	x	x		x				
CN-B-2 Area									
CN-MW-101				x					
GF-11 Area									
GF-MW-101								x	
Rail Car Dumper Area									
RCD-MW-101					x		x		
SHB-MW-1 Area									
SHB-MW-101			x		x			x	
UST 29/Latex Spill Area									
UST29-MW-101			x						
UST 70 Area									
UST70-MW-101					x				
UST70-MW-102					x				
UST70-MW-2					x		x		
USTs 71 Area									
UST71-MW101	x		x		x			x	
UST71-MW102	x		x		x			x	
UST71-MW103	x		x		x			x	

Notes

The proposed frequency for additional monitoring is presented in Section 4. In addition, well DAST-MW-101 will be sampled once for PCBs (refer to Section 3.10)

*: The PAH monitoring at well REC3-MW-1R is done relative to the UST 71 excavation area.

FIGURES



- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Water Table Elevation Contours (Nov 2013)
- Intermediate Berm (from Scott Paper drawing C-6911)
- Former Log Pond
- Interim Action Areas
- Upland Area Boundary
- 200-Foot Shoreline Buffer

N

0 200 400

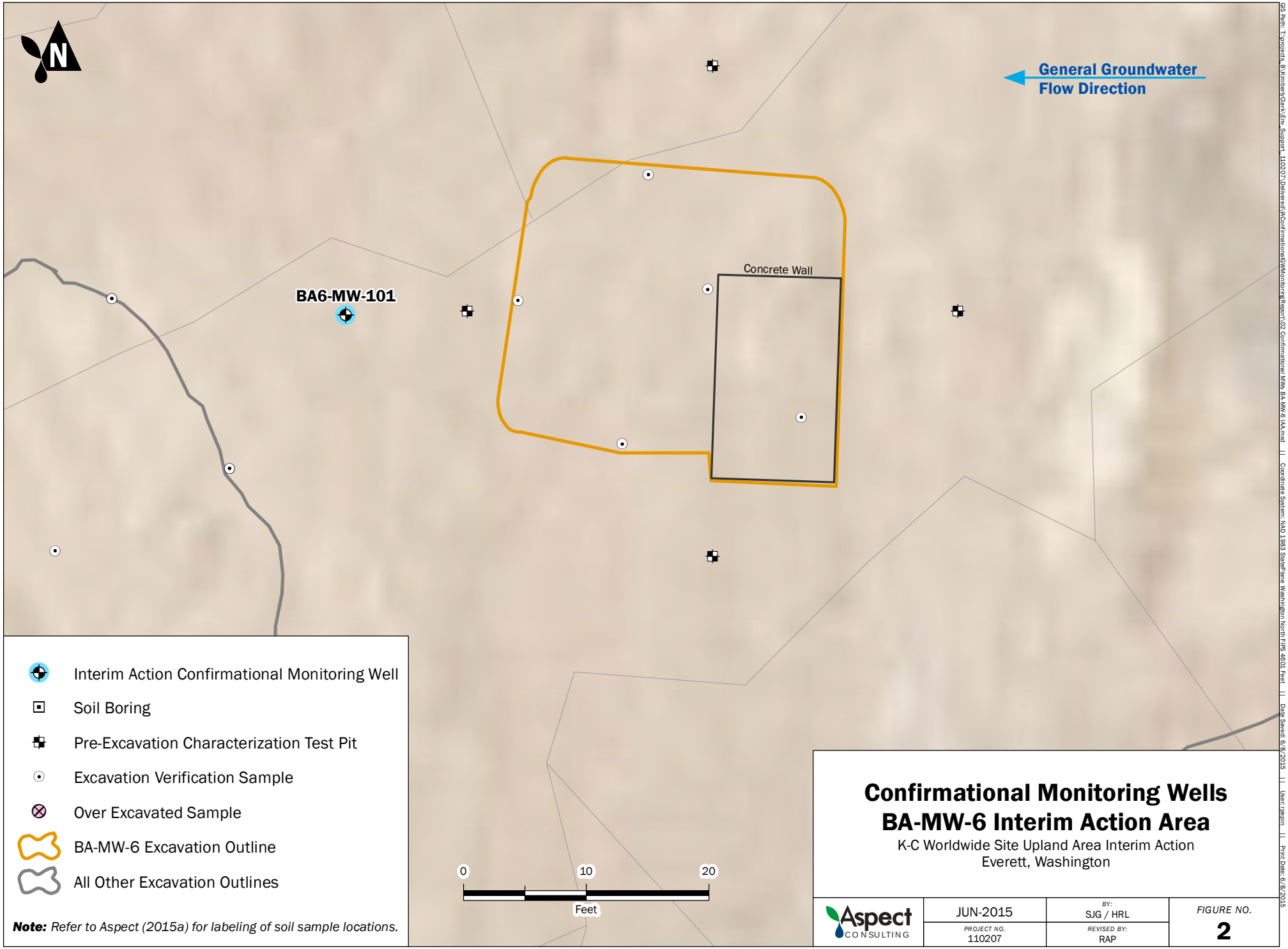
Feet

Interim Action Excavations and Confirmational Groundwater Monitoring Wells

K-C Worldwide Site Upland Area
Everett, Washington

Aspect Consulting	JUN-2015	BY: SJG / HRL	FIGURE NO. 1
	PROJECT NO. 110207-004-06	REVISED BY: RAP	

GIS Path: T:\projects_8\Kimberly-Clark\Env_Support_110207\Delivered\AConfirmationalGWMonitoringReport\Q1\A Excavations and GW MW.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/2/2015 || User: rpipin || Print Date: 6/2/2015



Note: *Refer to Aspect (2015a) for labeling of soil sample locations.*

Confirmational Monitoring Wells
BA-MW-6 Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 2
	PROJECT NO. 110207	REVISED BY: RAP	

UST70-MW-101
UST70-MW-2
UST70-MW-102
UST 70
BA
UST71-MW-101
UST71-MW-104
Bunker C
USTs 71,
72, 73
UST71-MW-102
UST71-MW-103
BA-MW-3
BA-MW-4
BBH-MW-101
BBH-MW-103
BBH-MW-102
BBH-MW-104
REC3-MW-1R
Heavy Duty Shop
Sump
PM-MW-6
PM-MW-8
PM-MW-1

- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Pre-Excavation Characterization Test Pit
- Soil Boring
- Excavation Verification Sample
- Over Excavated Sample
- Boiler Baghouse Excavation Outline
- All Other Excavation Outlines

Note: *Refer to Aspect (2015a) for labeling of soil sample locations.*

General Groundwater
Flow Direction

N

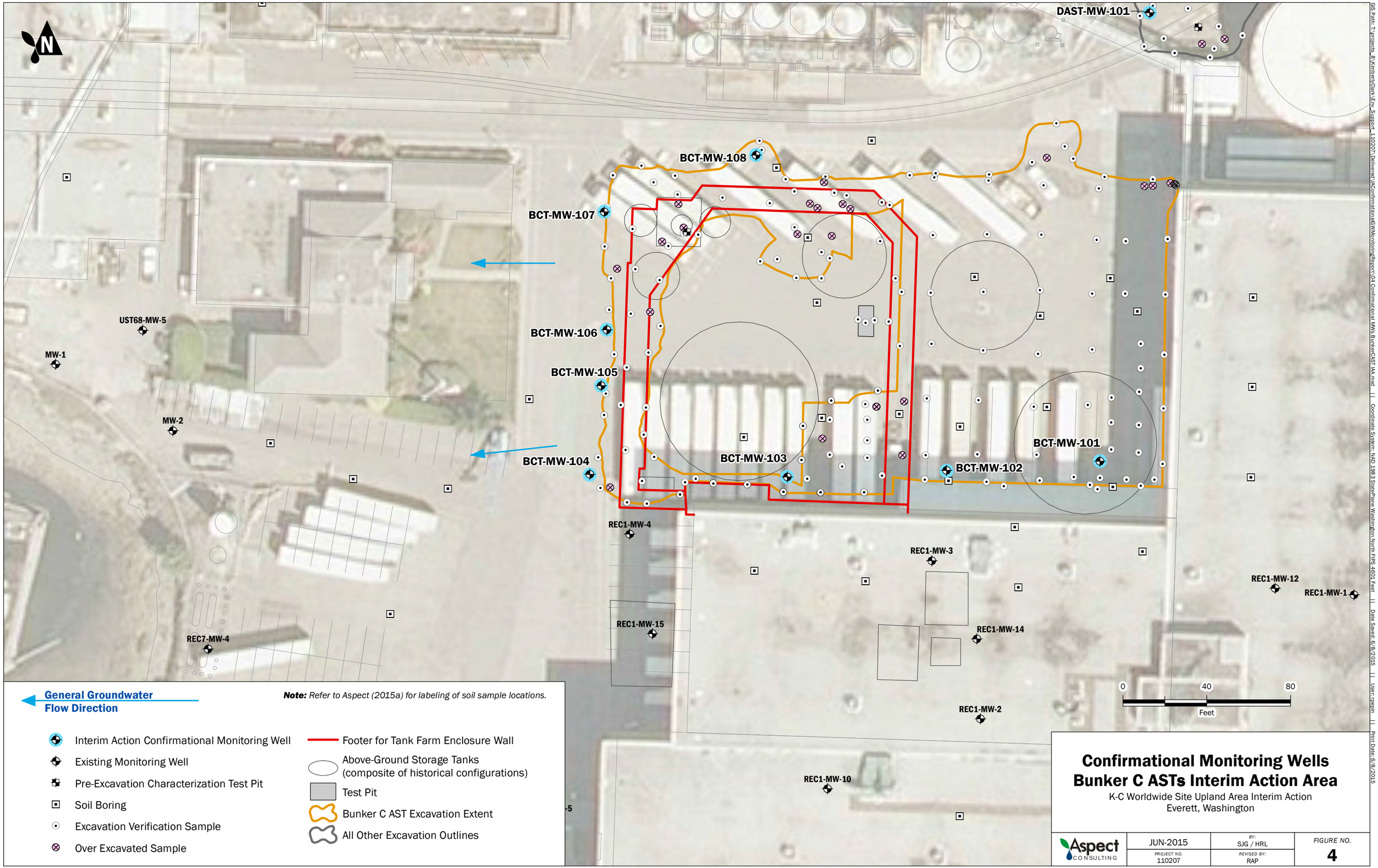
0 30 60
Feet

Confirmational Monitoring Wells
Boiler/Baghouse Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 3
	PROJECT NO. 110207	REVISED BY: RAP	

GIS Path: T:\projects_8\Kimberly\Task\Env_Support_110207\Delivered\IA\Confirmational\MW\MonitoringReport\03 Confirmational MWs Boiler Baghouse IA.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/8/2015 || User: rpejin || Print Date: 6/8/2015



General Groundwater Flow Direction

Note: *Refer to Aspect (2015a) for labeling of soil sample locations.*

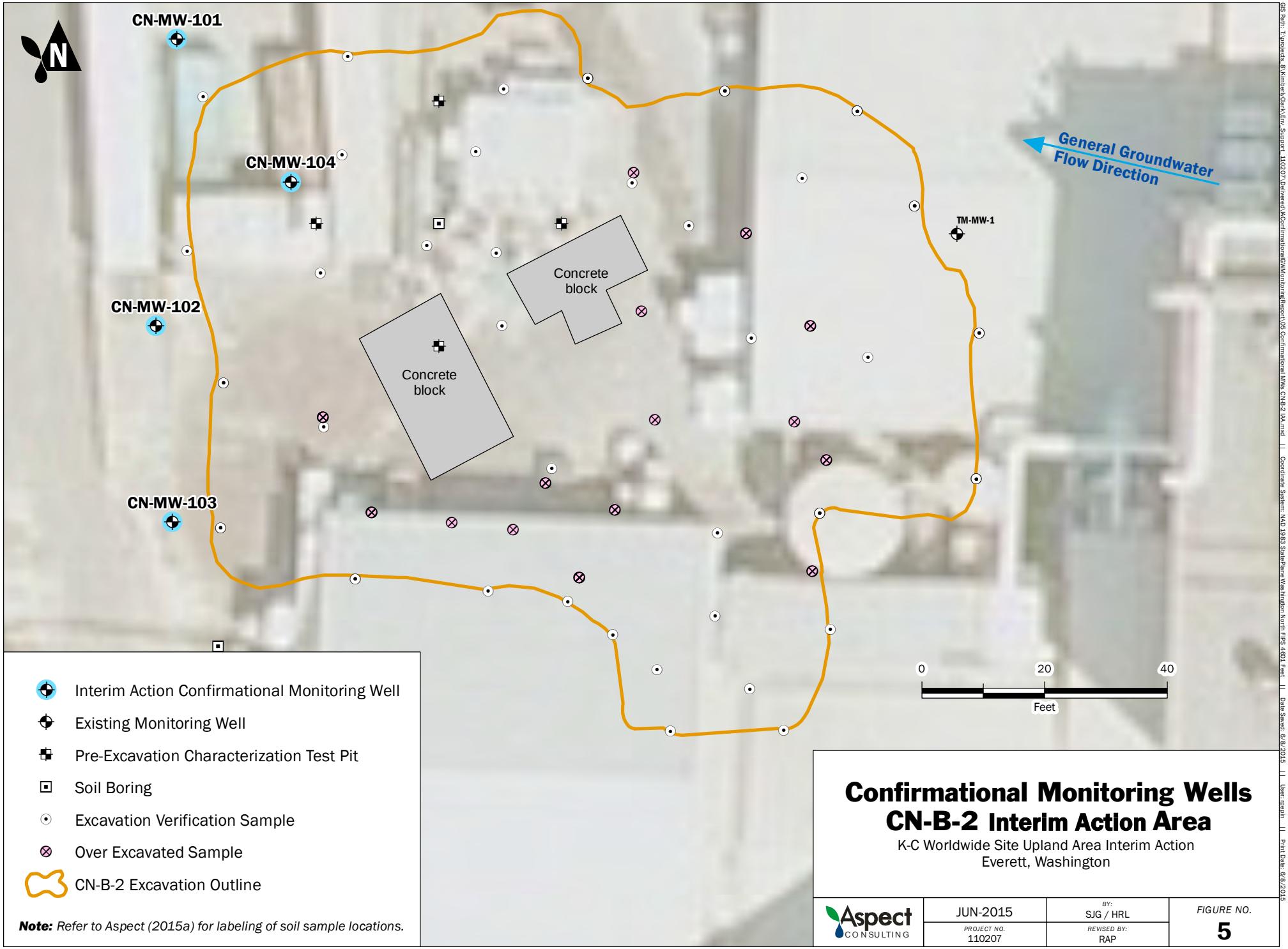
- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Pre-Excavation Characterization Test Pit
- Soil Boring
- Excavation Verification Sample
- Over Excavated Sample
- Footer for Tank Farm Enclosure Wall
- Above-Ground Storage Tanks (composite of historical configurations)
- Test Pit
- Bunker C AST Excavation Extent
- All Other Excavation Outlines

Confirmational Monitoring Wells
Bunker C ASTs Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 4
	PROJECT NO. 110207	REVISED BY: RAP	

GIS Path: T:\projects_8\Kimberly\Task\Env_Support_110207\Delivered\AConfirmationalGWMonitoringReport\04 Confirmational MWs Bunker\AST IAA.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/8/2015 || User: rpepin || Print Date: 6/8/2015



Confirmational Monitoring Wells
CN-B-2 Interim Action Area

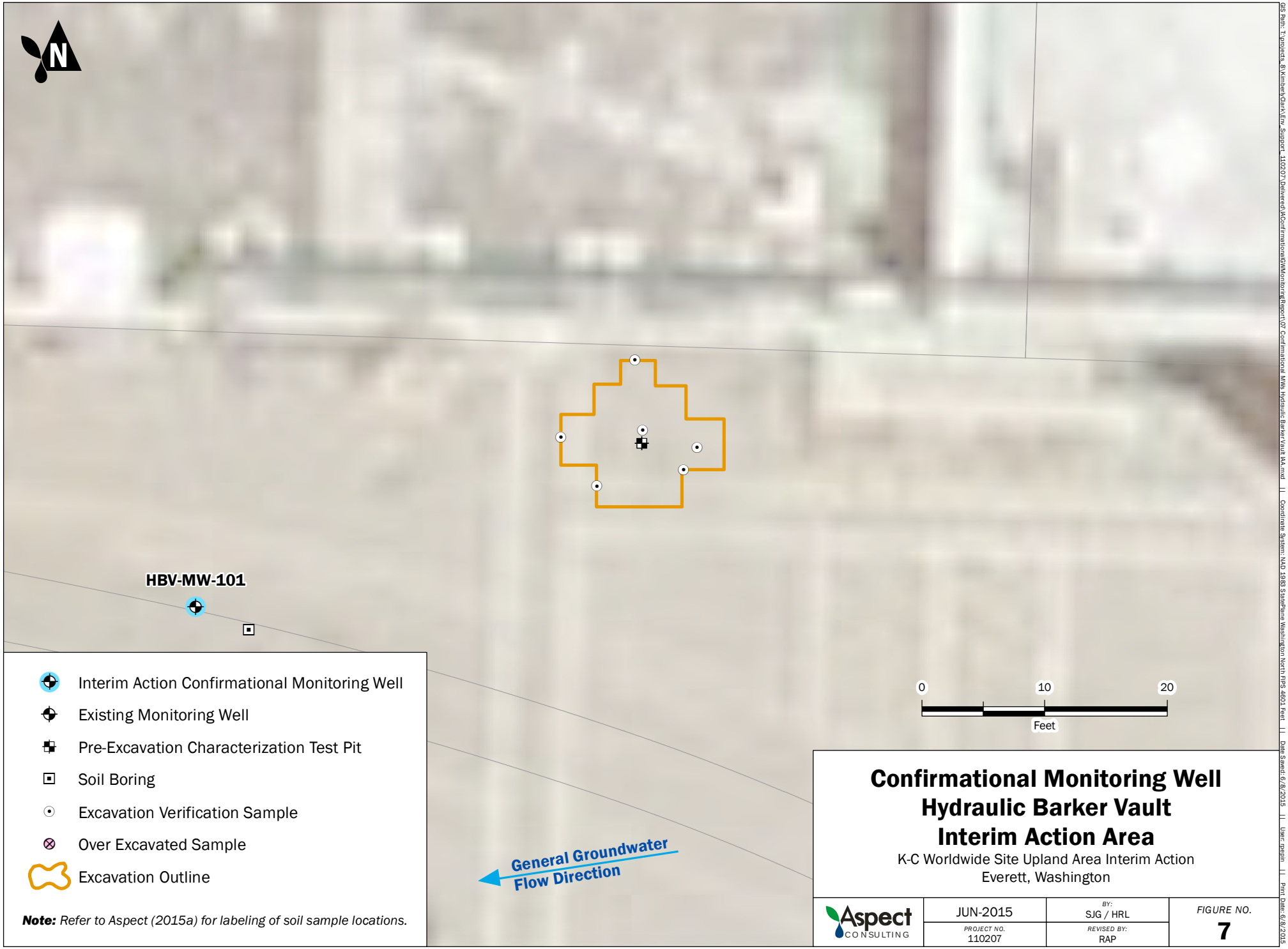
K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 5
	PROJECT NO. 110207	REVISED BY: RAP	

Confirmational Monitoring Wells
GF 11 Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 6
	PROJECT NO. 110207	REVISED BY: RAP	



Confirmational Monitoring Well
Hydraulic Barker Vault
Interim Action Area

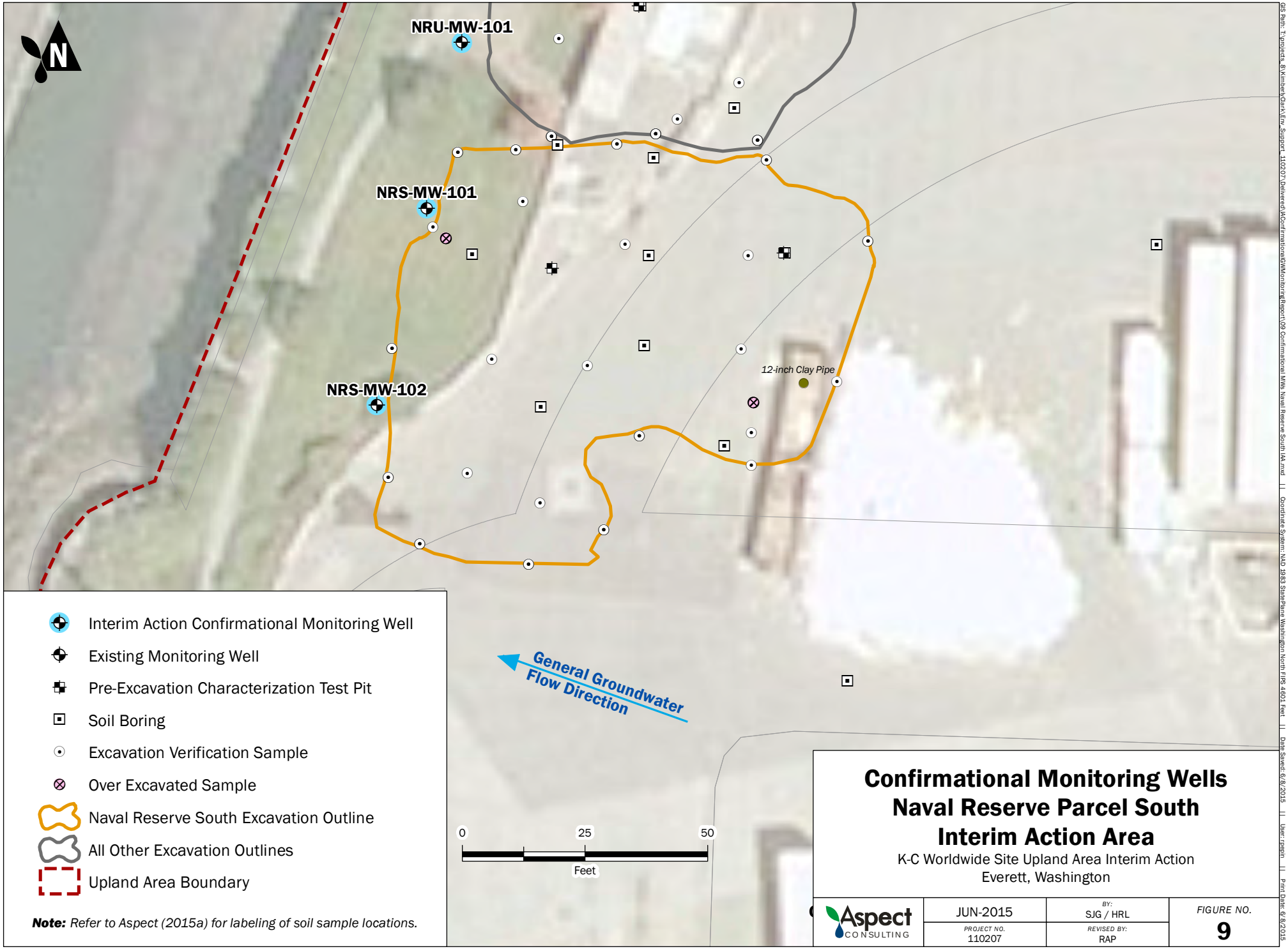
K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 7
	PROJECT NO. 110207	REVISED BY: RAP	

Confirmational Monitoring Wells
Naval Reserve Parcel UST
Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 8
	PROJECT NO. 110207	REVISED BY: RAP	



Confirmational Monitoring Wells
Naval Reserve Parcel South
Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 9
	PROJECT NO. 110207	REVISED BY: RAP	

Confirmational Monitoring Well
Rail Car Dumper Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 10
	PROJECT NO. 110207	REVISED BY: RAP	

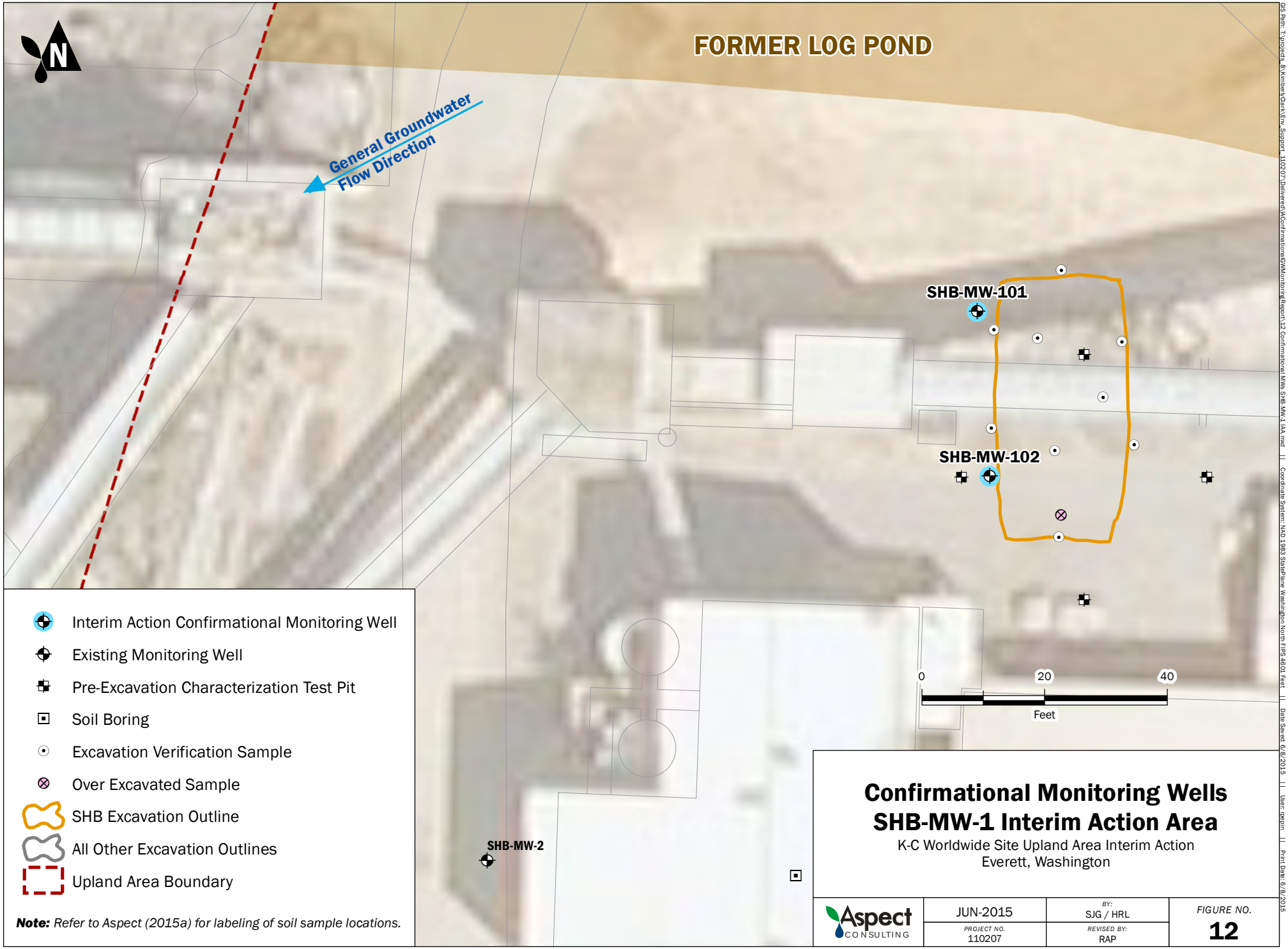
- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Pre-Excavation Characterization Test Pit
- Soil Boring
- Excavation Verification Sample
- Over Excavated Sample
- Diesel AST Excavation Outline
- All Other Excavation Outlines

Note: *Refer to Aspect (2015a) for labeling of soil sample locations.*

Confirmational Monitoring Wells
REC2-MW-5 (near Diesel AST)
Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

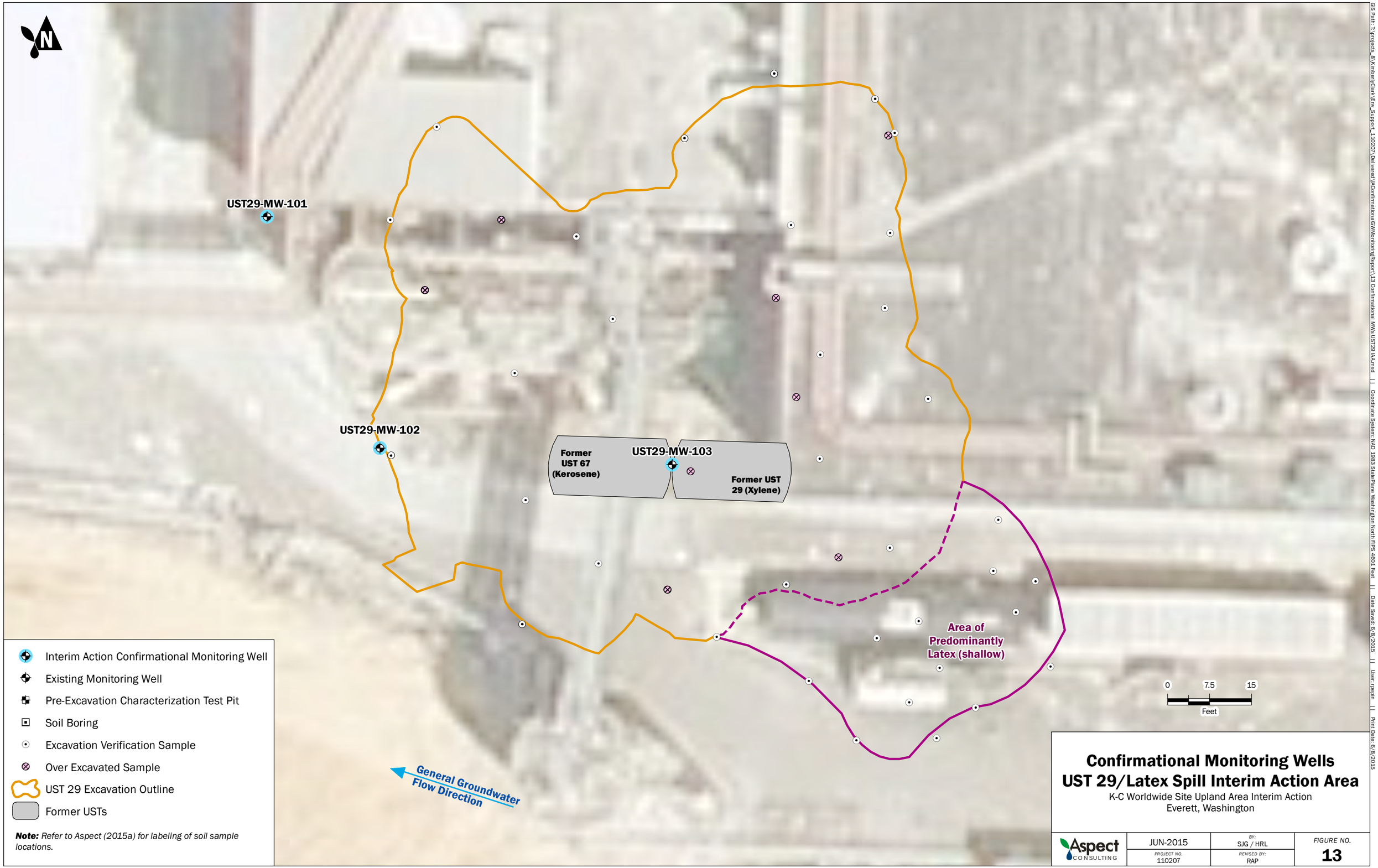
Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 11
	PROJECT NO. 110207	REVISED BY: RAP	



Confirmational Monitoring Wells
SHB-MW-1 Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 12
	PROJECT NO. 110207	REVISED BY: RAP	



- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Pre-Excavation Characterization Test Pit
- Soil Boring
- Excavation Verification Sample
- Over Excavated Sample
- UST 29 Excavation Outline
- Former USTs

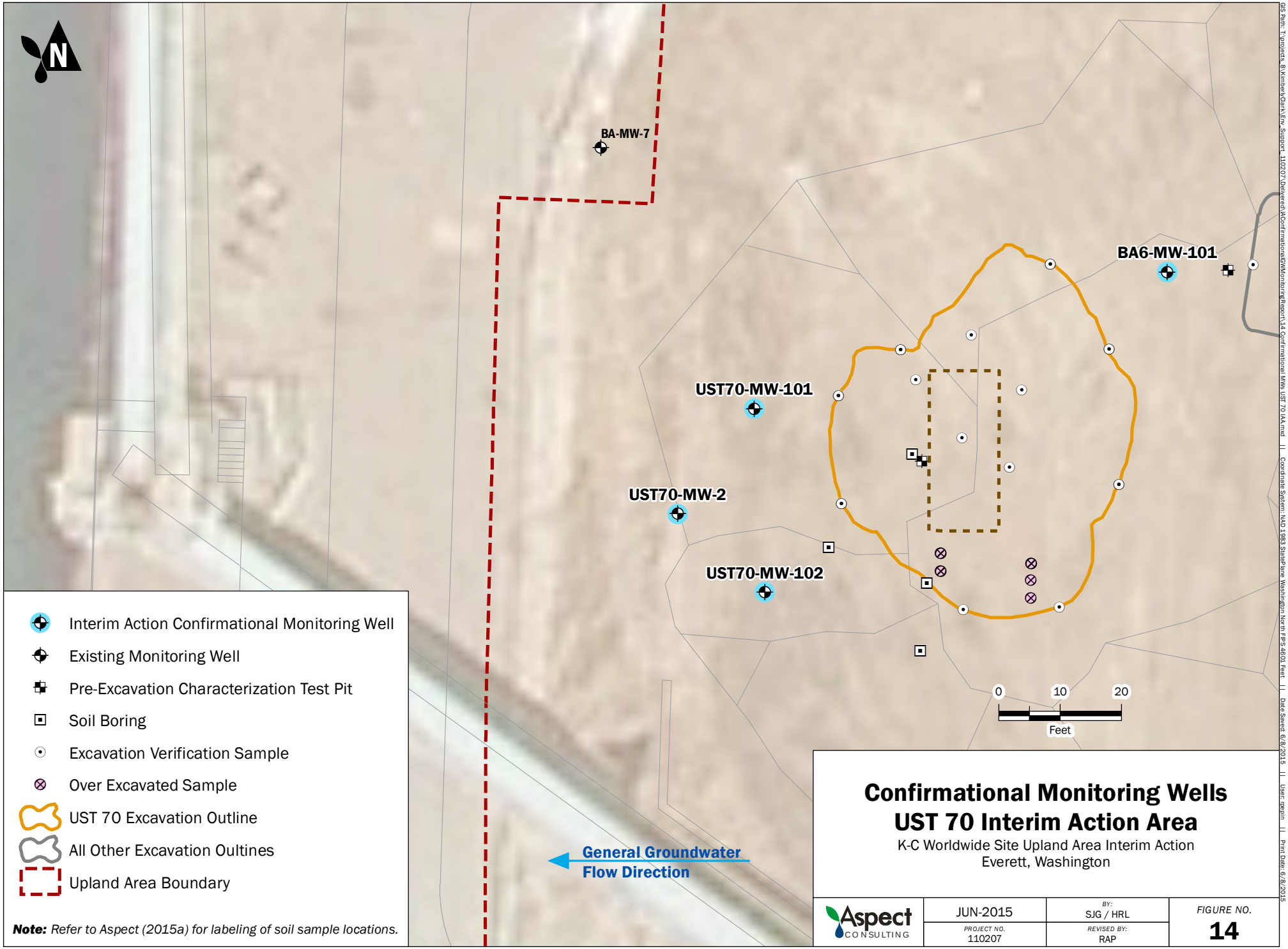
Note: *Refer to Aspect (2015a) for labeling of soil sample locations.*

Confirmational Monitoring Wells
UST 29/Latex Spill Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 13
	PROJECT NO. 110207	REVISED BY: RAP	

GIS Path: T:\projects_8\Kimberly\Clark\Env_Support_110207\Delivered\AConfirmationalGWMonitoringReport\13 Confirmational MWs UST29 AA.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 6/8/2015 || User: rpeplin || Print Date: 6/8/2015



Confirmational Monitoring Wells
UST 70 Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	JUN-2015	BY: SJG / HRL	FIGURE NO. 14
	PROJECT NO. 110207	REVISED BY: RAP	

GIS Path: T:\projects_8\Kimberly\Clark\Env_Support_110207\Delivered\ACconfirmationalGWmonitoringReport14 Confirmational MWs UST 70 AA.mxd | | Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet | | Date Saved: 6/8/2015 | | User: rpipin | | Print Date: 6/8/2015

- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Pre-Excavation Characterization Test Pit
- Soil Boring
- Excavation Verification Sample
- Over Excavated Sample
- Residual petroleum-impacted soil beneath monolithic foundation
- Bunker C UST Excavation Outline
- All Other Excavation Outlines

Note: *Refer to Aspect (2015a) for labeling of soil sample locations.*

BA

UST71-MW-101

UST71-MW-102

UST71-MW-103

UST71-MW-104

Former Sheet Pile Wall (removed)

REC3-MW-1R

BBH-MW-101

Boiler Baghouse

0 15 30

Feet

General Groundwater Flow Direction

Confirmational Monitoring Wells
Bunker C USTs 71/72/73
Interim Action Area

K-C Worldwide Site Upland Area Interim Action
Everett, Washington

Aspect CONSULTING	OCT-2015	BY: SJG / HRL	FIGURE NO. 15
	PROJECT NO. 110207	REVISED BY: RAP	

- Interim Action Confirmational Monitoring Well
- Existing Monitoring Well
- Well Recommended for Further Monitoring
- Former Log Pond
- Interim Action Areas
- Upland Area Boundary
- 200-Foot Shoreline Buffer

N

0 200 400

Feet

Locations of Wells Recommended for Additional Groundwater Monitoring for Interim Action Areas

K-C Worldwide Site Upland Area
Everett, Washington

Aspect Consulting	NOV-2015	BY: SJG / HRL	FIGURE NO. 16
	PROJECT NO. 110207-004-06	REVISED BY: RAP	

GIS Path: T:\projects_8\Kimberly-Clark\Env Support_110207\Delivered\AConfirmationalGWMonitoringReport\16 Wells for Additional GW Monitoring.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 11/6/2015 || User: mgiin || Print Date: 11/6/2015

APPENDIX A

Boring Logs for New Monitoring Wells

Coarse-Grained Soils - More than 50% (1) Retained on No. 200 Sieve	Gravels - More than 50% (1) of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines (5)	GW	Well-graded gravel and gravel with sand, little to no fines
			GP	Poorly-graded gravel and gravel with sand, little to no fines
		≥15% Fines (5)	GM	Silty gravel and silty gravel with sand
			GC	Clayey gravel and clayey gravel with sand
	Sands - 50% (1) or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines (5)	SW	Well-graded sand and sand with gravel, little to no fines
			SP	Poorly-graded sand and sand with gravel, little to no fines
		≥15% Fines (5)	SM	Silty sand and silty sand with gravel
			SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50% (1) or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diato-maceous fine sand or silt
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Terms Describing Relative Density and Consistency

	Density	SPT (2) blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50
	Consistency	**SPT (2) blows/foot**
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

FC = Fines Content
G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Consolidation
DD = Dry Density
K = Permeability
Str = Shear Strength
Env = Environmental
PiD = Photoionization Detector

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

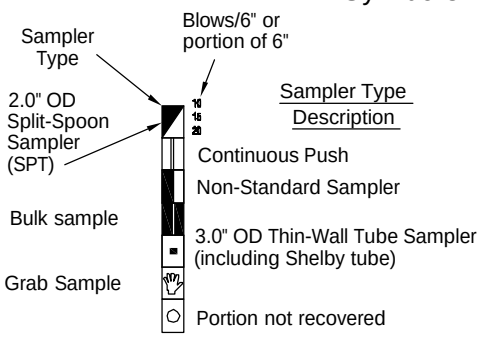
(3) Estimated Percentage

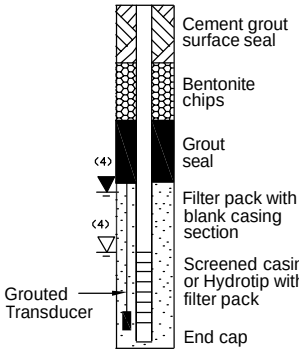
Percentage by Weight	Modifier
<5	Trace
5 to 15	Slightly (sandy, silty, clayey, gravelly)
15 to 30	Sandy, silty, clayey, gravelly)
30 to 49	Very (sandy, silty, clayey, gravelly)

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch
Slightly Moist - Perceptible moisture
Moist - Damp but no visible water
Very Moist - Water visible but not free draining
Wet - Visible free water, usually from below water table

Symbols





(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of groundwater — ATD = At time of drilling; Static water level (date); BGS = below ground surface
(5) Combined USCS symbols used for fines between 5% and 15% as estimated in General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

Aspect CONSULTING

Exploration Log Key

DATE:
DESIGNED BY:
DRAWN BY:
REVISED BY:

PROJECT NO.

FIGURE NO.
A-1

Q:_ACAD Standards\Standard Details\Exploration Log Key A1.dwg

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BA6-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/24/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 5'	S1		0.0 0.0 0.0			Imported sand (FILL) Moist, brown, silty SAND (SM); fine sand No recovery	
5	10/20 pre-pack Silica sand filter pack 10' to 15' 4/24/2014	S2		0.0 0.0 0.0 0.0			Moist, gray, silty SAND (SM); fine sand Becomes wet Wet, gray SAND (SP); fine to medium sand, trace fine gravel, 3" layer of fine gravel at upper contact No recovery	5
10	2" Diameter PVC pre-packed 10-slot screen 10' to 15'	S3		0.0 0.0 0.0 0.0 0.0			Wet, gray SAND (SP); fine to medium sand, trace fine gravel	10
15	Threaded cap						No recovery Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 2

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BBH-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Moist, brown, silty, gravelly SAND (SM); fine to medium sand, fine gravel	
	3/8" Hydrated bentonite chips 2' to 3'	S1					No recovery	
	10/20 pre-pack Silica sand filter pack 3' to 14'							
5	▽4/25/2014							5
				0.0			Moist, brown, silty, gravelly SAND (SM); fine to medium sand, fine gravel	
				0.0			Wet, dark gray, slightly gravelly, SAND (SP); fine to medium sand, fine gravel	
	▼	S2		0.0			Grades to wet, gray, very silty SAND (SM); fine sand	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'						No recovery	
10								10
				0.0			Wet, gray, very silty SAND (SM); fine sand	
				0.0			Scattered organics	
		S3		0.0				
							No recovery	
	Threaded cap							
	Slough							
15							Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 3

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BBH-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Moist, brown, silty SAND (SM); trace gravel	
	3/8" Hydrated bentonite chips 2' to 3'	S1		0.0			Moist, brown SAND (SP); fine to medium sand, iron oxide staining	
	10/20 pre-pack Silica sand filter pack 3' to 14'						No Recovery	
5								5
	▽ 4/28/2014			0.0			Moist, brownish gray, very sandy SILT (ML); fine sand, scattered organics	
				0.0				
	▼	S2		0.0			Wet, gray, very silty SAND (SM); fine sand, scattered organics	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'			0.0			No Recovery	
10								10
				0.0			Wet, gray, slightly silty SAND (SP-SM); fine sand, scattered organics	
				0.0				
		S3		0.0			Grades to very moist to wet, gray, sandy SILT (ML); fine sand, scattered organics	
				0.0			No Recovery	
	Threaded cap							
	Slough							
15							Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 4

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BBH-MW-103	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0				
	3/8" Hydrated bentonite chips 2' to 3'	S1		0.0			Moist, brown, slightly silty SAND (SP-SM); fine sand, iron oxide staining	
	10/20 pre-pack Silica sand filter pack 3' to 14'						No recovery	
5							Moist, brown, slightly silty SAND (SP-SM); fine sand	5
	▽ 4/28/2014			0.0			Grades to wet, brown SAND (SP), fine sand, scattered organics	
	▼			0.0				
		S2		0.0			Becomes gray	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'			0.0				
							No recovery	
10							Wet, gray SAND (SP), fine sand, scattered organics	10
				0.0				
				0.0				
		S3		0.0			Grades to wet, gray, silty SAND (SM); fine sand	
				0.0				
	Threaded cap						Grades to wet, gray, sandy SILT (ML); fine sand	
	Slough			0.0				
15							Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 5

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BBH-MW-104	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Moist, brown, slightly silty SAND (SP-SM); fine sand, iron oxide staining	
	3/8" Hydrated bentonite chips 2' to 3'	S1		0.0			Wood chips abundant	
	10/20 pre-pack Silica sand filter pack 3' to 14'						No recovery	
5								5
	▽ 4/28/2014			0.0			Moist, brown, slightly silty SAND (SP-SM); fine sand, iron oxide staining	
				0.0			Wet, gray SAND (SP); fine sand, trace silt, scattered organics	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'	S2		0.0				
				0.0				
				0.0			Grades to wet, gray, slightly silty SAND (SP-SM); fine sand	
10								10
				0.0			Grades to wet, gray SAND (SP); fine sand, trace silt, trace organics	
				0.0				
		S3		0.0				
				0.0				
	Threaded cap			0.0			Grades to wet, gray, very sandy SILT (ML); fine sand, scattered organics	
	Slough							
15							Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)

- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 6

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/29/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1'			0.0			Recycled demo debris	
				0.0			Moist, brown SAND (SP); fine to medium sand, trace silt	
	3/8" Hydrated bentonite chips 2' to 3'	S1		0.0			No recovery	
	10/20 pre-pack Silica sand filter pack 3' to 14'							
5								5
		S2						
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'							
10							Very moist, gray-brown SAND (SP); fine to medium sand, trace silt	10
	4/29/2014			0.0				
				0.0			Wet, gray, sandy SILT (ML); fine sand	
		S3		0.0			Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt	
				0.0				
				0.0				
	Threaded cap						No recovery	
15	Slough						Bottom of boring at 15' bgs	15

Sampler Type:
- No Recovery
- Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- Static Water Level
- Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 7

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Project Number	Boring Number	Sheet
110207	BCT-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core
Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/2/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap			0.0			Recycled demo debris	
	Concrete surface seal 0' to 1'			0.0			Moist, dark brown SAND (SP); fine to medium sand, predominantly medium, trace silt	
	3/8" Hydrated bentonite chips 1' to 3'	S1					No recovery	
	10/20 pre-pack Silica sand filter pack 3' to 14'							
5	▽ 5/2/2014							5
				0.0			Wet, brown SAND (SP); fine to medium sand, predominantly medium, trace silt	
				0.0			Becomes gravelly	
		S2		0.0			Becomes gray; trace gravel	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'			0.0				
							No recovery	
10								10
				0.0			Wet, gray, gravelly SAND (SP); fine to medium sand, predominantly medium	
				0.0			Woody debris and numerous seashells	
		S3		0.0			Grades to moist, deep brown, slightly sandy, ORGANIC SILT (OL); woodchip, sawdust, and fiber matrix, trace gravel	
	Threaded cap						No recovery	
15	Slough						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 8

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-103	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/2/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1'			0.0			Recycled demo debris	
	▽ 5/2/2014			0.0			Wet, gray, silty SAND (SM); fine sand	
	3/8" Hydrated bentonite chips 1' to 3'	S1					No recovery	
	10/20 pre-pack Silica sand filter pack 3' to 14'							
5	▼							5
				0.0			Wet, gray, silty SAND (SM); fine sand, numerous seashells	
				40.4			Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt, very strong petroleum odor	
		S2		285 107				
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'			90.0			No recovery	
10								10
				388 119 99.6 490			Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt, very strong petroleum odor	
		S3		923				
				29.5			Moist, dark brown, slightly sandy ORGANIC SILT (OL); wood chips, fibers, and sawdust abundant	
	Threaded cap			24.2 18.2 5.7			Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt, faint petroleum smell, scattered woodchips and charcoal	
15	Slough						Bottom of boring at 15' bgs	15

Sampler Type:
◯ No Recovery
▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 9

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-104	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/2/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 3'	S1		0.0 0.0 0.0			Recycled demo debris Moist, brown, sandy SILT (ML); numerous seashells	
	10/20 pre-pack Silica sand filter pack 3' to 14'						No recovery	
5	▽5/2/2014	S2		0.0 0.0 0.0 0.0			Moist, grayish brown SAND (SP); fine to medium sand, predominantly medium Becomes wet Becomes gray No recovery	5
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'							
10		S3		0.0 0.0 0.0 0.0 0.0			Wet, gray SAND (SP); fine to medium sand, predominantly medium, faint petroleum odor Petroleum odor becomes strong, 2" pocket of gray, sandy SILT (ML) Abundant charcoal	10
	Threaded cap							
15	Slough						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 10

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-105	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/2/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' ▽ 5/2/2014 3/8" Hydrated bentonite chips 1' to 3'			0.0			Recycled demo debris	
	10/20 pre-pack Silica sand filter pack 3' to 14'	S1		0.0			Moist, brown, silty SAND (SM); fine sand Becomes wet, gray, numerous seashells	
				0.0			No recovery	
5	▼			0.0			Wet, gray, silty SAND (SM); fine sand	5
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'	S2		0.0			Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt	
				0.0			No recovery	
10		S3		0.0			Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt	10
				0.0			Grades to wet, gray, silty SAND (SM); fine to medium sand, predominantly medium, numerous seashells	
	Threaded cap			0.0			3" pocket of coarse sand and fine gravel at 14.75' bgs	
15	Slough						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 11

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-106	1 of 3

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 2.5' 10/20 pre-pack Silica sand filter pack 2.5' to 13.5'	S1		0.0 0.0 0.0			Recycled demo debris Moist pea gravel (FILL) No recovery	
5	▽4/28/2014	S2		0.0 0.0 0.0			Moist pea gravel (FILL) becomes wet Wet, gray SAND (SP); fine to medium sand, predominantly medium No recovery	5
10	2" Diameter PVC pre-packed 10-slot screen 3.5' to 13.5'	S3		0.0 0.0 0.0 0.0			Wet, gray, silty SAND (SM); fine to medium sand, silt increases with depth, last 3" is sandy SILT (ML) Wet, gray, sandy SILT (ML) Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt, slight petroleum odor Wet, gray, sandy SILT (ML); fine sand, petroleum odor Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt, strong petroleum odor	10
15	Threaded cap Slough						No recovery Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 12

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-106	2 of 3

Project Name: Kimberly Clark
Ground Surface Elev.:
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Depth to Water (ft BGS):
Sampling Method: Continuous Core
Start/Finish Date: 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
25								25
30		○						30
35								35

Sampler Type:
○ No Recovery
▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 12

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-106	3 of 3

Project Name: Kimberly Clark
Ground Surface Elev.:
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Depth to Water (ft BGS):
Sampling Method: Continuous Core
Start/Finish Date: 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
45								45
50								50
55								55

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 12

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-107	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/30/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 3'	S1		0.0 0.0 0.0			Recycled demo debris Moist, brown, sandy SILT (ML); fine sand Becomes gray and wet	
	10/20 pre-pack Silica sand filter pack 3' to 14'						No recovery	
5	4/30/2014	S2		0.0 0.0 0.0 0.0 0.0			Moist, brown, sandy SILT (ML); fine sand Becomes wet numerous seashells 3" pocket of wet, gray, clayey SILT (ML); sticky, low plasticity with slight petroleum odor	5
10	2" Diameter PVC pre-packed 10-slot screen 4' to 14'	S3		0.0 0.0 0.0 0.0 0.0			Wet, gray SAND (SP); fine to medium sand, predominantly medium sand, trace silt, slight petroleum odor Becomes gravelly; numerous seashells Grades to wet, gray, sandy SILT (ML); fine sand	10
	Threaded cap Slough			0.0			Wet, gray SAND (SP); fine to medium sand, trace silt	
15							Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 13

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	BCT-MW-108	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core
Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/2/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 5/2/2014 3/8" Hydrated bentonite chips 1' to 3' 10/20 pre-pack Silica sand filter pack 3' to 14' 2" Diameter PVC pre-packed 10-slot screen 4' to 14' Threaded cap Slough	S1		0.0			Recycled demo debris	
				0.0			Wet, gray, silty SAND (SM); fine sand	
				0.0			No recovery	
5							Wet, slighty sandy SILT (ML); fine sand	5
		S2		0.0			No recovery	
10							Wet, gray SAND (SP); fine to medium sand, predominantly medium, trace silt, slight petroleum odor	10
		S3		0.0			3" thick pocket of sandy SILT (ML); numerous seashells	
				0.0			Trace gravel, slight petroleum odor	
				0.0			No recovery	
15							Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 14

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	CN-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0				
		S1		0.0			Moist, dark gray, sandy SILT (ML); fine sand	
	3/8" Hydrated bentonite chips 2' to 4'						No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5							Moist, dark gray, sandy SILT (ML); fine sand	5
				0.0				
	4/22/2014			0.0			Grades to wet, dark gray SAND (SP); fine to medium sand, scattered shells	
		S2		0.0				
				0.0				
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'			0.0			Wet, black, solid wood	
10				0.0			becomes sawdust	10
				1.3				
		S3					No recovery	
15	Threaded cap						Bottom of boring at 15 feet	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 15

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	CN-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0				
		S1		0.0			Moist, dark gray, very sandy SILT (ML); fine sand, scattered organics	
	3/8" Hydrated bentonite chips 2' to 4'						No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15' ▽ 4/22/2014							
5							Wet, dark gray SAND (SW); fine to coarse sand	5
				0.0			Wet, gray SAND (SP); fine to medium sand, scattered fibrous organics and shells	
		S2		0.0				
				0.0				
				0.0			Wet, light gray, sandy, GRAVEL (GP), fine, crushed gravel	
	2" Diameter PVC pre-packed 10-slot screen 5' to 14'			0.0			Wood debris	
10								10
				0.0			Wet, dark gray, slightly gravelly SAND (SP); medium sand, scattered organics and shells slight sheen at 11', no odor	
				0.0				
		S3		0.0			Wood debris and sawdust	
				0.0				
				0.0				
15	Threaded cap						Bottom of boring at 15 feet	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 16

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	CN-MW-103	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				60.0			Loose, moist, brown, sandy GRAVEL (GP); subrounded to subangular fine gravel	
		S1					Moist, gray, sandy SILT (ML); fine sand, trace organics	
	3/8" Hydrated bentonite chips 2' to 4'						No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5	▽4/22/2014							5
				0.0			Moist, gray and brown mottled, sandy, gravelly SILT (ML)	
				0.0			Wet, gray SAND (SP); fine to medium sand	
		S2		0.0				
				0.0				
	2" Diameter PVC pre-packed 10-slot screen 5' to 14'						No recovery	
10								10
				0.0			Dense, wet, gray SAND (SP); fine to medium sand	
				0.0			Medium dense, wet, sandy ORGANIC SILT (OL); sawdust and woodchips	
		S3		0.0				
				0.0			Dark brown, wood debris and sawdust	
				0.0				
15	Threaded cap						Bottom of boring at 15 feet	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 17

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	CN-MW-104	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Moist, brown, slightly gravelly SAND (SP); fine to medium sand	
	3/8" Hydrated bentonite chips 2' to 3'	S1		0.0			Wet	
	10/20 pre-pack Silica sand filter pack 3' to 14'						No recovery	
5	4/22/2014							5
				0.0			Wet, brown, slightly gravelly SAND (SP); fine to medium sand	
				0.0				
		S2					Wet, gray, silty SAND (SM); fine sand	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'			0.0			Wet, dark gray SAND (SP); fine to medium sand	
				0.0				
				0.0			Wet, gray to brown sawdust	
10								10
				0.0			Wet, brown SAND (SW); fine to coarse sand, trace gravel	
				0.0				
		S3		0.0			Wet, gray SAND (SP); fine to medium sand	
				0.0			Wood debris	
	Threaded cap			0.0				
15	Slough						Bottom of boring at 15 feet	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 18

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	DAST-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Burnt organic material, charcoal	
							Moist, gray SAND (SP); fine to medium sand	
	3/8" Hydrated bentonite chips 2' to 3'	S1		0.0			No recovery	
	10/20 pre-pack Silica sand filter pack 3' to 14'							
	▽ 4/28/2014							
5								5
				0.0			Moist, gray SAND (SP); fine to medium sand	
				0.0			Becomes wet and black	
		S2		0.0			2" silt bed	
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'			0.0			2" silt bed	
							No recovery	
10								10
				0.0			Loose, wet, brown SAND (SP); possibly slough	
							No recovery	
		S3						
	Threaded cap							
	Slough							
15								15
							Bottom of boring at 15' bgs	

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 19

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	GF11-MW-101	1 of 3

Project Name: Kimberly Clark
Ground Surface Elev.:
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Depth to Water (ft BGS):
Sampling Method: Continuous Core
Start/Finish Date: 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0				
		S1		0.0			Moist, black, sandy SILT (ML); numerous organics	
	3/8" Hydrated bentonite chips 2' to 4'						No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5								5
	▼ ▽ 4/28/2014			0.0			Moist, black, silty SAND (SM); fine sand, trace gravel, burnt appearance	
		S2		0.0				
				0.0			Wet, black, sandy SILT (ML); fine sand	
				0.0				
	2" Diameter PVC pre-packed 10-slot screen 4' to 14'						No recovery	
10								10
				0.0			Wet, black, slightly silty SAND (SP); with scattered, thick, sandy SILT (SM) interbeds	
				0.0				
		S3		0.0				
				0.0				
				0.0				
15	Threaded cap							15
							Bottom of boring at 15' bgs	

Sampler Type:
◯ No Recovery
▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 20

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Project Number	Boring Number	Sheet
110207	GF11-MW-101	2 of 3

Project Name: Kimberly Clark
Ground Surface Elev.:
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Depth to Water (ft BGS):
Sampling Method: Continuous Core
Start/Finish Date: 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
25								25
30		○						30
35								35

Sampler Type:
○ No Recovery
▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 20

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Project Number	Boring Number	Sheet
110207	GF11-MW-101	3 of 3

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/28/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
45		○						45
50		▌						50
55								55

Sampler Type:
○ No Recovery
▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 20

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	HBV-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Direct Push Probe-Limited Access

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1'			0.0			Recycled demo debris	
				0.0				
	3/8" Hydrated bentonite chips 1' to 5'	S1		0.0				
5							No recovery	5
				0.0				
				0.0				
		S2		40.1			Moist, gray, sandy SILT (ML); fine sand, numerous wood chips, petroleum odor	
				5.5				
				2.5				
				1.5			No recovery	
10	▽ 4/23/2014							10
	10/20 pre-pack Silica sand filter pack 10' to 15'			0.0			Moist, gray, gravelly SAND (SP); fine to medium sand, numerous wood chips	
							Crushed red brick	
				0.0			Wood chips and coarse sawdust	
		S3					No recovery	
				0.0				
	2" Diameter PVC pre-packed 10-slot screen 10' to 15'							
15	Threaded cap							15
		S4						
							Bottom of boring at 17' bgs	

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 21

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	NRS-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/1/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 4'	S1		0.0			Grass, roots, sandy, gravelly soil	
				0.0			Moist, brown, silty SAND (SM); fine to coarse sand, predominantly fine, trace fine gravel	
				0.0			No recovery	
5	10/20 pre-pack Silica sand filter pack 4' to 15'							5
	▽ 5/1/2014			0.0			Moist, brown, silty SAND (SM); fine to coarse sand, predominantly fine, trace fine gravel	
				0.0			Becomes wet and gray	
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'	S2		0.0			No recovery	
10								10
				47.3			Wet, gray, silty SAND (SM); fine to coarse sand, predominantly fine, numerous wood chips, strong petroleum odor	
				130				
				57.5				
				14.4			3" pocket of SILT (ML); trace sand	
		S3		0.0			Wet, gray SAND (SP); fine to medium sand, predominantly medium	
				0.0				
				0.0			Wet, gray, slightly sandy SILT (ML); fine sand	
15	Threaded cap							15
							Bottom of boring at 15' bgs	

Sampler Type:
◯ No Recovery
▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 22

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	NRS-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/1/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 4'	S1		0.0			Grass, roots, soil	
				0.0			Moist, brown, sandy GRAVEL (GW); fine to coarse sand, fine to coarse gravel, trace silt	
				0.0			Moist, brownish gray, sandy SILT (ML); fine sand Becomes wet and gray	
							No recovery	
5	10/20 pre-pack Silica sand filter pack 4' to 15'						Moist, gray, sandy SILT (ML); fine sand	5
	5/1/2014	S2		0.0			Moist, gray, silty SAND (SM); fine to medium sand Becomes wet	
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'			0.0			becomes predominantly fine sand	
				0.0			No recovery	
10		S3		0.0			Wet, gray, silty SAND (SM); fine to medium sand, predominantly fine, numerous seashells	10
				0.0				
				0.0			3" pocket of woodchips	
				0.0				
15	Threaded cap			0.0			3" pocket of woodchips	15
							Bottom of boring at 15' bgs	

Sampler Type:
- No Recovery
- Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- Static Water Level
- Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 23

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	NRU-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 5/1/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 4'	S1		0.0			Moist, brown, sandy GRAVEL (GP); medium to coarse sand, fine gravel, trace silt	
				0.0			Moist, gray, gravelly, sandy SILT (ML); fine gravel, fine to coarse sand, predominantly fine	
				0.0			Moist, brown, gravelly SAND (SW); fine to coarse sand, fine gravel, trace silt	
							No recovery	
5	10/20 pre-pack Silica sand filter pack 4' to 15'							5
	5/1/2014	S2		0.0			Moist, brown, gravelly, sandy SILT (ML); fine sand, fine gravel, mica flakes common Becomes wet and gray	
				0.0				
				0.0			Wet, gray, silty SAND (SM); fine sand coarsens with depth	
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'						No recovery	
10		S3		0.0			Wet, gray, silty SAND (SM); fine sand	10
				0.0			numerous Wood chips	
				0.0			Wet, gray SILT (ML)	
				0.0			Wet, gray, silty SAND (SM); numerous wood chips	
							No recovery	
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 24

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	NRU-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 5/1/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 4'			0.0			Grass, roots, soil	
				0.0			Moist, dark brown, gravelly, sandy SILT (ML); fine sand, fine gravel	
		S1					No recovery	
5	10/20 pre-pack Silica sand filter pack 4' to 15'							5
	5/1/2014			0.0			Moist, gray, gravelly, sandy SILT (ML); fine sand, fine gravel	
				0.0			Wet	
		S2		0.0			No recovery	
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'							
10				0.0			Wet, gray, silty, sandy GRAVEL (GM); coarse, angular sand, and angular crushed gravel	10
				0.0			Wet, gray, sandy SILT (ML); fine sand, trace fine gravel	
		S3					No recovery	
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 25

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	RCD-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/24/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Moist, brown gray SAND (SP); fine to medium sand, trace gravel Becomes wet	
				0.0			Moist, brown gray, silty SAND (SM); fine to medium sand	
	3/8" Hydrated bentonite chips 2' to 4'	S1					No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5				0.0			Moist, red brown SAND (SP); fine to medium sand	5
				0.0			grades to gray brown	
		S2		0.0			No recovery	
10	2" Diameter PVC pre-packed 10-slot screen 5' to 15' ▽ 4/24/2014			0.0			Moist, red brown and gray mottled SAND (SP); fine to medium sand Becomes wet	10
		S3		0.0				
				0.0				
				0.0				
				0.0			No recovery	
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 26

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	SHB-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Moist, dark brown, sandy GRAVEL (GP); fine to coarse sand, fine gravel 3" thick layer of wood	
		S1					No recovery	
	3/8" Hydrated bentonite chips 2' to 4'							
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5								5
	▽ 4/23/2014			0.0			Wet, gray, sandy SILT (ML); fine sand	
		S2		0.0				
				0.0				
				0.0			Wet, gray brown, SAND (SW)	
							No recovery	
10	2" Diameter PVC pre-packed 10-slot screen 5' to 15'			0.0			Wet, gray SAND (SW); fine to coarse sand	10
		S3		0.0				
				0.0				
				0.0				
				0.0				
15	Threaded cap							15
							Bottom of boring at 15' bgs	

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 27

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	SHB-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
				0.0			Moist, gray, sandy SILT (ML); fine sand, trace gravel	
		S1		0.0			becomes brown	
	3/8" Hydrated bentonite chips 2' to 4'						No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5								5
	▽ 4/23/2014			0.0			Moist, brown and gray mottled, sandy SILT (ML); fine sand	
		S2		0.0			Becomes wet	
	▼			0.0			Becomes gray	
				0.0				
10	2" Diameter PVC pre-packed 10-slot screen 5' to 15'			0.0			Wet, gray and brown mottled SAND (SW); fine to coarse sand, trace gravel	10
		S3		0.0				
				0.0				
				0.0			No recovery	
15	Threaded cap							15
							Bottom of boring at 15' bgs	

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 28

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST29-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/22/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
		S1		0.0			No recovery: rock in shoe	
	3/8" Hydrated bentonite chips 2' to 4'							
	10/20 pre-pack Silica sand filter pack 4' to 15'							
	4/22/2014							
5								5
				0.0			Peagravel	
				0.0			Wet, brown SAND (SW); fine to coarse sand	
		S2		0.0			Wet, gray to dark gray SAND (SP); fine to medium sand	
				0.0				
							No recovery	
10	2" Diameter PVC pre-packed 10-slot screen 5' to 15'							10
				0.0			Wet, gray SAND (SP); fine to medium sand	
				0.0				
		S3		0.0			Grades to wet, gray, sandy SILT (ML); fine sand	
				0.0			No recovery	
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 29

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST29-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Recycled demo debris	
	3/8" Hydrated bentonite chips 2' to 7'	S1		0.0			No recovery	
5	▽ 4/23/2014			0.0			Moist, brown SAND (SW); fine to coarse sand, trace gravel	5
	10/20 pre-pack Silica sand filter pack 7' to 18'	S2		0.0 0.0 0.0			Wet, brown SAND (SP); fine to medium sand becomes gray	
							No recovery	
10	2" Diameter PVC pre-packed 10-slot screen 8' to 18'	S3		0.0 0.0 0.0 0.0			Wet, gray, SAND (SP); fine to medium sand, trace silt grades to fine sand	10
							Wet, gray, sandy SILT (ML); fine sand	
				0.0			No recovery	
15				0.0			Wet, gray, sandy SILT (ML); fine sand	15
		S4		0.0 0.0			Wet, gray, silty SAND (SM); fine to coarse sand	
	Threaded cap			0.0				
20	Slough			0.0			Bottom of boring at 20' bgs	20

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 30

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST29-MW-103	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/23/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 2'			0.0			Recycled demo debris	
		S1		0.0				
				0.0			Moist, grayish brown, SAND (SW); fine to coarse sand	
	10/20 pre-pack Silica sand filter pack 2' to 13'						No recovery	
5								5
							Moist, gray brown, SAND (SW); fine to coarse sand	
				0.0			Moist, brown SAND (SP); fine to medium sand, trace silt	
				0.0				
		S2					No recovery	
	2" Diameter PVC pre-packed 10-slot screen 3' to 13'							
10								10
	▽4/23/2014			0.0			Moist, brown SAND (SP); fine to medium sand, trace silt Becomes wet, trace gravel	
				0.0				
		S3		0.0				
	Threaded cap							
				0.0			Wet, brown SAND (SW); fine to coarse sand, trace silt, trace fine gravel	
				0.0				
15	Slough							15
							Bottom of boring at 15' bgs Dark gray crushed rock	

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 31

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST70-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/24/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 2' to 4'	S1		0.0 0.0 0.0			Moist, brown SAND (SP); fine to medium sand Moist, brown, slightly silty SAND (SP-SM); fine to medium sand Moist, brown, gravelly SAND (SP); coarse crushed gravel, fine to medium sand No recovery	
5	10/20 pre-pack Silica sand filter pack 4' to 15' 4/24/2014	S2		0.0 0.0 0.0			Moist, red and brown mottled SAND (SP); fine to medium sand Crushed rock Wet, gray, sandy SILT (ML); fine sand No recovery	5
10	2" Diameter PVC pre-packed 10-slot screen 5' to 15'	S3		0.0 0.0 0.0 0.0			Wet, gray, slightly gravelly SAND (SP); fine to medium sand, fine gravel No recovery	10
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- No Recovery
- Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- Static Water Level
- Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 32

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST70-MW-102	1 of 1

Project Name: Kimberly Clark
Ground Surface Elev.:
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Depth to Water (ft BGS):
Sampling Method: Continuous Core
Start/Finish Date: 4/24/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Moist, brown SAND (SP); fine to medium sand,	
				0.0			3" pocket of silty sand	
							3" pocket of crushed rock artificial fill	
		S1		0.0			No recovery	
	3/8" Hydrated bentonite chips 2' to 4'							
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5								5
				0.0			Moist, brown, gravelly SAND (SP); fine to medium sand, fine gravel, woodchips	
				0.0				
	4/24/2014	S2		0.0			Wet, gray, gravelly, sandy SILT (ML); fine sand and gravel	
							No recovery	
10	2" Diameter PVC pre-packed 10-slot screen 5' to 15'							10
				0.0			Wet, gray, gravelly, sandy SILT (ML); fine sand and gravel	
				0.0				
		S3		0.0			Wet, gray, gravelly SAND (SP); fine to medium sand, predominantly medium sand, fine gravel	
				0.0				
							No recovery	
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 33

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST71-MW-101	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/24/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Moist, brown SAND (SP); fine to medium sand	
				0.0				
		S1		0.0			Moist, brown, slightly silty SAND (SP-SM); fine to medium sand	
	3/8" Hydrated bentonite chips 2' to 4'						No recovery	
	10/20 pre-pack Silica sand filter pack 4' to 15'							
5							Moist, brown, silty SAND (SM)	5
				0.0				
				0.0			Moist, gray, sandy SILT (ML); fine sand, numerous wood chips	
		S2		0.0				
				0.0			Moist, gray SAND (SP); fine to medium sand, trace gravel	
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'						No recovery	
10	▽ 4/24/2014						Moist, gray SAND (SP); fine to medium sand, trace gravel	10
				0.0			Wet, brownish gray, sandy SILT (ML); fine to medium sand	
				0.0				
		S3		0.0			Wet, gray SAND (SP); fine to medium sand, trace gravel	
				0.0				
				0.0				
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 34

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST71-MW-102	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 2'			0.0			Moist, brown, SAND (SP); fine to medium sand, trace fine gravel	
				0.0			Silt lense, petroleum odor	
	3/8" Hydrated bentonite chips 2' to 4'	S1		29.5			No recovery	
5	▽ 4/25/2014 10/20 pre-pack Silica sand filter pack 4' to 15'			11.4			Wet, gray, sandy SILT (ML); fine sand, slight petroleum odor	5
				0.0			No odor	
	2" Diameter PVC pre-packed 10-slot screen 5' to 15'	S2		0.0				
				0.0			Wet, gray SAND (SP); fine to medium sand, rare seashells	
							No recovery	
10				0.0			Wet, gray SAND (SP) with scattered thing SILT (ML) inerbeds; fine to medium sand, rare seashells	10
	Threaded cap	S3		0.0				
				0.0				
				0.0				
							Refusal at 14' bgs	
15								15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 35

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST71-MW-103	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.:
Depth to Water (ft BGS):
Start/Finish Date: 4/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 5'	S1		0.0			Moist, brown SAND (SP); fine to medium sand, trace fine gravel	
				0.0			Crushed rock, crushed concrete	
				0.0			Wet, brown gray, slightly silty, gravelly SAND (SP-SM); fine to medium sand	
							No recovery	
5	▽ 4/25/2014							5
							Wet, brown gray, slightly silty, gravelly SAND (SP-SM); fine to medium sand	
	10/20 pre-pack Silica sand filter pack 6' to 12'			0.0			Moist to wet, black, fibrous organics/wood in sandy matrix	
	▼	S2		0.0			No recovery	
10	2" Diameter PVC pre-packed 10-slot screen 7' to 12'							10
							Moist to wet, black, fibrous organics/wood in sandy matrix	
				0.0			Wet, dark gray, sandy GRAVEL (GP); coarse sand, fine gravel	
	Threaded cap			0.0			Wet, dark gray and brown mottled SAND (SP); fine to medium sand	
				0.0			Brick fragments	
				0.0			Mild petroleum odor, and dark brown mottling	
15							Bottom of boring at 15' bgs	15

Sampler Type:
◯ No Recovery
▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
▼ Static Water Level
▽ Water Level (ATD)

Logged by: AET
Approved by: SJG
Figure No. A- 36

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

Boring Log

Aspect CONSULTING

Project Number	Boring Number	Sheet
110207	UST71-MW-104	1 of 1

Project Name: Kimberly Clark
Location: Everett, WA
Driller/Method: Holt / Direct Push Probe-Limited Access
Sampling Method: Continuous Core

Ground Surface Elev.
Depth to Water (ft BGS)
Start/Finish Date 4/25/2014

Depth / Elevation (feet)	Borehole Completion	Sample Type/ID	Tests	PID (ppm)	Blows/ 6"	Material Type	Description	Depth (ft)
	8" Flush-mount monument and thermos cap Concrete surface seal 0' to 1' 3/8" Hydrated bentonite chips 1' to 4'	S1		0.0 0.0			Moist, brown SAND (SP); fine to medium sand, trace fine gravel Wet, brown, slightly silty SAND (SP-SM); fine to medium sand No recovery	
5	10/20 pre-pack Silica sand filter pack 14' to 15' 2" Diameter PVC pre-packed 10-slot screen 5' to 15'	S2		0.0 0.0 0.0			Wet, brown, slightly silty SAND (SP-SM); fine to medium sand Very moist, dark brown, slightly gravelly SAND (SP); trace silt No recovery	5
10	▽ 4/25/2014	S3		0.0 0.0 0.0 0.0			Very moist, dark brown, slightly gravelly SAND (SP); trace silt Wet, gray, slightly gravelly SAND (SW); fine to coarse sand, fine gravel, numerous shells Grades to wet, gray, slightly gravelly SAND (SP); fine to medium sand, fine gravel, numerous shells	10
15	Threaded cap						Bottom of boring at 15' bgs	15

Sampler Type:
- ◯ No Recovery
- ▌▌ Continuous Core

PID - Photoionization Detector (Headspace Measurement)
- ▼ Static Water Level
- ▽ Water Level (ATD)

Logged by: AET/MML
Approved by: SJG
Figure No. A- 37

_ENV BORING LOG KIMBERLY CLARK-EVERETT.GPJ July 31, 2014

APPENDIX B

Data Validation Reports

DATA VALIDATION REPORT

Kimberly Clark Worldwide Site Upland Area
Interim Action Confirmational Groundwater Monitoring
May 2014
SDGs 405224, 405255, 405285, 405290, 405253, 405254, K1404940, K1405926, K1409540

Prepared by:
Aspect Consulting, LLC
401 Second Ave South, Suite 201
Seattle, WA 98104

Project No. 110207 • October 7, 2014

V:\110207 KC Everett Mill\Deliverables\Confirmational GW Monitoring Report\App B\KC IA May 2014 Data Validation.docx

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for groundwater samples collected during May 12 through 15, 2014 for Kimberly Clark Worldwide Upland Site Interim Action Confirmational Groundwater Monitoring. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section. The metals data were sent to a separate lab for analysis, and are presented in Sections 8, 9, and 10 at the end of the report.

Samples were analyzed for non-metals analytes by Friedman & Bruya, Inc in Seattle, Washington, and for metals analytes by ALS Environmental in Kelso, Washington. The analytical methods are summarized below:

Analysis	Method	Laboratory
Polycyclic Aromatic Hydrocarbons (PAHs)	SW8270D-SIM	Friedman & Bruya, Inc
TPH - Gasoline Range and BTEX[1]	NWTPH-Gx/EPA 8021B	Friedman & Bruya, Inc
TPH - Diesel and Motor Oil Ranges	NWTPH-Dx	Friedman & Bruya, Inc
Total and Dissolved Metals	EPA 200.8	ALS
Total and Dissolved Mercury	EPA 1631E	ALS

The validation followed the procedures documented in the analytical methods, the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013), *National Functional Guidelines for Organic Data Review* (USEPA, 1999), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004).

Data assigned a J qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be taken into account when interpreting sample concentrations. Data marked as do-not-report (DNR) should not be used under any circumstances. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. A qualified laboratory electronic data deliverable (EDD) is also submitted with this report.

[1] BTEX = benzene, toluene, ethylbenzene, and xylenes

2 Data Validation Findings for SDG 405224

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte									
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead	Nickel	Zinc
BBH-MW101-051214	5/12/2014	GrWtr					x	x*	x*	x		x
BBH-MW102-051214	5/12/2014	GrWtr					x	x	x*	x		x
RCD-MW101-051214	5/12/2014	GrWtr	x			x	x	x	x*		x*	
SHB-MW101-051214	5/12/2014	GrWtr	x	x	x	x	x*		x*			
SHB-MW102-051214	5/12/2014	GrWtr	x	x	x	x	x		x			
UST70-MW101-051214	5/12/2014	GrWtr	x			x		x	x		x	x
UST70-MW102-051214	5/12/2014	GrWtr	x			x		x	x		x	x
UST70-MW2-051214	5/12/2014	GrWtr	x			x		x	x		x	x
UST71-MW101-051214	5/12/2014	GrWtr	x			x			x			x
UST71-MW102-051214	5/12/2014	GrWtr	x			x			x			x
UST71-MW104-051214	5/12/2014	GrWtr	x			x			x			x
UST71-MW500-051214	5/12/2014	GrWtr	x			x			x			x

* = Total and dissolved metals analysis, otherwise only total metals

2.1 PAHs by SW8270-SIM

2.1.1 *Sample Receipt, Preservation, and Holding Times*

Water samples should be extracted within 7 days of collection and soil within 14 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees Celsius [C]), and holding times were acceptable.

2.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

2.1.3 *Surrogates*

All surrogate spike recoveries were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No data qualification was necessary.

2.1.4 *Laboratory Control Samples (LCS/LCSD)*

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) percent recovery (%R) and relative percent difference (RPD) were within the project control limits.

2.1.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

Matrix spike (MS) and matrix spike duplicate (MSD) %R and RPD were within the project control limits.

2.1.6 *Field Duplicates*

Field duplicates are an indication of both field and laboratory precision. According to the EPA National Functional Guidelines, there are no set criteria for field duplicate evaluation, but the following advisory criteria were used. For results greater than or equal to the analytical reporting limit (RL), the advisory RPD is 35%. For results <5 times the RL, the difference between the sample and the duplicate should be <RL.

One set of blind field duplicates was submitted for this analysis, UST71-MW104-051214 and UST71-MW500-051214. The RPD for the field duplicate pair was within the control limits specified above.

2.1.7 *Reported Results and Reporting Limits (RL)*

The results for acenaphthene and fluorene in sample UST70-MW102-051214 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as do-not-report (DNR) in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The reporting limits outlined in the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013) were met or were elevated accordingly due to high concentrations of target analytes.

2.1.8 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B and EPA 8021B

2.2.1 *Sample Receipt, Preservation, and Holding Times*

Soil and water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

2.2.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

2.2.3 *Surrogates*

All %R were within control limits.

2.2.4 *Laboratory Control Samples (LCS)*

LCS %R and RPD were within the project control limits.

2.2.5 *Laboratory Duplicates*

For laboratory duplicate results that are greater than the RL, the RPD control limit is 20%. For laboratory duplicate results less than 5 times the RL, the difference between the sample and duplicate must be less than the reporting limit.

RPD values met the control criteria for laboratory duplicates.

2.2.6 *Field Duplicates*

One set of blind field duplicates was submitted, UST71-MW104-051214 and UST71-MW500-051214. All RPD were within the control limits.

2.2.7 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

2.2.8 *Overall Assessment*

Accuracy was acceptable based on the LCS recoveries, and precision was acceptable based on the laboratory and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.3 Diesel- and Oil-Range TPH by NWTPH-Dx

2.3.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable (see Section 2.1.1).

2.3.2 *Method Blanks*

Target analytes were not detected at or above RLs in the method blanks.

2.3.3 *Surrogates*

All %R were within control limits or were not applicable due to sample matrix interference.

2.3.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

2.3.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

2.3.6 *Field Duplicates*

One set of blind field duplicates was submitted, UST71-MW104-051214 and UST71-MW500-051214. All RPD were within the control limits.

2.3.7 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

2.3.8 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3 Data Validation Findings for SDG 405255

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte									
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead	Nickel	Zinc
BA6-MW101-051314	5/12/2014	GrWtr	x			x						
BBH-MW103-051314	5/12/2014	GrWtr					x*	x*	x*	x		x
BBH-MW104-051314	5/12/2014	GrWtr					x	x*	x*	x		x*
BCT-MW101-051314	5/12/2014	GrWtr	x	x	x	x	x		x	x		
BCT-MW104-051314	5/12/2014	GrWtr	x	x	x	x	x		x	x		
BCT-MW500-051314	5/12/2014	GrWtr	x	x	x	x	x		x	x		
UST71-MW103-051314	5/12/2014	GrWtr	x			x			x*			x*

* = Total and dissolved metals analysis, otherwise only total metals

3.1 PAHs by SW8270-SIM

3.1.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

3.1.3 *Surrogates*

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No qualification of the results was necessary.

3.1.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

3.1.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

3.1.6 *Field Duplicates*

One set of blind field duplicates was submitted, BCT-MW104-051314 and BCT-MW500-051314. All RPD were within the control limits.

3.1.7 *Reported Results and Reporting Limits (RL)*

The results for naphthalene, acenaphthene and fluorene in sample UST71-MW103-051314 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The result for acenaphthene in sample BA6-MW101-051314 also exceeded the linear range and was qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

3.1.8 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries and precision was acceptable based on the MS/MSD, LCS/LCSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

3.2.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.2.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

3.2.3 *Surrogates*

All %R were within control limits.

3.2.4 *Laboratory Control Samples (LCS)*

LCS %R and RPD were within the project control limits.

3.2.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

3.2.6 *Field Duplicates*

One set of blind field duplicates was submitted, BCT-MW104-051314 and BCT-MW500-051314. All RPD were within the control limits.

3.2.7 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

3.2.8 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3.3 Diesel- and Oil-Range TPH by NWTPH-Dx

3.3.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.3.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

3.3.3 *Surrogates*

All %R were within control limits.

3.3.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

3.3.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

3.3.6 *Field Duplicates*

One set of blind field duplicates was submitted, BCT-MW104-051314 and BCT-MW500-051314. All RPD were within the control limits.

3.3.7 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

3.3.8 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4 Data Validation Findings for SDG 405285

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte							
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead
BCT-MW105-051414	5/14/2014	GrWtr	x	x	x	x	x		x	x
BCT-MW106-051414	5/14/2014	GrWtr	x	x	x	x	x		x*	x
CN-MW101-051414	5/14/2014	GrWtr	x			x		x	x*	x
CN-MW102-051414	5/14/2014	GrWtr	x			x		x	x	x
CN-MW103-051414	5/14/2014	GrWtr	x			x		x	x	x
CN-MW104-051414	5/14/2014	GrWtr	x			x		x	x*	x
DAST-MW101-051414	5/14/2014	GrWtr	x			x	x		x	
GF11-MW101-051414	5/14/2014	GrWtr					x		x	x
HBV-MW101-051414	5/14/2014	GrWtr	x			x				
UST29-MW101-051414	5/14/2014	GrWtr	x	x	x	x				
UST29-MW102-051414	5/14/2014	GrWtr	x	x	x	x				
UST29-MW103-051414	5/14/2014	GrWtr	x	x	x	x				

* = Total and dissolved metals analysis, otherwise only total metals

4.1 PAHs by SW8270-SIM

4.1.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

4.1.3 *Surrogates*

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No qualification of the results was necessary.

4.1.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

4.1.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

There were no MS/MSD associated with this SDG.

4.1.6 *Reported Results and Reporting Limits (RL)*

The results for acenaphthene in sample BCT-MW105-051414 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as do-not-report (DNR) in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The results for fluorene and acenaphthene in sample DAST-MW101-051414 also exceeded the linear range and was qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

4.1.7 *Overall Assessment*

Accuracy was acceptable based on the LCS and surrogate spike recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

4.2.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.2.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

4.2.3 *Surrogates*

All %R were within control limits.

4.2.4 *Laboratory Control Samples (LCS)*

LCS %R and RPD were within the project control limits.

4.2.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

There were no MS/MSD associated with this SDG.

4.2.6 *Laboratory Duplicates*

All RPD were within the control limits.

4.2.7 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

4.2.8 *Overall Assessment*

Accuracy was acceptable based on the LCS and surrogate spike recoveries, and precision was acceptable based on the laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4.3 Diesel- and Oil-Range TPH by NWTPH-Dx

4.3.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.3.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

4.3.3 *Surrogates*

All percent recoveries were within control limits or were at levels that had no adverse effects on data quality.

4.3.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

4.3.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

There were no MS/MSD associated with this SDG.

4.3.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

4.3.7 *Overall Assessment*

Accuracy was acceptable based on the LCS and surrogate spike recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

5 Data Validation Findings for SDG 405290

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte						
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Mercury	Copper	Lead
BCT-MW102-051514	5/15/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW103-051514	5/15/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW107-051514	5/15/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW108-051514	5/15/2014	GrWtr	x	x	x	x	x	x*	x

* = Total and dissolved metals analysis

5.1 PAHs by SW8270-SIM

5.1.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

5.1.3 *Surrogates*

All surrogate spike %R were within control limits or were not applicable due to sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No qualification of the results was necessary.

5.1.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

5.1.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

There were no MS/MSD associated with this SDG.

5.1.6 *Reported Results and Reporting Limits (RL)*

The results for naphthalene and acenaphthene in sample BCT-MW107-051514 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as do-not-report (DNR) in the undiluted sample. The remaining analytes were reported from the undiluted sample.

Naphthalene, acenaphthene, and fluorene in BCT-MW108-051514 and acenaphthene in BCT-MW103-051514 exceeded the linear range and were qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

5.1.7 *Overall Assessment*

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

5.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

5.2.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.2.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

5.2.3 *Surrogates*

All %R were within control limits.

5.2.4 *Laboratory Control Samples (LCS)*

LCS %R and RPD were within the project control limits.

5.2.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

5.2.6 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

5.2.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

5.3 Diesel- and Oil-Range TPH by NWTPH-Dx

5.3.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.3.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

5.3.3 *Surrogates*

All %R were within control limits.

5.3.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

5.3.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

There were no MS/MSD associated with this SDG.

5.3.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

5.3.7 *Overall Assessment*

Accuracy was acceptable based on the surrogate spike and laboratory control sample recoveries and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6 Data Validation Findings for SDG 405253

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte			
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs
NRP-MW2-051314	5/13/2014	GrWtr	x	x	x	x
NRU-MW101-051314	5/13/2014	GrWtr	x	x	x	x
NRU-MW102-051314	5/13/2014	GrWtr	x	x	x	x

6.1 PAHs by SW8270-SIM

6.1.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

6.1.3 *Surrogates*

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference. No qualification of the results was necessary.

6.1.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

6.1.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

6.1.6 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

6.1.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

6.2.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.2.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

6.2.3 *Surrogates*

All %R were within control limits or were at levels that had no adverse effects on data quality.

6.2.4 *Laboratory Control Samples (LCS)*

LCS %R and RPD were within the project control limits.

6.2.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

6.2.6 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

6.2.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

6.3 Diesel- and Oil-Range TPH by NWTPH-Dx

6.3.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.3.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

6.3.3 *Surrogates*

All %R were within control limits or were at levels that had no adverse effects on data quality.

6.3.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

6.3.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

6.3.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

6.3.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

7 Data Validation Findings for SDG 405254

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte			
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs
NRS-MW101-051314	5/13/2014	GrWtr	x	x	x	x
NRS-MW102-051314	5/13/2014	GrWtr	x	x	x	x

7.1 PAHs by SW8270-SIM

7.1.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

7.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

7.1.3 *Surrogates*

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference. No qualification of the results was necessary.

7.1.4 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

7.1.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

7.1.6 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

7.1.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

7.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

7.2.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

7.2.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

7.2.3 *Surrogates*

All percent recoveries were within control limits or were at levels that had no adverse effects on data quality.

7.2.4 *Laboratory Control Samples (LCS)*

LCS %R and RPD were within the project control limits.

7.2.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

7.2.6 *Reported Results and Reporting Limits (RL)*

All reporting limits were met as outlined in the QAPP.

7.2.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

7.3 Diesel- and Oil-Range TPH by NWTPH-Dx

7.3.1 *Sample Receipt, Preservation, and Holding Times*

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

7.3.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

7.3.3 *Surrogates*

All %R were within control limits.

7.3.4 *Laboratory Control Samples (LCS)*

LCS and LCSD %R and RPD were within the project control limits.

7.3.5 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

7.3.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

7.3.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

8 Data Validation Findings for SDG K1404940 (Metals Analysis)

In accordance with the QAPP, the groundwater samples were submitted to ALS in Kelso, Washington, for metals analyses, as they have particular expertise performing trace metals analyses in saline water matrices. Friedman and Bruya combined groundwater samples from multiple SDGs into a single batch for transfer to ALS. The specific metals analytes for each sample in this ALS SDG are tabulated in the preceding sections. The sections below describe the results of the data quality review, separated into mercury and the other metals.

8.1 Mercury by EPA 1631E

8.1.1 *Sample Receipt, Preservation, and Holding Times*

Water samples should be analyzed within 28 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

8.1.2 *Method Blanks*

Target analytes were either not detected at or above the reporting levels in the method blanks, except for one method blank associated with sample BBH-MW103-051314. The result was greater than 10 times the blank concentration so no qualification was required.

8.1.3 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

8.1.4 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

8.1.5 *Field Duplicates*

One set of blind field duplicates was submitted, BCT-MW101-051314 and BCT-MW500-051314. All RPD were within the control limits specified above.

8.1.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

8.1.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries and precision was acceptable based on the LCS/LCSD, MS/MSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

8.2 Total Metals by EPA 200.8 and 6010C

Depending on the well, groundwater samples were analyzed for arsenic, copper, lead, nickel, and/or zinc.

8.2.1 *Sample Receipt, Preservation, and Holding Times*

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable, with the following exceptions. Six of the coolers were received at a temperature below 2 degrees C, but no action was taken as this did not affect the data quality. Sample bottles from BCT-MW102-051514 (1 of 2 totals) and UST71-MW103-051314 (2 of 2 totals) were received at pH >2, but had sufficient nitric acid added by the lab to achieve the pH requirements within 2 weeks of collection as outlined in the method (USEPA, 1994). Therefore, no data qualifiers are assigned.

To reduce the analytical interferences due to high concentrations of dissolved solids, samples identified as having high specific conductance in the field (UST70-MW2-051214 and RCD-MW101-051214) were prepared by the reductive precipitation method (USEPA, 1997).

8.2.2 *Method Blanks*

Target analytes were either not detected at or above the reporting levels in the method blanks, or sample results were greater than 10 times the detection in the blank.

8.2.3 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

8.2.4 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

8.2.5 *Laboratory Duplicates*

All RPD were either within the control limits or the control limits were not applicable.

8.2.6 *Field Duplicates*

Two sets of blind field duplicates were submitted, BCT-MW101-051314 and BCT-MW500-051314; and UST71-MW104-051214 and UST71-MW500-051214. All RPD were within the control limits specified above.

8.2.7 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

8.2.8 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the laboratory and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

9 Data Validation Findings for SDG K1405926 (Metals Analysis)

In accordance with the QAPP, the groundwater samples were submitted to ALS in Kelso, Washington, for metals analyses, as they have particular expertise performing trace metals analyses in saline water matrices. Friedman and Bruya combined groundwater samples from multiple SDGs into a single batch for transfer to ALS. The specific metals analytes for each sample in this ALS SDG are tabulated in the preceding sections. Based on the results of the total metals analysis (reviewed in Section 8), certain samples were analyzed for dissolved metals. The sections below describe the results of the data quality review, separated into dissolved mercury and the other dissolved metals.

9.1 Dissolved Mercury by EPA 1631E

9.1.1 *Sample Receipt, Preservation, and Holding Times*

Water samples should be analyzed within 28 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

9.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

9.1.3 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

9.1.4 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

9.1.5 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

9.1.6 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the LCS/LCSD, MS/MSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

9.2 Dissolved Metals by EPA 200.8 and 6010C

9.2.1 *Sample Receipt, Preservation, and Holding Times*

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable. Sample bottles from UST71-MW103-051314 (1 of 2 dissolved) were received at pH >2, but had sufficient nitric acid added by the lab to achieve the pH requirements within 2 weeks of collection as outlined in the method (USEPA, 1994). Therefore, no data qualifiers are assigned.

To reduce the analytical interferences due to high concentrations of dissolved solids, samples identified as having high specific conductance in the field (RCD-MW101-051214) were prepared by the reductive precipitation method (USEPA, 1997).

9.2.2 *Method Blanks*

Target analytes were either not detected at or above the reporting levels in the method blanks, or sample results were greater than 10 times the detection in the blank.

9.2.3 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

9.2.4 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

9.2.5 *Laboratory Duplicates*

All RPD were either within the control limits or the control limits were not applicable.

9.2.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

9.2.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the LCS/LCSD, MS/MSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

10 Data Validation Findings for SDG K1409540 (Metals Analysis)

In accordance with the QAPP, the groundwater samples were submitted to ALS in Kelso, Washington, for metals analyses, as they have particular expertise performing trace metals analyses in saline water matrices. Friedman and Bruya combined groundwater samples from multiple SDGs into a single batch for transfer to ALS. The specific metals analytes for each sample in this ALS SDG are tabulated in the preceding sections. Based on the results of the total metals analysis (reviewed in Section 8), certain samples were later analyzed for dissolved metals. The section below describes the results of the data quality review for supplemental dissolved metals analyses.

10.1 Dissolved Metals by EPA 200.8 and 6010C

10.1.1 *Sample Receipt, Preservation, and Holding Times*

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable. Dissolved metals analyses were not completed for samples UST71-MW101-051214 and UST71-MW102-051214 because field filtered sample bottles were not submitted.

10.1.2 *Method Blanks*

Target analytes were not detected at or above the reporting levels in the method blanks.

10.1.3 *Laboratory Control Samples (LCS/LCSD)*

LCS and LCSD %R and RPD were within the project control limits.

10.1.4 *Matrix Spike/Matrix Spike Duplicates (MS/MSD)*

MS and MSD %R and RPD were within the project control limits.

10.1.5 *Laboratory Duplicates*

All RPD were either within the control limits or the control limits were not applicable.

10.1.6 *Reported Results and Reporting Limits (RL)*

All target RLs were met as outlined in the QAPP.

10.1.7 *Overall Assessment*

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the LCS/LCSD and laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

11 Qualified Data Summary

Qualified Data Summary Table

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
UST70-MW102-051214 DAST-MW101-051414	405224-01 405285-11	Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
UST71-MW103-051314 BCT-MW108-051514	405255-05 405290-02	Naphthalene Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
BA6-MW101-051314 BCT-MW105-051414 BCT-MW103-051514	405255-08 405285-10 405290-04	Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
BCT-MW107-051514	405290-01	Naphthalene Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Phenanthrene Fluorene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene	DNR	A more appropriate result is reported. Use undiluted result.

Data Qualifier Definitions

Data Qualifier	Definition
DNR	Do not report; the result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.
X	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

12 References

U.S. Environmental Protection Agency (USEPA), 1994, Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry, Revision 5.4, Environmental Monitoring Systems Laboratory Office of Research and Development.

U.S. Environmental Protection Agency (USEPA), 1997, Method 1640 Determination of Trace Elements in Waters by Preconcentration and Inductively Coupled Plasma – Mass Spectrometry, Office of Water & Office of Science and Technology Engineering and Analysis Division (4303), April.

U.S. Environmental Protection Agency (USEPA), 1999, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Emergency and Remedial Response, USEPA Publication No. 540/R-99/008, October.

U.S. Environmental Protection Agency (USEPA), 2004, Contract Laboratory Program National Functional Guidelines for Organic Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA Publication No. 540-R-04-004, October.

Aspect, 2013, Work Plan for Remedial Investigation/Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013.

DATA VALIDATION REPORT

Kimberly Clark Worldwide Site Upland Area
Interim Action Confirmational Groundwater Monitoring
August 2014
SDGs 408183, 408213, 408237, 408211, 408212, K1408718

Prepared by:
Aspect Consulting, LLC
401 Second Ave South, Suite 201
Seattle, WA 98104

Project No. 110207 • October 7, 2014

S:\Kimberly Clark\Everett Mill 110207\Data\Lab Data\Interim Action\Confirmational GW Monitoring\Data Validation\KC IA August 2014 Data Validation.docx

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for groundwater samples collected during August 11 through 14, 2014 for Kimberly Clark Worldwide Upland Site Interim Action Confirmational Groundwater Monitoring. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section. The metals data were sent to a separate lab for analysis, and are presented in Sections 7 at the end of the report.

Samples were analyzed for non-metals analytes by Friedman & Bruya, Inc in Seattle, Washington, and for metals analytes by ALS Environmental in Kelso, Washington. The analytical methods are summarized below:

Analysis	Method	Laboratory
Polycyclic Aromatic Hydrocarbons (PAHs)	SW8270D-SIM	Friedman & Bruya, Inc
TPH - Gasoline Range and BTEX[1]	NWTPH-Gx/EPA 8021B	Friedman & Bruya, Inc
TPH - Diesel and Motor Oil Ranges	NWTPH-Dx	Friedman & Bruya, Inc
Total and Dissolved Metals	EPA 200.8	ALS
Total and Dissolved Mercury	EPA 1631E	ALS

The validation followed the procedures documented in the analytical methods, the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013), *National Functional Guidelines for Organic Data Review* (USEPA, 1999), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004).

Data assigned a J qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be taken into account when interpreting sample concentrations. Data marked as do-not-report (DNR) should not be used under any circumstances. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. A qualified laboratory electronic data deliverable (EDD) is also submitted with this report.

[1] BTEX = benzene, toluene, ethylbenzene, and xylenes

2 Data Validation Findings for SDG 408183

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte								
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Diss Arsenic	Diss Copper	Diss Nickel	Diss Mercury	Diss Zinc
UST71-MW102-081114	8/11/2014	GrWtr	x			x		x			x
UST70-MW101-081114	8/11/2014	GrWtr	x			x	x	x	x		x
UST70-MW102-081114	8/11/2014	GrWtr	x			x	x	x	x		x
BA6-MW101-081114	8/11/2014	GrWtr	x			x					
UST70-MW2-081114	8/11/2014	GrWtr	x			x	x	x	x		x
RCD-MW101-081114	8/11/2014	GrWtr	x			x	x	x	x	x	
SHB-MW101-081114	8/11/2014	GrWtr	x	x	x	x		x		x	
SHB-MW102-081114	8/11/2014	GrWtr	x	x	x	x		x		x	
UST71-MW104-081114	8/11/2014	GrWtr	x			x		x			x
UST71-MW500-081114	8/11/2014	GrWtr	x			x		x			x

2.1 PAHs by SW8270-SIM

2.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection and soil within 14 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees Celsius [C]), and holding times were acceptable. Sample UST71-MW500-081114 was incorrectly labeled as UST70-MW500-081114 in the lab report, but is correctly named in the EDD.

2.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.1.3 Surrogates

All surrogate spike recoveries were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No data qualification was necessary.

2.1.4 Laboratory Control Samples (LCS/LCSD)

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) percent recovery (%R) and relative percent difference (RPD) were within the project control limits.

2.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Matrix spike (MS) and matrix spike duplicate (MSD) %R and RPD were within the project control limits, except for benzo(a)pyrene in sample UST71-MW104-081114. This sample had MS and MSD %R values of 58% and 59%, which was below the acceptance criteria of 60-86%. This result was flagged as UJ.

2.1.6 Field Duplicates

Field duplicates are an indication of both field and laboratory precision. According to the EPA National Functional Guidelines, there are no set criteria for field duplicate evaluation, but the following advisory criteria were used. For results greater than or equal to the analytical reporting limit (RL), the advisory RPD is 35%. For results <5 times the RL, the difference between the sample and the duplicate should be <RL.

One set of blind field duplicates was submitted for this analysis, UST71-MW104-081114 and UST71-MW500-081114. The RPD for the field duplicate pair was within the control limits specified above.

2.1.7 Reported Results and Reporting Limits (RL)

The results for acenaphthene and fluorene in sample BA6-MW101-081114 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as do-not-report (DNR) in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The results for naphthalene, acenaphthene and fluorene in sample SHB-MW101-081114 also exceeded the linear range and were qualified in the same manner.

The reporting limits outlined in the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013) were met or were elevated accordingly due to high concentrations of target analytes.

2.1.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

2.2.1 Sample Receipt, Preservation, and Holding Times

Soil and water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable. Sample UST71-MW500-081114 was incorrectly labeled as UST70-MW500-081114 in the lab report, but is correctly named in the EDD.

2.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.2.3 Surrogates

All %R were within control limits.

2.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

2.2.5 Laboratory Duplicates

For laboratory duplicate results that are greater than the RL, the RPD control limit is 20%. For laboratory duplicate results less than 5 times the RL, the difference between the sample and duplicate must be less than the reporting limit.

RPD values met the control criteria for laboratory duplicates.

2.2.6 Field Duplicates

One set of blind field duplicates was submitted, UST71-MW104-081114 and UST71-MW500-081114. All RPD were within the control limits specified above.

2.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP (Quality Assurance Project Plan).

2.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the lab and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.3 Diesel- and Oil-Range TPH by NWTPH-Dx

2.3.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable (see Section 2.1.1). Sample UST71-MW500-081114 was incorrectly labeled as UST70-MW500-081114 in the lab report, but is correctly named in the EDD.

2.3.2 Method Blanks

Target analytes were not detected at or above RLs in the method blanks.

2.3.3 Surrogates

All percent recoveries were within control limits or were at levels that had no adverse effects on data quality.

2.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

2.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

2.3.6 Field Duplicates

One set of blind field duplicates was submitted, UST71-MW104-081114 and UST71-MW500-081114. All RPD were within the control limits specified above.

2.3.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

2.3.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3 Data Validation Findings for SDG 408213

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte								
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Diss Arsenic	Diss Copper	Diss Lead	Diss Mercury	Diss Zinc
BBH-MW102-081214	8/12/2014	GrWtr					x	x	x	x	x
BBH-MW101-081214	8/12/2014	GrWtr					x	x	x	x	x
UST71-MW-103-081214	8/12/2014	GrWtr	x			x		x			x
UST71-MW-101-081214	8/12/2014	GrWtr	x			x		x			x
BCT-MW-104-081214	8/12/2014	GrWtr	x	x	x	x		x	x	x	
CN-MW-101-081214	8/12/2014	GrWtr	x			x	x	x	x		
CN-MW-102-081214	8/12/2014	GrWtr	x			x	x	x	x		
CN-MW-103-081214	8/12/2014	GrWtr	x			x	x	x	x		
BCT-MW-103-081214	8/12/2014	GrWtr	x		x	x		x	x	x	
CN-MW-104-081214	8/12/2014	GrWtr	x			x	x	x	x		
UST29-MW-101-081314	8/13/2014	GrWtr	x	x	x	x					
UST29-MW-102-081314	8/13/2014	GrWtr	x	x	x	x					
UST29-MW-103-081314	8/13/2014	GrWtr	x	x	x	x					
BBH-MW103-081314	8/13/2014	GrWtr					x	x	x	x	x
BBH-MW104-081314	8/13/2014	GrWtr					x	x	x	x	x
GF11-MW101-081314	8/13/2014	GrWtr						x	x	x	
HBV-MW-101-081314	8/13/2014	GrWtr	x			x					
DAST-MW-101-081314	8/13/2014	GrWtr	x			x		x		x	
BCT-MW-106-081314	8/13/2014	GrWtr	x	x	x	x		x	x	x	
BCT-MW-105-081314	8/13/2014	GrWtr	x	x	x	x		x	x	x	

3.1 PAHs by SW8270-SIM

3.1.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No qualification of the results was necessary.

3.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

3.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

3.1.6 Reported Results and Reporting Limits (RL)

The results for naphthalene and phenanthrene in sample UST71-MW-103-081214 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as do-not-report (DNR) in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The result for acenaphthene in sample BCT-MW-103-081214 also exceeded the linear range and was qualified in the same manner.

The results for acenaphthene and fluorene in sample DAST-MW-101-081314 also exceeded the linear range and were qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

3.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

3.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

3.2.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.2.3 Surrogates

All %R were within control limits.

3.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

3.2.5 Laboratory Duplicates

RPD values met the control criteria for laboratory duplicates.

3.2.6 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

3.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

3.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3.3 Diesel- and Oil-Range TPH by NWTPH-Dx

3.3.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.3.3 Surrogates

All %R were within control limits.

3.3.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

3.3.5 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

3.3.6 Overall Assessment

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4 Data Validation Findings for SDG 408237

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte						
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs	Diss Copper	Diss Lead	Diss Mercury
BCT-MW108-081414	8/14/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW107-081414	8/14/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW102-081414	8/14/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW101-081414	8/14/2014	GrWtr	x	x	x	x	x	x	x
BCT-MW500-081414	8/14/2014	GrWtr	x	x	x	x	x	x	x

4.1 PAHs by SW8270-SIM

4.1.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No qualification of the results was necessary.

4.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

4.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, except for benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene in sample BCT-MW101-081414, which exceeded the RPD control limit of 20% and had %R below the lower control limit for the MS. These results were flagged as UJ. The MS %R for phenanthrene in this sample fell below the control limit, but because the MSD %R was acceptable and the RPD, no action was taken.

4.1.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-081414 and BCT-MW500-081414. All RPD were within the control limits specified above.

4.1.7 Reported Results and Reporting Limits (RL)

The results for naphthalene, acenaphthene, and phenanthrene in sample BCT-MW108-081414 exceeded the instrument calibration range, requiring the sample to be diluted and

re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The results for naphthalene and acenaphthene in sample BCT-MW107-081414 also exceeded the linear range and was qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

4.1.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

4.2.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.2.3 Surrogates

All %R were within control limits.

4.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

4.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

4.2.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-081414 and BCT-MW500-081414. All RPD were within the control limits specified above.

4.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

4.2.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4.3 Diesel- and Oil-Range TPH by NWTPH-Dx

4.3.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.3.3 Surrogates

All %R were within control limits.

4.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

4.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, except for the diesel range hydrocarbon results in sample BCT-MW101-081414, which exceeded the RPD control limit of 20% with a value of 22%. This result was flagged as UJ.

4.3.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-081414 and BCT-MW500-081414. All RPD were within the control limits specified above.

4.3.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

4.3.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

5 Data Validation Findings for SDG 408211

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte			
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs
NRS-MW-102-081214	8/12/2014	GrWtr	x	x	x	x
NRS-MW-101-081214	8/12/2014	GrWtr	x	x	x	x

5.1 PAHs by SW8270-SIM

5.1.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference. No qualification of the results was necessary.

5.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

5.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

5.1.6 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

5.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

5.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

5.2.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.2.3 Surrogates

All %R were within control limits.

5.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

5.2.5 Laboratory Duplicates

RPD values met the control criteria for laboratory duplicates.

5.2.6 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

5.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP (Quality Assurance Project Plan).

5.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the MS/MSD and laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

5.3 Diesel- and Oil-Range TPH by NWTPH-Dx

5.3.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.3.3 Surrogates

All %R were within control limits.

5.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

5.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD submitted with this SDG.

5.3.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

5.3.7 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6 Data Validation Findings for SDG 408212

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte			
			TPH-Dx	TPH-Gx	BTEX	Low Level PAHs
NRU-MW-102-081214	8/12/2014	GrWtr	x	x	x	x
NRP-MW-2-081214	8/12/2014	GrWtr	x	x	x	x
NRU-MW-101-081214	8/12/2014	GrWtr	x	x	x	x

6.1 PAHs by SW8270-SIM

6.1.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.1.3 Surrogates

All surrogate spike recoveries were within control limits or were not applicable due to sample matrix interference. No qualification of the results was necessary.

6.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

6.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

6.1.6 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP (Quality Assurance Project Plan).

6.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6.2 TPH-Gasoline and BTEX by NWTPH-Gx and EPA 8021B

6.2.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.2.3 Surrogates

All %R were within control limits.

6.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

6.2.5 Laboratory Duplicates

RPD values met the control criteria for laboratory duplicates.

6.2.6 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

6.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

6.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the MS/MSD and laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

6.3 Diesel- and Oil-Range TPH by NWTPH-Dx

6.3.1 Sample Receipt, Preservation, and Holding Times

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.3.3 Surrogates

All %R were within control limits.

6.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

6.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

6.3.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

6.3.7 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

7 Data Validation Findings for SDG K1408718 (Metals Analysis)

In accordance with the QAPP, the groundwater samples were submitted to ALS in Kelso, Washington, for metals analyses, as they have particular expertise performing trace metals analyses in saline water matrices. Friedman and Bruya combined groundwater samples from multiple SDGs into a single batch for transfer to ALS. The specific metals analytes for each sample in this ALS SDG are tabulated in the preceding sections. The sections below describe the results of the data quality review, separated into mercury and the other metals. The groundwater samples for metals analysis were field-filtered, therefore the results are reported as dissolved metals.

7.1 Dissolved Mercury by EPA 1631E

7.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 28 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

7.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

7.1.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

7.1.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

7.1.5 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-081414 and BCT-MW500-081414. All RPD were within the control limits specified above.

7.1.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP (Quality Assurance Project Plan).

7.1.7 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and field duplicates relative percent difference values. The data are of known quality and are acceptable for use as qualified.

7.2 Dissolved Metals by EPA 200.8 and 6010C

7.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable. Samples UST71-MW-102-081114 and UST71-MW-103-081214 were received at pH>2, but had sufficient nitric acid added by the lab to achieve the pH requirements within 2

weeks of collection as outlined in the method (USEPA, 1994). Therefore, no data qualifiers are assigned.

To reduce the analytical interferences due to high concentrations of dissolved solids, samples identified as having high specific conductance in the field (UST70-MW2-081114, RCD-MW101-081114, UST71-MW101-081214) were prepared by the reductive precipitation method (USEPA, 1997).

7.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

7.2.3 Laboratory Control Samples (LCS)

LCS and LCSD %R and RPD were within the project control limits.

7.2.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

7.2.5 Laboratory Duplicates

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

7.2.6 Field Duplicates

Two sets of blind field duplicates was submitted, BCT-MW101-081414 and BCT-MW500-081414; and UST71-MW104-081114 and UST71-MW500-081114. All RPD were within the control limits specified above.

7.2.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP (Quality Assurance Project Plan).

7.2.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the laboratory duplicates relative percent difference values. The data are of known quality and are acceptable for use as qualified.

8 Qualified Data Summary

Qualified Data Summary Table

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
UST71-MW104-081114	408183-09	Benzo(a)pyrene	UJ	MS/MSD %R below control limits.
BA6-MW101-081114 DAST-MW-101-081314	408183-04 408213-18	Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
SHB-MW101-081114 BCT-MW108-081414	408183-07 408237-01	Naphthalene Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
UST71-MW-103-081214	408213-03	Naphthalene Phenanthrene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Acenaphthene Fluorene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
BCT-MW-103-081214	408237-09	Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
BCT-MW107-081414	408213-09	Naphthalene Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
BCT-MW101-081114	408237-04	Diesel Range Hydrocarbons	UJ	MS/MSD %R below control limits.
		Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	UJ	MS/MSD %RPD above control limits, MS/MSD %R below control limits.

Data Qualifier Definitions

Data Qualifier	Definition
DNR	Do not report; the result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.
X	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

9 References

U.S. Environmental Protection Agency (USEPA), 1994, Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry, Revision 5.4, Environmental Monitoring Systems Laboratory Office of Research and Development.

U.S. Environmental Protection Agency (USEPA), 1997, Method 1640 Determination of Trace Elements in Waters by Preconcentration and Inductively Coupled Plasma – Mass Spectrometry, Office of Water & Office of Science and Technology Engineering and Analysis Division (4303), April.

U.S. Environmental Protection Agency (USEPA), 1999, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Emergency and Remedial Response, USEPA Publication No. 540/R-99/008, October.

U.S. Environmental Protection Agency (USEPA), 2004, Contract Laboratory Program National Functional Guidelines for Organic Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA Publication No. 540-R-04-004, October.

Aspect, 2013, Work Plan for Remedial Investigation/Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013.

DATA VALIDATION REPORT

Kimberly Clark Worldwide Site Upland Area
Interim Action Confirmational Groundwater Monitoring
November 2014
SDGs 411039, 411066, 411067, 411116, 411119, K1412631

Prepared by:
Aspect Consulting, LLC
401 Second Ave South, Suite 201
Seattle, WA 98104

Project No. 110207 • December 8, 2014

S:\Kimberly Clark\Everett Mill 110207\Data\Validation\Data Validation - Delia\KC IA Nov 2014 Data Validation.docx

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for groundwater samples collected during November 3 through 6, 2014 for Kimberly Clark Worldwide Upland Site Interim Action Confirmational Groundwater Monitoring. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section. The metals data were sent to a separate lab for analysis, and are presented in Section 7 at the end of the report.

Samples were analyzed for non-metal analytes by Friedman & Bruya, Inc in Seattle, Washington, and for metal analytes by ALS Environmental in Kelso, Washington. The analytical methods are summarized below:

Analysis	Method	Laboratory
Polycyclic Aromatic Hydrocarbons (PAHs)	SW8270D-SIM	Friedman & Bruya, Inc
TPH - Gasoline Range and BTEX[1]	NWTPH-Gx/EPA 8021B	Friedman & Bruya, Inc
TPH - Diesel and Motor Oil Ranges	NWTPH-Dx	Friedman & Bruya, Inc
Total and Dissolved Metals	EPA 200.8	ALS
Total and Dissolved Mercury	EPA 1631E	ALS

The validation followed the procedures documented in the analytical methods, the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013), *National Functional Guidelines for Organic Data Review* (USEPA, 1999), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004).

Data assigned a J qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be taken into account when interpreting sample concentrations. Data marked as do-not-report (DNR) should not be used under any circumstances. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. Data qualifiers have been incorporated into the project chemistry database to reflect the validation in this report.

[1] BTEX = benzene, toluene, ethylbenzene, and xylenes

2 Data Validation Findings for SDG 411039

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte							
			TPH-Dx/Oil	TPH-Gx/BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead	Zinc
BCT-MW101-110314	11/3/2014	GrWtr	x	x	x	x		x	x	x
BCT-MW500-110314	11/3/2014	GrWtr	x	x	x	x		x	x	x
BCT-MW102-110314	11/3/2014	GrWtr	x	x	x	x		x	x	x
BCT-MW103-110314	11/3/2014	GrWtr	x	x	x	x		x	x	x
BCT-MW104-110314	11/3/2014	GrWtr	x	x	x	x		x	x	x
BBH-MW104-110314	11/3/2014	GrWtr				x	x	x	x	x
BBH-MW103-110314	11/3/2014	GrWtr				x	x	x	x	x
BBH-MW102-11314	11/3/2014	GrWtr				x	x	x	x	x
BBH-MW101-110314	11/3/2014	GrWtr				x	x	x	x	x
GF11-MW101-110314	11/3/2014	GrWtr				x		x	x	

2.1 PAHs (SW8270-SIM)

2.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees Celsius [C]), and holding times were acceptable.

2.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.1.3 Surrogates

All surrogate spike recoveries were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No data qualification was necessary.

2.1.4 Laboratory Control Samples (LCS/LCSD)

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) percent recovery (%R) and relative percent difference (RPD) were within the project control limits.

2.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Matrix spike (MS) and matrix spike duplicate (MSD) %R and RPD were within the project control limits, except for the sixteen semivolatile target compounds in sample BCT-MW101-110314. Each analyte had an RPD above the control limit of 20% and were flagged as estimated (UJ).

2.1.6 Field Duplicates

Field duplicates are an indication of both field and laboratory precision. According to the EPA National Functional Guidelines, there are no set criteria for field duplicate evaluation, but the following advisory criteria were used. For results greater than or equal to the analytical reporting limit (RL), the advisory RPD is 35%. For results <5 times the RL, the difference between the sample and the duplicate should be <RL.

One set of blind field duplicates was submitted for this analysis, BCT-MW101-110314 and BCT-MW500-110314. The RPD for the field duplicate pair was within the control limits specified above.

2.1.7 Reported Results and Reporting Limits (RL)

The reporting limits outlined in the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013) were met.

2.1.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

2.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

2.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.2.3 Surrogates

All %R were within control limits.

2.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

2.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

2.2.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-110314 and BCT-MW500-110314. All RPD were within the control limits specified above.

2.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP (Quality Assurance Project Plan).

2.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate spike, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

2.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

2.3.2 Method Blanks

Target analytes were not detected at or above RLs in the method blanks.

2.3.3 Surrogates

All percent recoveries were within control limits or were at levels that had no adverse effects on data quality.

2.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

2.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

2.3.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-110314 and BCT-MW500-110314. All RPD were within the control limits specified above.

2.3.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

2.3.8 Overall Assessment

Accuracy was acceptable based on the surrogate spike, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD, and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3 Data Validation Findings for SDG 411066

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte		
			TPH-Dx/Oil	TPH-Gx/BTEX	Low Level PAHs
NRS-MW101-110414	11/4/2014	GrWtr	x	x	x
NRS-MW102-110414	11/4/2014	GrWtr	x	x	x

3.1 PAHs (SW8270-SIM)

3.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.1.3 Surrogates

All %R were within control limits.

3.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

3.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

3.1.6 Reported Results and Reporting Limits (RL)

The reporting limits outlined in the QAPP were met.

3.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

3.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

3.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.2.3 Surrogates

All %R were within control limits.

3.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

3.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

3.2.6 Reported Results and Reporting Limits (RL)

The reporting limits were met as outlined in the QAPP.

3.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

3.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

3.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.3.3 Surrogates

All %R were within control limits.

3.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

3.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

3.3.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

3.3.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4 Data Validation Findings for SDG 411067

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte								
			TPH-Dx/Oil	TPH-Gx/BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead	Nickel	Zinc
BCT-MW105-110414	11/4/2014	GrWtr	x	x	x	x		x	x		
BCT-MW106-110414	11/4/2014	GrWtr	x	x	x	x		x	x		
BCT-MW107-110414	11/4/2014	GrWtr	x	x	x	x		x	x		
BCT-MW108-110414	11/4/2014	GrWtr	x	x	x	x		x	x		
HBV-MW101-110414	11/4/2014	GrWtr	x		x						
HB-MW1R-110414	11/4/2014	GrWtr				x	x	x	x	x	x
UST71-MW102-110414	11/4/2014	GrWtr	x		x			x			x
UST70-MW102-110414	11/4/2014	GrWtr	x		x		x	x		x	x
UST70-MW2-110414	11/4/2014	GrWtr	x		x		x	x		x	x
UST70-MW101-110414	11/4/2014	GrWtr	x		x		x	x		x	x
RCD-MW101-110414	11/4/2014	GrWtr	x		x	x	x	x		x	

4.1 PAHs (SW8270-SIM)

4.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations, with one exception. The %R for benzo(a)anthracene-d12 in HBV-MW101-110414 (194 percent) was above the control limit of 150 percent. Because the recovery was greater than the upper control limit, the detected semivolatile target compounds in this sample will be qualified as estimated (J), and the non-detected target compounds will not be qualified.

4.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

4.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

4.1.6 Reported Results and Reporting Limits (RL)

The results for naphthalene, acenaphthene, and phenanthrene in samples BCT-MW107-110414 and BCT-MW108-110414 exceeded the instrument calibration range, requiring the samples to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted samples. The remaining analytes were reported from the undiluted samples.

The results for acenaphthene in sample UST70-MW102-110414 also exceeded the linear range and was qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

4.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

4.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.2.3 Surrogates

All %R were within control limits.

4.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

4.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

4.2.6 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

4.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

4.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.3.3 Surrogates

All %R were within control limits.

4.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

4.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

4.3.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

4.3.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

5 Data Validation Findings for SDG 411116

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte		
			TPH-Dx/Oil	TPH-Gx/BTEX	Low Level PAHs
NRU-MW101-110514	11/5/2014	GrWtr	x	x	x
NRU-MW102-110514	11/5/2014	GrWtr	x	x	x
NRP-MW2-110514	11/5/2014	GrWtr	x	x	x

5.1 PAHs (SW8270-SIM)

5.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference. No qualification of the results was necessary.

5.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

5.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

5.1.6 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

5.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

5.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

5.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.2.3 Surrogates

All %R were within control limits.

5.2.4 Laboratory Control Samples (LCS)

LCS and LCSD %R and RPD were within the project control limits.

5.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

5.2.6 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP (Quality Assurance Project Plan).

5.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

5.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

5.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.3.3 Surrogates

All %R were within control limits.

5.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

5.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

5.3.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

5.3.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6 Data Validation Findings for SDG 411119

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte							
			TPH-Dx/Oil	TPH-Gx/BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead	Zinc
UST71-MW104-110514	11/5/2014	GrWtr	x		x			x		x
UST71-MW101-110514	11/5/2014	GrWtr	x		x			x		x
UST71-MW500-110514	11/5/2014	GrWtr	x		x			x		x
DAST-MW101-110514	11/5/2014	GrWtr	x		x	x		x		
UST29-MW101-110514	11/5/2014	GrWtr	x	x	x					
BA6-MW101-110514	11/5/2014	GrWtr	x		x					
UST71-MW103-110514	11/5/2014	GrWtr	x		x			x		
SHB-MW101-110514	11/5/2014	GrWtr	x	x	x	x		x		
SHB-MW102-110514	11/5/2014	GrWtr	x	x	x	x		x		
UST29-MW103-110614	11/6/2014	GrWtr	x	x	x					
UST29-MW102-110614	11/6/2014	GrWtr	x	x	x					
CN-MW101-110614	11/6/2014	GrWtr	x		x		x	x	x	
CN-MW102-110614	11/6/2014	GrWtr	x		x		x	x	x	
CN-MW103-110614	11/6/2014	GrWtr	x		x		x	x	x	
CN-MW104-110614	11/6/2014	GrWtr	x		x		x	x	x	

6.1 PAHs (SW8270-SIM)

6.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations, with one exception. The %R for sample UST71-MW103-110514 were below the control limits because the surrogates were not added prior to extraction and should be considered estimates. Because the MS and LCS %R were within the limits for this sample, no qualification of the results was necessary.

6.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

6.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, with one exception. The RPDs for indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene in UST71-MW104-110514 were above the control limit of 20%. The results for these analytes were qualified as estimated (UJ).

6.1.6 Field Duplicates

One set of blind field duplicates was submitted, UST71-MW104-110514 and UST71-MW500-110514. All RPD were within the control limits specified above.

6.1.7 Reported Results and Reporting Limits (RL)

The results for acenaphthene and fluorene in sample DAST-MW101-110514 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted sample. The remaining analytes were reported from the undiluted sample.

The results for acenaphthene, fluorene, and phenanthrene in sample UST71-MW103-110514, acenaphthene in UST29-MW102-110614, and naphthalene and acenaphthene in CN-MW101-110614 also exceeded the linear range and was qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes.

6.1.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the field duplicate, MS/MSD, and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

6.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.2.3 Surrogates

All %R were within control limits.

6.2.4 Laboratory Control Samples (LCS)

LCS and LCSD %R and RPD were within the project control limits.

6.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

There were no MS/MSD associated with this SDG.

6.2.6 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

6.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate spikes and LCS recoveries, and precision was acceptable based on the LCS/LCSD and RPD values. The data are of known quality and are acceptable for use as qualified.

6.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

6.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.3.3 Surrogates

All %R were within control limits.

6.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

6.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

6.3.6 Field Duplicates

One set of blind field duplicates was submitted, UST71-MW104-110514 and UST71-MW500-110514. All RPD were within the control limits specified above.

6.3.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

6.3.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the field duplicate, MS/MSD, and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

7 Data Validation Findings for SDG K1412631 (Metals Analyses)

In accordance with the QAPP, the groundwater samples were submitted to ALS in Kelso, Washington, for metals analyses, as they have particular expertise performing trace metals analyses in saline water matrices. Friedman and Bruya combined groundwater samples from multiple SDGs into a single batch for transfer to ALS. The specific metals analytes for each sample in this ALS SDG are tabulated in the preceding sections. The sections below describe the results of the data quality review, separated into mercury and the other metals. The groundwater samples for metals analysis were field-filtered, therefore the results are reported as dissolved metals.

7.1 Dissolved Mercury (EPA 1631E)

7.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 28 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

7.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

7.1.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

7.1.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

7.1.5 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-110314 and BCT-MW500-110314. All RPD were within the control limits specified above.

7.1.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

7.1.7 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and field duplicates relative percent difference values. The data are of known quality and are acceptable for use as qualified.

7.2 Dissolved Metals (EPA 200.8 and 6010C)

7.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

To reduce the analytical interferences due to high concentrations of dissolved solids, samples identified as having high specific conductance in the field (UST70-MW2-

110414, RCD-MW101-110414) were prepared by the reductive precipitation method (USEPA, 1997).

7.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

7.2.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

7.2.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

7.2.5 Laboratory Duplicates

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

7.2.6 Field Duplicates

Two sets of blind field duplicates were submitted, BCT-MW101-110314 and BCT-MW500-110314; and UST71-MW104-110514 and UST71-MW500-110514. All RPD were within the control limits specified above.

7.2.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP (Quality Assurance Project Plan).

7.2.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD, laboratory and field duplicates relative percent difference values. The data are of known quality and are acceptable for use as qualified.

8 Qualified Data Summary

Qualified Data Summary Table

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
BCT-MW101-110314	411039-01	Acenaphthene Fluorene Naphthalene Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	UJ	MS/MSD %RPD above control limits.
HBV-MW101-110414	411067-05	Acenaphthene Fluorene Naphthalene Phenanthrene Anthracene Fluoranthene Pyrene	J	Surrogate %R above control limit.
UST71-MW104-110514	411119-01	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	UJ	MS/MSD %R below control limits.
BCT-MW107-110414 BCT-MW108-110414	411067-03 411067-04	Naphthalene Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
UST70-MW102-110414 UST29-MW102-110614	411067-08 411119-11	Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
DAST-MW101-110514	411119-04	Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
UST71-MW103-110514	411119-07	Phenanthrene Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
CN-MW101-110614	411119-12	Naphthalene Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Data Qualifier Definitions

Data Qualifier	Definition
DNR	Do not report; the result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.
X	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

9 References

U.S. Environmental Protection Agency (USEPA), 1994, Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry, Revision 5.4, Environmental Monitoring Systems Laboratory Office of Research and Development.

U.S. Environmental Protection Agency (USEPA), 1997, Method 1640 Determination of Trace Elements in Waters by Preconcentration and Inductively Coupled Plasma – Mass Spectrometry, Office of Water & Office of Science and Technology Engineering and Analysis Division (4303), April.

U.S. Environmental Protection Agency (USEPA), 1999, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Emergency and Remedial Response, USEPA Publication No. 540/R-99/008, October.

U.S. Environmental Protection Agency (USEPA), 2004, Contract Laboratory Program National Functional Guidelines for Organic Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA Publication No. 540-R-04-004, October.

Aspect, 2013, Work Plan for Remedial Investigation/Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013.

DATA VALIDATION REPORT

Kimberly Clark Worldwide Site Upland Area
Interim Action Confirmational Groundwater Monitoring
February 2015
SDGs 502284, 502285, 502286, 502297, 502330, K1501795

Prepared by:
Aspect Consulting, LLC
401 Second Ave South, Suite 201
Seattle, WA 98104

Project No. 110207 • March 16, 2015

S:\Kimberly Clark\Everett Mill 110207\Data\Validation\Data Validation - Delia\KC IA Feb 2015 Data Validation.docx

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for groundwater samples collected during February 17 through 19, 2015 for Kimberly Clark Worldwide Upland Site Interim Action Confirmational Groundwater Monitoring. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section. The metals data were sent to a separate lab for analysis, and are presented in Section 7 at the end of the report.

Samples were analyzed for non-metal analytes by Friedman & Bruya, Inc in Seattle, Washington and Fremont Analytical in Seattle, Washington, and for metal analytes by ALS Environmental in Kelso, Washington. The analytical methods are summarized below:

Analysis	Method	Laboratory
Polycyclic Aromatic Hydrocarbons (PAHs)	SW8270D-SIM	Friedman & Bruya, Inc
TPH - Gasoline Range and BTEX[1]	NWTPH-Gx/EPA 8021B	Friedman & Bruya, Inc
TPH - Diesel and Motor Oil Ranges with Silica Gel	NWTPH-Dx	Friedman & Bruya, Inc
Extractable Petroleum Hydrocarbons (EPH)	NWEPH	Fremont Analytical
Total and Dissolved Metals	EPA 200.8	ALS
Total and Dissolved Mercury	EPA 1631E	ALS

The validation followed the procedures documented in the analytical methods, the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013), *National Functional Guidelines for Organic Data Review* (USEPA, 1999), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004).

Data assigned a J qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be taken into account when interpreting sample concentrations. Data marked as do-not-report (DNR) should not be used under any circumstances. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. Data qualifiers have been incorporated into the project chemistry database to reflect the validation in this report.

[1] BTEX = benzene, toluene, ethylbenzene, and xylenes

2 Data Validation Findings for SDG 502284

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte		
			TPH-Dx/Oil w/ SG	TPH-Gx/BTEX	Low Level PAHs
NRS-MW101-021715	2/17/2015	GrWtr	x	x	x
NRS-MW102-021715	2/17/2015	GrWtr	x	x	x

2.1 PAHs (SW8270D-SIM)

2.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees Celsius [C]), and holding times were acceptable.

2.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.1.3 Surrogates

All percent recoveries (%R) were within control limits.

2.1.4 Laboratory Control Samples (LCS/LCSD)

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) percent recovery (%R) and relative percent difference (RPD) were within the project control limits.

2.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

Matrix spike (MS) and matrix spike duplicate (MSD) %R and RPD were within the project control limits, with the exception of eight analytes. However, because the parent sample was from a different SDG and the interference was likely due to the sample matrix, no results were qualified.

2.1.6 Reported Results and Reporting Limits (RL)

The reporting limits (RLs) outlined in the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013) were met.

2.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

2.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

2.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

2.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.2.3 Surrogates

All %R were within control limits.

2.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

2.2.5 Laboratory Duplicate

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

2.2.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

2.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

2.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

2.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

2.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.3.3 Surrogates

All %R were within control limits.

2.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

2.3.5 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

2.3.6 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

3 Data Validation Findings for SDG 502285

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte		
			TPH-Dx/Oil w/ SG	TPH-Gx/BTEX	Low Level PAHs
NRU-MW101-021715	2/17/2015	GrWtr	x	x	x
NRU-MW102-021715	2/17/2015	GrWtr	x	x	x
NRP-MW2-021715	2/17/2015	GrWtr	x	x	x

3.1 PAHs (SW8270D-SIM)

3.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations. No qualification of the results was necessary.

3.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

3.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, with the exception of seven analytes. However, because the parent sample was from a different SDG and the interference was likely due to the sample matrix, no results were qualified.

3.1.6 Reported Results and Reporting Limits (RL)

The results for acenaphthene and fluorene in sample NRU-MW102-021715 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted sample. The remaining analytes were reported from the undiluted samples.

The RLs outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes. RLs were acceptable for their intended use.

3.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

3.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

3.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.2.3 Surrogates

All %R were within control limits.

3.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

3.2.5 Laboratory Duplicate

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

3.2.6 Reported Results and Reporting Limits (RL)

The RLs outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes. RLs were acceptable for their intended use.

3.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

3.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

3.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

3.3.3 Surrogates

All %R were within control limits.

3.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

3.3.5 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

3.3.6 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4 Data Validation Findings for SDG 502286

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte							
			TPH-Dx/Oil w/ SG	TPH-Gx/ BTEX	Low Level PAHs	Arsenic	Copper	Lead	Mercury	Zinc
BBH-MW103-021715	2/17/2015	GrWtr				x	x	x	x	x
BBH-MW102-021715	2/17/2015	GrWtr				x	x	x	x	x
BBH-MW104-021715	2/17/2015	GrWtr				x	x	x	x	x
BCT-MW104-021715	2/17/2015	GrWtr	x	x	x		x	x	x	
BCT-MW105-021715	2/17/2015	GrWtr	x	x	x		x	x	x	
UST71-MW101-021715	2/17/2015	GrWtr	x		x		x			x
UST71-MW102-021715	2/17/2015	GrWtr	x		x		x			x

4.1 PAHs (SW8270D-SIM)

4.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.1.3 Surrogates

All %R were within control limits.

4.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

4.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, with the exception of seven analytes. However, because the parent sample was from a different SDG and the interference was likely due to the sample matrix, no results were qualified.

4.1.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

4.1.7 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries and precision was acceptable based on the MS/MSD and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

4.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

4.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

4.2.3 Surrogates

All %R were within control limits.

4.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

4.2.5 Laboratory Duplicate

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

4.2.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

4.2.7 Overall Assessment

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

4.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

4.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

4.3.2 Method Blanks

Target analytes were not detected at or above RLs in the method blanks.

4.3.3 Surrogates

All %R were within control limits.

4.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

4.3.5 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

4.3.6 Overall Assessment

Accuracy was acceptable based on the surrogate spike and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

5 Data Validation Findings for SDG 502297

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte									
			TPH-Dx/ Oil w/ SG	TPH-Gx/ BTEX	Low Level PAHs	EPH	Hg	As	Cu	Pb	Ni	Zn
GF11-MW101-021815	2/18/2015	GrWtr					x		x	x		
HBV-MW101-021815	2/18/2015	GrWtr	x		x							
BBH-MW101-021815	2/18/2015	GrWtr					x	x	x	x		x
UST71-MW104-021815	2/18/2015	GrWtr	x		x				x			x
UST71-MW500-021815	2/18/2015	GrWtr	x		x				x			x
UST29-MW101-021815	2/18/2015	GrWtr	x	x	x							
UST29-MW102-021815	2/18/2015	GrWtr	x	x	x							
UST29-MW103-021815	2/18/2015	GrWtr	x	x	x							
UST71-MW103-021815	2/18/2015	GrWtr	x		x	x			x			x
BA6-MW101-021815	2/18/2015	GrWtr	x		x							
SHB-MW101-021815	2/18/2015	GrWtr	x	x	x		x		x			
SHB-MW102-021815	2/18/2015	GrWtr	x	x	x		x		x			
RCD-MW101-021815	2/18/2015	GrWtr	x		x		x	x	x		x	
UST70-MW101-021815	2/18/2015	GrWtr	x		x			x	x		x	x
UST70-MW102-021815	2/18/2015	GrWtr	x		x			x	x		x	x
BCT-MW106-021815	2/18/2015	GrWtr	x	x	x		x		x	x		

5.1 PAHs (SW8270D-SIM)

5.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations.

5.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

5.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, with several exceptions. The %R and/or RPD were outside the control limits for benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-

c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. These analytes were qualified as estimated (J) in the parent sample, UST71-MW104-021814.

5.1.6 Field Duplicates

Field duplicates are an indication of both field and laboratory precision. According to the EPA National Functional Guidelines, there are no set criteria for field duplicate evaluation, but the following advisory criteria were used. For results greater than or equal to the analytical RL, the advisory RPD is 35%. For results <5 times the RL, the difference between the sample and the duplicate should be <RL.

One set of blind field duplicates was submitted for this analysis, UST71-MW104-021815 and UST71-MW500-021815. The RPD for the field duplicate pair was within the control limits specified above.

5.1.7 Reported Results and Reporting Limits (RL)

The results for naphthalene, acenaphthene, fluorene, and phenanthrene in sample UST71-MW103-021815 exceeded the instrument calibration range, requiring the sample to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted sample. The remaining analytes were reported from the undiluted samples.

The results for naphthalene and acenaphthene in sample SHB-MW101-021815 and acenaphthene in UST70-MW102-021815 also exceeded the linear range and were qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes. RLs were acceptable for their intended use.

5.1.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

5.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

5.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.2.3 Surrogates

All %R were within control limits.

5.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

5.2.5 Laboratory Duplicate

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

5.2.6 Field Duplicates

One set of blind field duplicates was submitted, UST71-MW104-021815 and UST71-MW500-021815. All RPD were within the control limits specified above.

5.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

5.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the laboratory and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

5.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

5.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.3.3 Surrogates

All %R were within control limits.

5.3.4 Laboratory Control Samples (LCS/LCSD)

LCS %R were within the project control limits, however, the LCSD %R and RPD were above the project control limits. All positive sample results were qualified as estimated (J).

5.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

5.3.6 Field Duplicates

One set of blind field duplicates was submitted, UST71-MW104-021815 and UST71-MW500-021815. All RPD were within the control limits specified above.

5.3.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

5.3.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD, LCS/LCSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

5.4 Extractable Petroleum Hydrocarbons (NWEPH)

5.4.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 14 days of collection. Extracted samples must be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

5.4.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

5.4.3 Surrogates

All %R were within control limits.

5.4.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

5.4.5 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

5.4.6 Overall Assessment

Accuracy was acceptable based on the surrogate and LCS recoveries, and precision was acceptable based on the LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6 Data Validation Findings for SDG 502330

Groundwater samples in this SDG, and the chemical analyses performed on them, are tabulated below. The sections below describe the results of the data quality review for this SDG by analyte group (analysis).

Sample Index

Sample ID	Sample Date	Sample Matrix	Analyte								
			TPH-Dx/Oil w/ SG	TPH-Gx/ BTEX	Low Level PAHs	Mercury	Arsenic	Copper	Lead	Nickel	Zinc
BCT-MW103-021915	2/19/2015	GrWtr	x	x	x	x		x	x		
BCT-MW102-021915	2/19/2015	GrWtr	x	x	x	x		x	x		
BCT-MW101-021915	2/19/2015	GrWtr	x	x	x	x		x	x		
BCT-MW500-021915	2/19/2015	GrWtr	x	x	x	x		x	x		
BCT-MW107-021915	2/19/2015	GrWtr	x	x	x	x		x	x		
BCT-MW108-021915	2/19/2015	GrWtr	x	x	x	x		x	x		
DAST-MW-101-021915	2/19/2015	GrWtr	x		x	x		x			
CN-MW101-021915	2/19/2015	GrWtr	x		x		x	x	x		
CN-MW102-021915	2/19/2015	GrWtr	x		x		x	x	x		
CN-MW103-021915	2/19/2015	GrWtr	x		x		x	x	x		
CN-MW104-021915	2/19/2015	GrWtr	x		x		x	x	x		
UST70-MW2-021915	2/19/2015	GrWtr	x		x		x	x		x	x

6.1 PAHs (SW8270-SIM)

6.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be extracted within 7 days of collection. Extracted samples should be analyzed within 40 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.1.3 Surrogates

All surrogate spike %R were within control limits or were not applicable due to sample matrix interference or sample dilution below quantitation limits because of high petroleum hydrocarbon concentrations.

6.1.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

6.1.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits, with one exception. The RPDs for fluorene, phenanthrene, anthracene, benzo(k)fluoranthene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene in BCT-MW101-021915 were above the control limit of 20%. The results for these analytes were qualified as estimated (UJ).

6.1.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-021915 and BCT-MW500-021915. All RPD were within the control limits specified above.

6.1.7 Reported Results and Reporting Limits (RL)

The results for naphthalene, acenaphthene, and fluorene in samples BCT-MW107-021915 and BCT-MW108-021915 exceeded the instrument calibration range, requiring the samples to be diluted and re-analyzed. These analytes were reported from the dilution and qualified as DNR in the undiluted samples. The remaining analytes were reported from the undiluted samples.

The results for acenaphthene and fluorene in sample DAST-MW-101-021915 also exceeded the linear range and were qualified in the same manner.

The reporting limits outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes. RLs were acceptable for their intended use.

6.1.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the field duplicate, MS/MSD, and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

6.2 TPH-Gasoline and BTEX (NWTPH-Gx and EPA 8021B)

6.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.2.3 Surrogates

All %R were within control limits.

6.2.4 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

6.2.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

6.2.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-021915 and BCT-MW500-021915. All RPD were within the control limits specified above.

6.2.7 Reported Results and Reporting Limits (RL)

All reporting limits were met as outlined in the QAPP.

6.2.8 Overall Assessment

Accuracy was acceptable based on the surrogate spikes, MS, and LCS recoveries, and precision was acceptable based on the MS/MSD and RPD values. The data are of known quality and are acceptable for use as qualified.

6.3 Diesel- and Oil-Range TPH (NWTPH-Dx)

6.3.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 14 days of collection.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

6.3.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

6.3.3 Surrogates

All %R were within control limits.

6.3.4 Laboratory Control Samples (LCS/LCSD)

LCS and LCSD %R and RPD were within the project control limits.

6.3.5 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

6.3.6 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-021915 and BCT-MW500-021915. All RPD were within the control limits specified above.

6.3.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

6.3.8 Overall Assessment

Accuracy was acceptable based on the surrogate, MS, and LCS recoveries, and precision was acceptable based on the field duplicate, MS/MSD, and LCS/LCSD RPD values. The data are of known quality and are acceptable for use as qualified.

7 Data Validation Findings for SDG K1501795 (Metals Analyses)

In accordance with the QAPP, the groundwater samples were submitted to ALS in Kelso, Washington, for metals analyses, as they have particular expertise performing trace metals analyses in saline water matrices. Friedman and Bruya combined groundwater samples from multiple SDGs into a single batch for transfer to ALS. The specific metal analytes for each sample in this ALS SDG are tabulated in the preceding sections. The sections below describe the results of the data quality review, separated into mercury and the other metals. The groundwater samples for metals analysis were field-filtered, therefore the results are reported as dissolved metals.

7.1 Dissolved Mercury (EPA 1631E)

7.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 28 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable, with one exception. Sample RCD-MW101-021815 was incorrectly labeled as RCD-MW102-021815, but the lab was able to determine the correct Sample ID through process of elimination. No further action was needed.

7.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

7.1.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

7.1.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

7.1.5 Field Duplicates

One set of blind field duplicates was submitted, BCT-MW101-021915 and BCT-MW500-021915. All RPD were within the control limits specified above.

7.1.6 Reported Results and Reporting Limits (RL)

The RLs outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes. RLs were acceptable for their intended use.

7.1.7 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

7.2 Dissolved Metals (EPA 200.8)

7.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable.

To reduce the analytical interferences due to high concentrations of dissolved solids, samples identified as having high specific conductance in the field (UST70-MW2-021915, RCD-MW101-021915) were prepared by the reductive precipitation method (USEPA, 1997).

7.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

7.2.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

7.2.4 Matrix Spike (MS)

MS %R were within the project control limits.

7.2.5 Laboratory Duplicates

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

7.2.6 Field Duplicates

Two sets of blind field duplicates were submitted, BCT-MW101-021915 and BCT-MW500-021915; and UST71-MW104-021815 and UST71-MW500-021815. All RPD were within the control limits specified above.

7.2.7 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

7.2.8 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the laboratory duplicate and field duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

8 Qualified Data Summary Table

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
UST71-MW104-021815	502297-04	Benz(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	UJ	MS/MSD %R and RPD outside control limits.
UST71-MW104-021815 UST29-MW103-021815 UST71-MW103-021815 SHB-MW101-021815	502297-04 502297-08 502297-09 502297-11	Diesel Range Hydrocarbons	J	LCS/LCSD %R and RPD above control limits.
BCT-MW101-021915	502330-03	Fluorene Phenanthrene Anthracene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	UJ/J	MS/MSD %R and RPD outside control limits.
UST71-MW103-021815	502297-09	Naphthalene Acenaphthene Fluorene Phenanthrene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
SHB-MW101-021815	502297-11	Naphthalene Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Sample ID	Laboratory ID	Analyte	Qualifier	Qualified Reason
UST70-MW102-021815	502297-15	Acenaphthene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
BCT-MW107-021915 BCT-MW108-021915	502330-05 502330-06	Naphthalene Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.
NRU-MW102-021715 DAST-MW-101-021915	502285-02 502330-07	Acenaphthene Fluorene	DNR	Result outside of instrument calibration range. Use diluted result.
		Naphthalene Acenaphthylene Phenanthrene Anthracene Fluoranthene Pyrene Benz[a]anthracene Chrysene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(ghi)perylene	DNR	A more appropriate result is reported. Use undiluted result.

Data Qualifier Definitions

Data Qualifier	Definition
DNR	Do not report; the result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.
X	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

9 References

Aspect, 2013, Work Plan for Remedial Investigation/Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013.

U.S. Environmental Protection Agency (USEPA), 1994, Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry, Revision 5.4, Environmental Monitoring Systems Laboratory Office of Research and Development.

U.S. Environmental Protection Agency (USEPA), 1997, Method 1640 Determination of Trace Elements in Waters by Preconcentration and Inductively Coupled Plasma – Mass Spectrometry, Office of Water & Office of Science and Technology Engineering and Analysis Division (4303), April.

U.S. Environmental Protection Agency (USEPA), 1999, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Emergency and Remedial Response, USEPA Publication No. 540/R-99/008, October.

U.S. Environmental Protection Agency (USEPA), 2004, Contract Laboratory Program National Functional Guidelines for Organic Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA Publication No. 540-R-04-004, October.

DATA VALIDATION REPORT

Kimberly Clark Worldwide Site Upland Area
Interim Action Confirmational Groundwater Monitoring
April 2015
SDGs K1504093

Prepared by:
Aspect Consulting, LLC
401 Second Ave South, Suite 201
Seattle, WA 98104

Project No. 110207 • April 29, 2015

S:\Kimberly Clark\Everett Mill 110207\Data\Validation\Data Validation - Delia\KC IA Feb 2015 Data Validation.docx

1 Introduction

This report summarizes the findings of the United States Environmental Protection Agency (USEPA) Stage 2A data validation performed on analytical data for groundwater samples collected on April 20, 2015 for Kimberly Clark Worldwide Upland Site Interim Action Confirmational Groundwater Monitoring. This data quality review is divided into sections by sample delivery group (SDG). A complete list of samples and analyses for each SDG is provided in the Sample Index at the beginning of each section.

Samples were analyzed for metal analytes by ALS Environmental in Kelso, Washington. The analytical methods are summarized below:

Analysis	Method	Laboratory
Total and Dissolved Metals	EPA 200.8	ALS
Total and Dissolved Mercury	EPA 1631E	ALS

The validation followed the procedures documented in the analytical methods, the Quality Assurance Project Plan (QAPP; in Appendix A to Aspect, 2013), *National Functional Guidelines for Organic Data Review* (USEPA, 1999), and *National Functional Guidelines for Inorganic Data Review* (USEPA, 2004).

Data assigned a J qualifier (estimated) may be used for site evaluation purposes but the reasons for qualification should be taken into account when interpreting sample concentrations. Data marked as do-not-report (DNR) should not be used under any circumstances. Values without qualification meet all data measurement quality objectives and are suitable for use.

Data qualifier definitions and a summary table of the qualified data are included in the Qualified Data Summary at the end of this report. Data qualifiers have been incorporated into the project chemistry database to reflect the validation in this report.

2 Data Validation Findings for SDG K1504093

Sample ID	Sample Date	Sample Matrix	Analyte				
			Arsenic	Copper	Lead	Mercury	Zinc
BBH-MW103-021715	2/17/2015	GrWtr	x	x	x	x	x

2.1 Dissolved Mercury (EPA 1631E)

2.1.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 28 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable, with one exception. Sample BBH-MW103-042015 had a pH > 2 upon sample receipt, however, sufficient nitric acid was added to lower the pH more than 16 hours before analysis. No further action was needed.

2.1.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.1.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

2.1.4 Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS and MSD %R and RPD were within the project control limits.

2.1.5 Reported Results and Reporting Limits (RL)

The RLs outlined in the QAPP were met or were elevated accordingly due to high concentrations of target analytes. RLs were acceptable for their intended use.

2.1.6 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the MS/MSD RPD values. The data are of known quality and are acceptable for use as qualified.

2.2 Dissolved Metals (EPA 200.8)

2.2.1 Sample Receipt, Preservation, and Holding Times

Water samples should be analyzed within 180 days of extraction.

Sample receipt, preservation (2-6 degrees C), and holding times were acceptable. Sample BBH-MW103-042015 had a pH > 2 upon sample receipt, however, sufficient nitric acid was added to lower the pH more than 16 hours before analysis. No further action was needed.

2.2.2 Method Blanks

Target analytes were not detected at or above the reporting levels in the method blanks.

2.2.3 Laboratory Control Samples (LCS)

LCS %R were within the project control limits.

2.2.4 Matrix Spike (MS)

MS %R were within the project control limits.

2.2.5 Laboratory Duplicates

For laboratory duplicate results that are greater than the reporting limit, the RPD control limit is 20%. For laboratory duplicate results less than five times the reporting limit, the difference between the sample and duplicate must be less than the reporting limit.

All RPD were within the control limits specified above.

2.2.6 Reported Results and Reporting Limits (RL)

All target RLs were met as outlined in the QAPP.

2.2.7 Overall Assessment

Accuracy was acceptable based on the MS and LCS recoveries, and precision was acceptable based on the laboratory duplicate RPD values. The data are of known quality and are acceptable for use as qualified.

3 Qualified Data Summary Table

No data were qualified.

Data Qualifier Definitions

Data Qualifier	Definition
DNR	Do not report; the result should be reported from an alternative analysis.
J	The analyte was detected above the reported quantitation limit, and the reported concentration was an estimated value.
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but was considered not detected at the reporting limit or reported value.
UJ	The analyte was analyzed for, and the associated quantitation limit was an estimated value.
X	The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

4 References

Aspect, 2013, Work Plan for Remedial Investigation/Feasibility Study, Kimberly-Clark Worldwide Site Upland Area, Everett, Washington, November 22, 2013.

U.S. Environmental Protection Agency (USEPA), 1994, Method 200.8 Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry, Revision 5.4, Environmental Monitoring Systems Laboratory Office of Research and Development.

U.S. Environmental Protection Agency (USEPA), 1997, Method 1640 Determination of Trace Elements in Waters by Preconcentration and Inductively Coupled Plasma – Mass Spectrometry, Office of Water & Office of Science and Technology Engineering and Analysis Division (4303), April.

U.S. Environmental Protection Agency (USEPA), 1999, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, Office of Emergency and Remedial Response, USEPA Publication No. 540/R-99/008, October.

U.S. Environmental Protection Agency (USEPA), 2004, Contract Laboratory Program National Functional Guidelines for Organic Methods Data Review, Office of Superfund Remediation and Technology Innovation (OSRTI), USEPA Publication No. 540-R-04-004, October.