Spring 2012 Semiannual Groundwater Sampling Report
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

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LIST OF ACRONYMS AND ABBREVIATIONS

Boomsnub	Boomsnub Corporation
CAS	Columbia Analytical Services, Inc.
cis-1,2-DCE	*cis*-1,2-dichloroethene
CFC-11	trichlorofluoromethane
CPU	Clark Public Utilities
1,1-DCE	1,1-dichloroethene
DO	dissolved oxygen
EA	EA Engineering, Science, and Technology, Inc.
EPA	U.S. Environmental Protection Agency
ft	feet
IWS	in-well stripping
Linde	Linde LLC (formerly The BOC Group, Inc.)
MCL	maximum contaminant level
MDL	method detection limit
µg/L	micrograms per liter
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
OU	operable unit
ORP	oxidation-reduction potential
PCE	tetrachloroethene
PDB	passive diffusion bag
QA	quality assurance
QASP	Quality Assurance and Sampling Plan
QC	quality control
ROD	Record of Decision
RPD	relative percent difference
Site	Boomsnub/Airco Superfund Site
SVE	soil vapor extraction

1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene
VOC	volatile organic compound

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1. INTRODUCTION

1.1 Background

This report presents the results of the Spring 2012 semiannual sampling event conducted at the Boomsnub/Airco Superfund Site (Site). The Site is located in Hazel Dell, Washington, just north of the city limits of Vancouver, Washington. A site location map is presented as Figure 1.

The Site includes two adjacent properties, the Linde LLC (Linde) facility and the former Boomsnub Corporation (Boomsnub) property. Linde was formerly known as The BOC Group and Airco Gases. The Site includes impacted groundwater in the alluvial and Troutdale aquifers (Operable Unit [OU]-3). The Site extends approximately 4,000 feet (ft) in a west-northwest direction from the two properties. The primary compounds of concern at the Site are hexavalent chromium and trichloroethene (TCE). The chromium and TCE plumes at the Site originate on the Boomsnub and Linde properties, respectively. These two plumes collectively are referred to as the OU-3 Plume.

In 2008, an investigation identified a new TCE plume north of the OU-3 Plume, in the area around well AMW-18 (EA 2008). This plume is referred to as the Northern Plume. Additional investigation of the Northern Plume area was performed in May 2011 (EA 2011), and a new monitoring well was installed in the Northern Plume area in February 2012. The source of this plume is unknown, but it does not appear to be related to OU-3. The U.S. Environmental Protection Agency (EPA) is leading the effort to characterize and remediate the Northern Plume.

Linde assumed responsibility for Site operations and maintenance on 1 April 2002, pursuant to an Administrative Order on Consent signed by Linde and the EPA (Docket No. CERCLA 10-2002-0052). The responsibility continues with the entry of a Consent Decree (Docket No. CO7-5163 FDB) on 29 June 2007. EA Engineering, Science, and Technology, Inc. (EA) operates three systems at the Site for Linde: one system that extracts and treats groundwater containing chromium and volatile organic compounds (VOCs); an in-well stripping (IWS) system that treats the VOC source area (OU-2); and an infiltration gallery on the Linde property which is used for discharge of treated groundwater. Two other treatment systems recently operated at the Site. A soil vapor extraction (SVE) system was operated from 2004 to 2008 to treat the vadose zone soil in OU-2. This system was turned off in 2008 with EPA approval. The Toe-of-Plume Pilot Study, an *in situ* treatment program, was successfully performed in 2006 to treat an area of recalcitrant contamination.

The Spring 2012 semiannual sampling event included collection of groundwater samples from selected wells at the site with analysis for VOCs and/or chromium. Figure 2 presents the locations of Site monitoring and extraction wells and identifies wells sampled during the Spring 2012 event.

1.2 Purpose and Scope

The goals of semiannual groundwater sampling at the Site include the following:

- Evaluating the progress of VOC remediation activities in the OU-2 area.
- Documenting the lateral and vertical extent of VOCs and chromium in groundwater.
- Monitoring changes in VOC and chromium concentrations in groundwater at monitoring and extraction wells across the Site.
- Evaluating groundwater flow patterns for the alluvial and Troutdale aquifers.

The following tasks were performed to accomplish these goals:

- Collected and analyzed groundwater samples from selected monitoring and extraction wells.
- Collected water level data from Site monitoring and extraction wells.

1.3 Organization of this Document

This report is divided into six sections and six appendices:

- Section 1 provides the project background and scope.
- Section 2 discusses field activities performed and samples collected.
- Section 3 provides a brief discussion of analytical results for environmental samples and groundwater elevation measurements.
- Section 4 presents information on data quality.
- Section 5 summarizes the findings and presents recommendations.
- Section 6 lists the references cited in this document.

Depth to groundwater measurements and calculated groundwater elevations are presented in Appendix A. Field groundwater purge and sampling forms are provided in Appendix B. Laboratory chain-of-custody documentation is provided in Appendix C. A summary of the analytical results is provided in Appendix D. A summary of the results of sampling of wells in the Northern Plume area is included in Appendix E.

2. FIELD ACTIVITIES

2.1 Overview

The Site sampling schedule is presented in the Long-Term Monitoring Plan (EA 2007), with updates provided in the 2011 Annual Status Report (EA 2012b). Wells included in the Spring 2012 sampling event were those on quarterly, semiannual, and annual sampling schedules. Additionally, wells AMW-14 and AMW-15 were sampled, as requested by EPA, prior to decommissioning of the wells. These wells were decommissioned with EPA approval, due to construction activities on the property. Sampling activities were conducted in accordance with the EPA-approved Quality Assurance and Sampling Plan (QASP; EA 2004) and the EPA-approved QASP Addendum for the Spring 2012 Semiannual Sampling Event (EA 2012a). These documents are referred to as the Reference QASP and the QASP Spring Addendum, respectively. Groundwater samples were analyzed by Columbia Analytical Services (CAS)/ALS Group of Kelso, Washington.

The Spring 2012 groundwater sampling activities were conducted in the field during the period from 23 April through 26 April 2012. Wells AMW-14 and AMW-15 were sampled on 6 April 2012, prior to decommissioning. Field personnel present during all or a portion of the sampling event and their responsibilities are listed in the table below.

EA Personnel	Responsibility
Mark Blinstrub	Field Sampling Team Leader/Health and Safety Supervisor
Rick Read	Field Sampling Team Member

The Spring 2012 semiannual sampling event included collection of groundwater samples from 30 wells. Samples from TCE Source (OU-2) wells were analyzed for VOCs. Samples from OU-3 wells were analyzed for VOCs and/or total chromium. Wells in the Northern Plume area also were sampled for VOCs for use in evaluating potential impacts to site remediation. Additional samples were collected for quality assurance/quality control (QA/QC), including field duplicates, equipment rinsate blanks, trip blanks, and matrix spike/matrix spike duplicates (MS/MSDs).

2.2 Field Methods

Approved monitoring and sampling methods were used in the field. The methods and procedures are described in the Reference QASP (EA 2004).

2.2.1 Water Level Gauging Program

A round of water level measurements was obtained from accessible monitoring and extraction wells during a 24-hour period. The water levels were measured to the nearest 0.01 ft relative to the top of the well casing using an electronic water level indicator. Water level measurements were collected while the extraction system was actively pumping to evaluate groundwater flow

across the site under drawdown conditions. A summary of the water level data is provided in Appendix A.

2.2.2 Extraction Well Sampling

The 16 active Site extraction wells were sampled during the Spring 2012 sampling event. Extraction wells are equipped with 3-inch diameter submersible pumps with operating flow rates ranging from 0.5 to 17 gallons per minute. Samples from the extraction wells were collected from sampling spigots located at the wellheads. At actively pumping extraction wells, the spigots were opened and the flow rate was adjusted to less than 0.5 liter per minute prior to measuring field water quality parameters and collecting samples. The field parameters measured consisted of pH, specific conductivity, temperature, dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP). Groundwater purge and sampling forms are included in Appendix B. Samples collected were analyzed for VOCs and total chromium.

2.2.3 Monitoring Well Sampling

Groundwater samples from monitoring wells were collected either by using low-flow purging and sampling techniques or by the use of passive diffusion bag (PDB) samplers.

2.2.3.1 Low-Flow Sampling

Samples requiring analysis for chromium and VOCs, were collected from Site monitoring wells using low-flow purging and sampling techniques. At each monitoring well location, water quality parameters (pH, specific conductivity, temperature, DO, turbidity, and ORP) were allowed to stabilize before sample collection, in accordance with the procedures outlined in the Reference QASP (EA 2004).

Electric submersible pumps were used to purge and sample the monitoring wells. Dedicated pumps have been installed in some, but not all, of the monitoring wells. Monitoring wells equipped with dedicated pumping systems are identified with an “M/D” on the table in Appendix A. Wells without dedicated pumps (identified with an “M” on the table) were sampled using a non-dedicated Grundfos™ submersible pump. This pump was decontaminated prior to each use following the decontamination procedures outlined in the Reference QASP (EA 2004). Groundwater purge and sampling forms are included in Appendix B.

2.2.3.2 Passive Diffusion Bag Sampling

Groundwater samples were collected from the OU-2 wells and selected OU-3 wells using PDB samplers. These samples were submitted for laboratory analysis of VOCs only. Field measurements of water quality parameters for wells sampled using PDB samplers are only required during the Fall sampling events. PDB sampling forms are included in Appendix B.

2.2.4 Private Well Sampling

One private well was sampled during the Spring 2012 sampling event. A groundwater sample was collected from the Bennett well (Parcel No. 149147-000) and analyzed for VOCs and total chromium. The sample was collected from the spigot at the wellhead, prior to any residential treatment system. Water was purged from the well for approximately 40 minutes before sampling, in accordance with the procedures used by Clark Public Utilities (CPU). Water quality parameters (pH, specific conductivity, temperature, DO, ORP, and turbidity) were measured before filling the sample bottles. Water from this well is used for non-potable purposes. Potable water for the residence is supplied by CPU.

2.3 Sample Quantities, Analyses, and Handling

All laboratory analyses were conducted by CAS in Kelso, Washington under direct contract with EA. Copies of the chain-of-custody forms that accompanied the samples to CAS are included in Appendix C. The following samples were collected and submitted for laboratory analysis during the Spring sampling event:

- Nineteen groundwater samples, three field duplicate samples, and three MS/MSD samples were collected from extraction and monitoring wells, and one private well, and analyzed for total chromium (EPA Method 200.7).
- Two groundwater samples were collected and analyzed for dissolved chromium (EPA Method 200.7) in addition to total chromium due to slightly elevated sample turbidity.
- Thirty groundwater samples, four field duplicate samples, and three MS/MSD samples were collected from extraction and monitoring wells, and one private well, and analyzed for VOCs (EPA Method 8260C).
- Two equipment rinsate samples were collected from the decontaminated Grundfos pump and analyzed for VOCs and total chromium.
- Four trip blanks were transported with the coolers of samples and were analyzed for VOCs.

Note that a field duplicate sample, equipment rinsate sample, trip blank and MS/MSD sample were collected on 6 April 2012, along with samples from monitoring wells AMW-14 and AMW-15. This resulted in a greater number of QC samples than would normally be collected for a sampling event of this size.

2.4 Problems Encountered and Resolution

The following is a summary of the problems encountered during the sampling event and their resolution.

- Clark County recently developed a large parcel of land (parcel no. 144505-000) overlying a portion of the Site including a number of Site wells. A portion of this parcel was developed as a roadway (NE 39th Avenue/NE 79th Street). Site wells/piezometers

MW-39/PZ-39 and MW-40/PZ-40 now lie within the roadway and require traffic control permits and procedures to allow access. Therefore, routine water level measurements from these wells are no longer practical. Nearby shallow monitoring well MW-38 is still accessible and will provide sufficient data for determining the groundwater elevation in this area. Water levels also will be measured in these wells when/if they are sampled. PZ-39 was sampled during this event and the water level was measured at that time.

- Depth-to-water measurements were not obtained from several wells during the round of water level measurements, as follows:
    - AMW-20 – Standing water was present over the well monument. This well, which is no longer sampled, is located in a low area where water ponds during heavy rainfall events. AMW-20 is redundant for use in determining groundwater elevations due to the proximity of numerous other shallow wells; therefore, water level measurements are not needed from this well.
    - MW-39/PZ-39 and MW-40/PZ-40 – These wells are now located in the middle of a roadway and access was not reasonably available, as described above. In the future, water levels will be measured in these wells only when they are sampled.
    - MW-31, MW-32, MW-35, and MW-37 – Permission to access the property which includes these wells was not granted by the property owner during this event. Access issues for this property are being discussed with the property owner and EPA.

3. SUMMARY OF RESULTS

This section summarizes the analytical results for environmental samples and groundwater elevation data. In the following discussion, chromium and TCE results are presented by aquifer (alluvial and Troutdale) and by well grouping. Concentrations of additional contaminants detected are also briefly discussed. Note that concentration trends observed in Site groundwater, by aquifer and well grouping, are presented in the Annual Status Reports, the most recent of which was prepared for 2011 (EA 2012b).

The alluvial aquifer is divided geographically into the following well groupings: Upgradient wells, TCE Source wells, Proximal wells, Intermediate wells, Church of God wells, and Toe-of-Plume wells (including Sentinel and Other Toe wells). Well groupings are presented in Table 1 and shown on Figure 3.

Tables 2 through 5 present data for wells sampled during the Spring 2012 event. A summary of the analytical results for total chromium and selected VOCs is presented in Table 2. Wells with analytical results at or above the cleanup levels are presented in Table 3. Table 4 presents a summary of the chromium analytical results for each well along with results for the previous three semiannual sampling events for comparison purposes; note that only wells sampled for chromium are included in Table 4. Table 5 presents a summary of the TCE analytical results for each well sampled for TCE, along with results for the previous three semiannual sampling events for comparison purposes.

Contour maps for the chromium concentrations and the OU-3 TCE concentrations in the alluvial aquifer groundwater are shown on Figures 4 and 5, respectively. Analytical results for the samples collected during the Spring 2012 semiannual event are included in Appendix D.

3.1 Chromium Results and Distribution

As shown on Table 4, in 3 of 19 groundwater samples collected during the Spring 2012 event chromium was detected at concentrations above the Site-specific cleanup level of 80 micrograms per liter (µg/L), as established in the Record of Decision (ROD) for the Site (EPA 2000). The following subsections summarize the chromium results by aquifer and well grouping.

3.1.1 Alluvial Aquifer

Alluvial aquifer monitoring and extraction wells from the following well groupings were sampled for chromium during the Spring 2012 sampling event: Proximal, Intermediate, and the Church of God.

3.1.1.1 Proximal Wells

The Proximal wells are located west of the maintenance building (former machine shop) on the Boomsnub property and east of NE St. Johns Road. This group includes wells within the chromium source area. The following four active extraction wells in this group were sampled for chromium during the Spring 2012 sampling event: MW-6B, MW-10B, MW-10C, and PW-1B.

Chromium concentrations were below the 80 µg/L groundwater cleanup level in three of the four wells sampled (Table 4). Chromium concentrations in groundwater exceeded the cleanup level in well MW-10C (116 µg/L). Concentrations in this well continue to fluctuate. Historically, chromium concentrations in groundwater from wells in the Proximal area have fluctuated, with an overall decreasing trend.

3.1.1.2 Intermediate Wells

The Intermediate wells are located west of NE St. Johns Road and north and south of NE 78th Street (Figure 3). The following five active extraction wells in this group were sampled for chromium during the Spring 2012 sampling event: MW-14C, MW-14E, MW-18D, MW-19D, and MW-20D.

Chromium concentrations were below the 80 µg/L groundwater cleanup level in three of the five wells sampled (Table 4). Chromium concentrations exceeded the cleanup level in groundwater samples from the following two wells: MW-18D (109 µg/L) and MW-19D (113 µg/L). Chromium concentrations in groundwater samples from wells in this area continue in a decreasing trend (Table 4).

3.1.1.3 Church of God Wells

The Church of God wells are located north of NE 78th Street, between the west side of the Clark County sports fields and the western Church of God property line. Nine wells in this area were sampled including the seven active extraction wells and monitoring wells AMW-14 and AMW-15.

Chromium concentrations were below the 80 µg/L groundwater cleanup level in all nine wells sampled (Table 4). Wells AMW-14 and AMW-15 were also sampled for dissolved chromium due to slightly elevated turbidity measurements. The dissolved and total chromium concentrations in these two wells were very similar (see Table 4). Chromium concentrations in groundwater in the Church of God area continue on a decreasing trend.

3.1.2 Troutdale Aquifer

The Troutdale aquifer is a primary drinking water source for several water districts in Clark County. The Bennett private well was the only well sampled during the Spring 2012 sampling event that is screened in the Troutdale aquifer. Chromium was not detected in this Troutdale

aquifer well. Historically, chromium concentrations have not exceeded the chromium cleanup level in groundwater samples from Troutdale aquifer monitoring wells.

3.2 Trichloroethene Results and Distribution

As shown in Table 5, TCE was detected at concentrations at or above the Site-specific cleanup level of 5 µg/L, as established in the ROD (EPA 2000), in 17 of the 30 groundwater samples collected during the Spring 2012 event. The following subsections summarize the TCE results by aquifer and well grouping . The distribution of TCE at the site, based on the Spring 2012 sampling results is depicted on Figure 5.

3.2.1 Alluvial Aquifer

3.2.1.1 TCE Source Wells

The TCE Source wells are located on the western half of the Linde property. A source removal system was constructed in this area in September 2003 and operations began in February 2004. Most of the wells in this group are part of the OU-2 monitoring program.

The TCE concentration was below the 5 µg/L groundwater cleanup level in one of the five wells sampled in this area (Table 5). TCE concentrations exceeded the cleanup level in groundwater samples from the following four wells: AMW-1A (5.7 µg/L), AMW-2A (6.1 µg/L), AMW-12A (27 µg/L), and MW-1A (6.1 µg/L). The TCE concentrations in four of these five wells decreased in comparison to the last time they were sampled. Historically, the TCE concentrations in wells in this area tend to fluctuate, with an overall decreasing trend.

3.2.1.2 Proximal Wells

TCE concentrations were below the 5 µg/L groundwater cleanup level in three of the four wells sampled for TCE in this area (Table 5). TCE remains above the cleanup level in well MW-10B, at a concentration of 16 µg/L. Historically, TCE concentrations in groundwater samples from this area have been on an overall decreasing trend.

3.2.1.3 Intermediate Wells

TCE concentrations in two of the 11 wells sampled in this area (AMW-16 and MW-15E) were below the 5 µg/L groundwater cleanup level. TCE concentrations exceeded the cleanup level in from the following nine wells: MW-14C, MW-14E, MW-18D,MW-19D, MW-20D, PZ-39, AMW-17, AMW-18 and AMW-64 (Table 5). It should be noted that sampling in this area included three monitoring wells (AMW-17, AMW-18 and AMW-64) which are impacted by the Northern Plume, and are included with the nine wells that had exceedances of the TCE cleanup level. New monitoring well AMW-64 was installed in the Northern Plume area on 1 February 2012, as directed by EPA. TCE concentrations in samples collected from the Northern Plume wells exceeded the cleanup level at 160 µg/L in AMW-17, 52 µg/L in AMW-18, and 160 µg/L

in AMW-64. Additional discussion of the Northern Plume, including previous monitoring results, is provided in Appendix E.

TCE concentrations in samples collected from the OU-3 plume remain above the 5 µg/L cleanup level in the following wells: MW-14C (11 µg/L), MW-14E (72 µg/L), MW-18D (47 µg/L), MW-19D (30 µg/L), MW-20D (47 µg/L), and PZ-39 (56 µg/L). The TCE concentration in MW-15E (4. 5 µg/L) dropped below the cleanup level for the first time during the Spring 2012 sampling event. TCE concentrations in groundwater samples collected from wells in this area remained relatively constant or decreased in comparison to previous sampling results. Historically, TCE concentrations in groundwater samples from wells in this area have been on a decreasing trend.

3.2.1.4 Church of God Wells

TCE concentrations were below the 5 µg/L groundwater cleanup level in six of the nine wells sampled for TCE in this area. TCE concentrations exceeded the cleanup level in groundwater samples from the following three wells: AMW-27 (12 µg/L), MW-21D (5.4 µg/L), and MW-22D (6.8 µg/L). TCE concentrations in samples collected from wells in this area continue on a decreasing trend (Table 5).

3.2.2 Troutdale Aquifer

The Bennett private well was the only Troutdale aquifer well sampled during the Spring 2012 sampling event (Table 5) and the TCE concentration was below the 5 µg/L cleanup level (Table 5). The TCE concentration in this well continues to fluctuate above and below the cleanup level.

3.3 Other Detected VOCs

Several additional VOCs were detected at the Site. Results for these compounds, in relation to site cleanup levels, are briefly described in the following subsections.

3.3.1 Tetrachloroethene Results and Distribution

Tetrachloroethene (PCE) was not detected above the 5 µg/L site-specific cleanup level as established in the ROD (EPA 2000) in any of the 30 groundwater samples collected during the Spring 2012 sampling event (Table 2).

3.3.2 Trichlorofluoromethane Results and Distribution

Trichlorofluoromethane (CFC-11) was not detected above the 2,400 µg/L Model Toxics Control Act (MTCA) Method B cleanup level in any of the 30 groundwater samples collected during the Spring 2012 sampling event (Table 2).

3.3.3 1,1,1-Trichloroethane Results and Distribution

The compound 1,1,1-trichloroethane (1,1,1-TCA) was not detected above the 200 µg/L site-specific cleanup level, as established in the ROD (EPA 2000), in any of the 30 groundwater samples collected during the Spring 2012 sampling event (Table 2).

3.3.4 1,1-Dichloroethene Results and Distribution

The compound 1,1-dichloroethene (1,1-DCE) was detected above the 1.0 µg/L site-specific cleanup level as established in the ROD (EPA 2000) in 5 of the 30 groundwater samples collected during the Spring 2012 event (Table 2). Wells with 1,1-DCE concentrations above the cleanup level were alluvial aquifer wells MW-14E (3.5 µg/L), MW-19D (1.4 µg/L), MW-20D (3.3 µg/L), PZ-39 (4.0 µg/L), and AMW-64 (2.5 µg/L). All of these wells are in the Intermediate Zone.

3.3.5 Cis-1,2-Dichloroethene Results and Distribution

The compound *cis*-1,2-dichloroethene (*cis*-1,2-DCE) was not detected above the 70 µg/L EPA Maximum Contaminant Level (MCL) in any of the 30 groundwater samples collected during the Spring 2012 sampling event (Table 2).

3.4 Groundwater Elevations

Depth-to-groundwater measurements were collected from monitoring and extraction wells during the Spring 2012 semiannual event. Both alluvial aquifer and Troutdale aquifer wells were gauged on 26 May 2012. Groundwater levels were measured under active pumping conditions. The groundwater elevation for each well was determined by subtracting the depth-to-groundwater measurement from the surveyed top-of-casing measurement. Groundwater elevations and well construction details are presented in Appendix A.

Generalized groundwater elevation contour maps for the alluvial and Troutdale aquifers for the Spring 2012 water level gauging event are presented as Figures 6 and 7, respectively. These contour maps are similar to those generated based on previous sampling events.

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4. ANALYTICAL DATA QUALITY

This section summarizes the results of the data quality assessment and the analytical results for the QA/QC samples collected during the Spring 2012 semiannual groundwater monitoring event. In accordance with the Consent Decree, full data validation is only required for one data package from Fall semiannual sampling events; therefore full validation was not performed on data generated during this sampling event. The analytical results for the environmental and QA/QC samples are contained in Appendix D.

4.1 Data Quality Assessment

The analytical data quality was assessed through a review of the reported results. The review encompassed an evaluation of the following, as appropriate for the analytical method:

- Data package completeness
- Holding times and condition at laboratory receipt
- Detection limits
- Blanks results
- Blank spike recoveries
- Matrix spike recoveries and relative percent difference (RPD)
- Surrogate recoveries
- Field and laboratory duplicate RPD
- Target analyte list verification

The analytical results for project samples are acceptable as reported and usable for the intended purpose; none of these data have been qualified, except as noted below. None of these data have been rejected.

4.2 Field Duplicates

Four field duplicates were collected to evaluate the precision of sampling procedures and laboratory analyses. The following table presents a summary of the field duplicates and associated field samples collected.

Field Duplicate Summary

Well ID	Sample No.	Field Duplicate Sample No.	Analysis	Sample Collection Date	Sample Collection Time
AMW-14	1214002	1214003	VOCs/Total Chromium	6 April 2012	14:23/1430
AMW-27	1217004	1217005	VOCs/Total Chromium	23 April 2012	11:48/11:50
MW-19D	1217015	1217016	VOCs/Total Chromium	23 April 2012	16:15/16:20
AMW-2A	1217032	1217033	VOCs	25 April 2012	14:20/14:30

NOTE: VOCs = Volatile organic compounds.

The precision between primary and duplicate field sample results is specified in the Reference QASP (EA 2004) as a maximum relative percent difference (RPD) of 25 percent. The calculated

RPDs were within the project established limit of 25 percent for the field duplicate and original sample results, with one exception. The RPD exceeded the limit of 25 percent for the field duplicate and original sample results for PCE for the samples collected at AMW-14. The results were already flagged as estimated for these two samples because the detected results were reported above the method detection limit (MDL) but below the reporting limit. A comparison of VOC and chromium concentrations for primary and duplicate groundwater samples is presented in Table 6.

4.3 Equipment Rinsate Blanks

Two equipment rinsate samples (shown in the following table below) were collected to evaluate the effectiveness of field decontamination procedures and to assess the incidental introduction of contaminants into non-disposable sampling equipment. The equipment rinsate samples were analyzed for the same parameters as the associated field samples.

Equipment Rinsate Blank Summary

Sample No.	Analyses	Sample Collection		Comments
		Date	Time	
1214005	VOCs/Total Chromium	6 April 2012	15:15	Associated with 1214002 through 1214004, 1214006, and 1214007
1217023	VOCs	24 April 2012	15:10	Associated with 1217021, 1217022, and 1217024

The chromium and/or VOC analytical results for equipment rinsate blank samples were reported below the MDLs, with the following exception: 1217023 dichloromethane (methylene chloride) (0.12 µg/L). This compound was not detected in the associated samples, with the following exception. Methylene chloride was detected in sample 1217024 (AMW-64) at an estimated concentration of 0.10 µg/L. This result has been flagged as estimated and nondetectable with the UJ qualifier on the basis of this field blank result.

4.4 Trip Blanks

The results of the trip blanks are used to evaluate the potential for sample cross-contamination during sample handling, shipping, or storage on site or at the laboratory. Trip blanks were collected to assess the potential for VOC cross-contamination. A trip blank was included in each cooler that contained project samples for VOC analysis, as specified in the Reference QASP (EA 2004). The following table presents a summary of the trip blank samples collected. The trip blanks were reported free of VOC contamination, with the exception of methylene chloride detected in the following samples: 1214001 (1.1 µg/L), 1217001 (0.14 J µg/L), 1217025 (0.13 J µg/L), and 1217035 (0.13 J µg/L). Methylene chloride was not detected in the associated samples, with the exception of sample 1217024 (AMW-64) at an estimated concentration of 0.10 µg/L. This result has been flagged as estimated and nondetectable with the UJ qualifier on the basis of this field blank result.

Trip Blank Summary	
Sample No.	**Associated Field Samples**
1214001	1214002 through 1214007
1217001	1217002 through 1217010
1217025	1217021 through 1217024 and 1217026 through 1217034
1217035	1217011 through 1217020

4.5 Completeness

Usable analytical data were available for the VOC and chromium analyses; therefore, the total analytical completeness was 100 percent. Analytical completeness was calculated by reviewing the number of acceptable analytical results against the total number of analytical results. The entire set of planned field samples were collected, resulting in a field completeness of 100 percent.

4.6 Data Review Summary

The following table summarizes the findings for the data quality assessment.

Data Quality Assessment Summary									
Parameter	**Holding Time**	**Field/Method Blank Contamination**	**Precision**		**Accuracy**			**Completeness**	
			Lab	**Field**	**SMC**	**MS/ MSD**	**LCS**	**Analytical**	**Field**
VOCs	X	XJ	X	XJ	X	X	X	100%	100%
Chromium	X	X	X	X	NA	X	X	100%	100%

NOTE:
X = The data are usable as reported based on the review of this quality measurement.
J = There are estimated results due to QC issues.
SMC = System monitoring compound surrogate.
MS/MSD = Matrix spike/matrix spike duplicate.
LCS = Laboratory control sample.
NA = The quality measurement does not apply to this matrix or analytical methodology.
VOCs = Volatile organic compounds.

The data collected as part of the Spring 2012 semiannual groundwater monitoring event were found to meet the standards established in the Reference QASP (EA 2004).

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5. FINDINGS AND RECOMMENDATIONS

5.1 Findings

In general, contaminant concentrations in groundwater across the Site have decreased or remained stable since the previous semiannual sampling event. Notable exceptions are identified below. No significant changes to the plume footprints, as shown in Figures 4 and 5, were noted.

5.1.1 Chromium

Chromium concentrations were below the 80 µg/L Site-specific cleanup level in all wells sampled in the Church of God Area and in the one Troutdale aquifer well sampled. TCE Source Area wells were not sampled for chromium during the Spring 2012 sampling event. Chromium concentrations exceeded the cleanup level in three of 19 wells sampled during this event, in the Proximal and Intermediate well groups. The highest chromium concentration detected was in groundwater from Proximal well MW-10C (116 µg/L), where the chromium concentration increased from Fall 2011 (70 µg/L). Fluctuations in chromium concentrations in groundwater collected from wells in the Proximal group, in and near the chromium source area, are typical. Chromium concentrations continue to decrease in wells in other areas of the Site.

5.1.2 Trichloroethene

TCE concentrations exceeded the cleanup level in 17 of 30 wells sampled during this event, including wells in the following well groups: TCE Source, Proximal, Intermediate, and Church of God. TCE concentrations continue to decrease in Site wells, with the exception of wells in the Northern Plume area. Well AMW-17 and new well AMW-64, located within the Northern Plume, both had TCE concentrations of 160 µg/L in Spring 2012, higher than TCE concentrations detected within the OU-3 plume.

5.2 Recommendations

Based on the findings of the Spring 2012 semiannual sampling event, the following recommendation is made:

- Continue sampling the wells in accordance with the schedule in the 2011 Annual Status Report (EA 2012b), with revisions as described in the QASP Addendums and as approved by EPA. This schedule will be updated, as appropriate, in the 2012 Annual Status Report.

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6. REFERENCES

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Figures

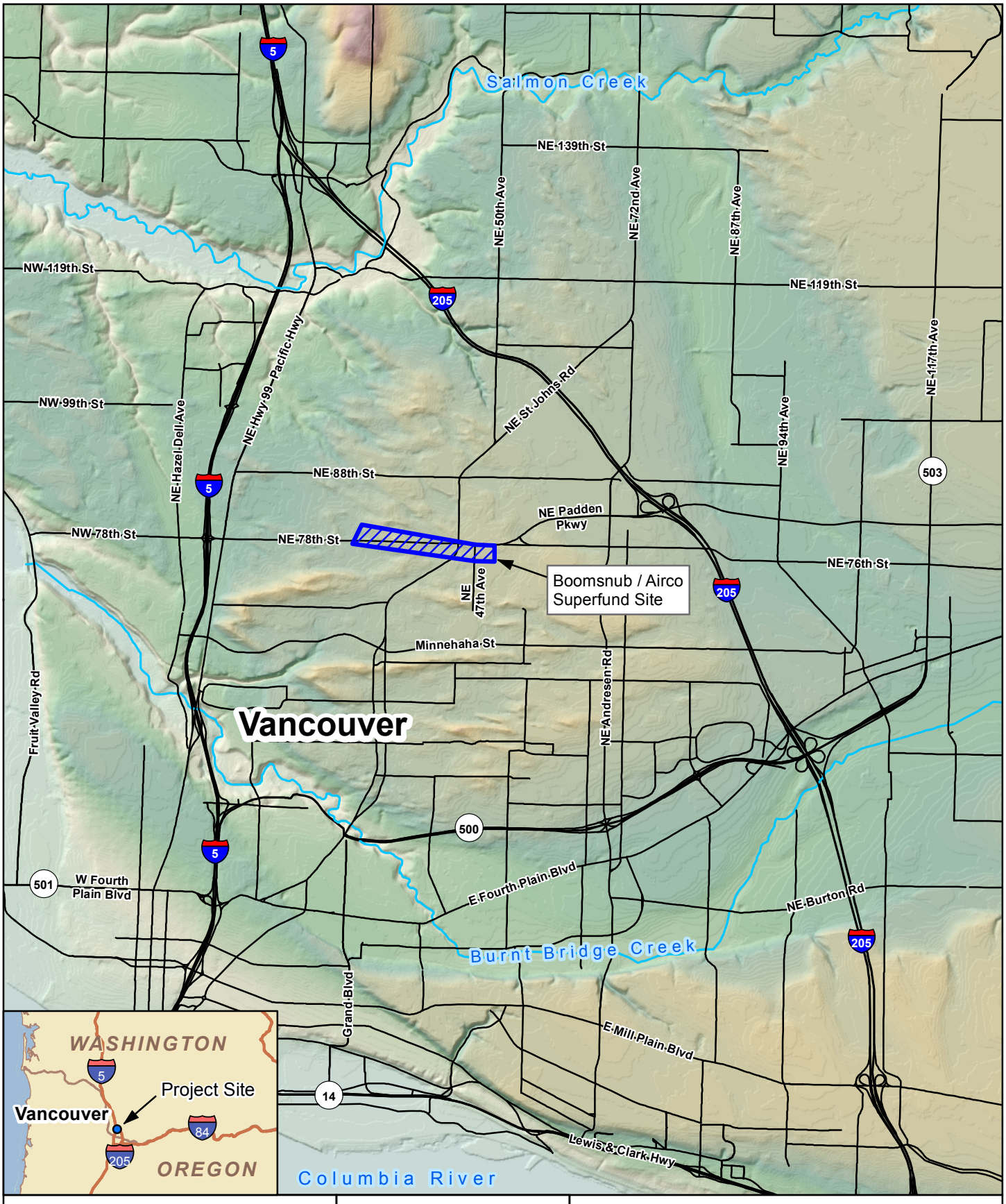

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FIGURE 1
SITE LOCATION MAP

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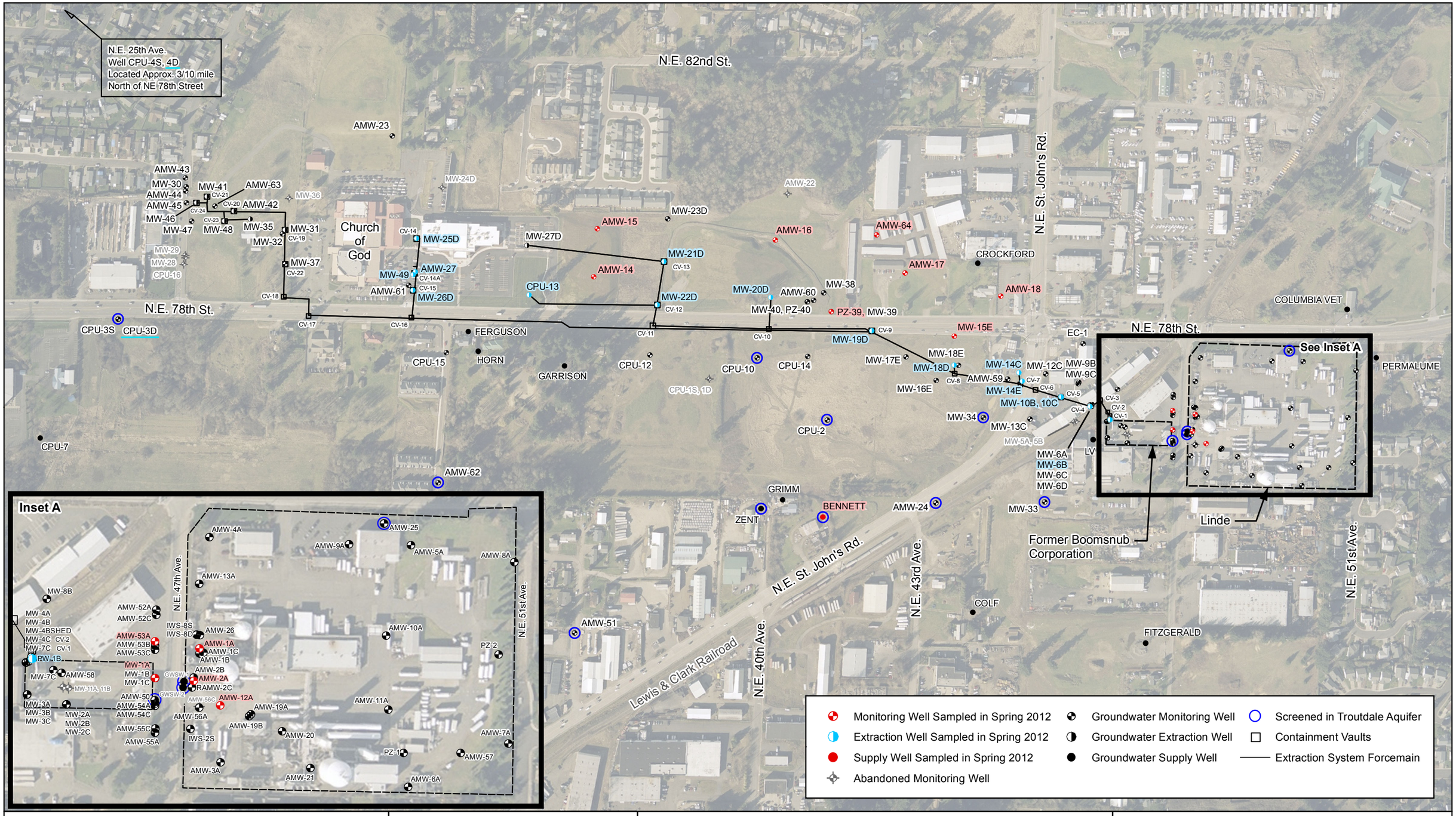

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FIGURE 2
SAMPLING LOCATIONS, SPRING 2012

EA Project No. 14495.05
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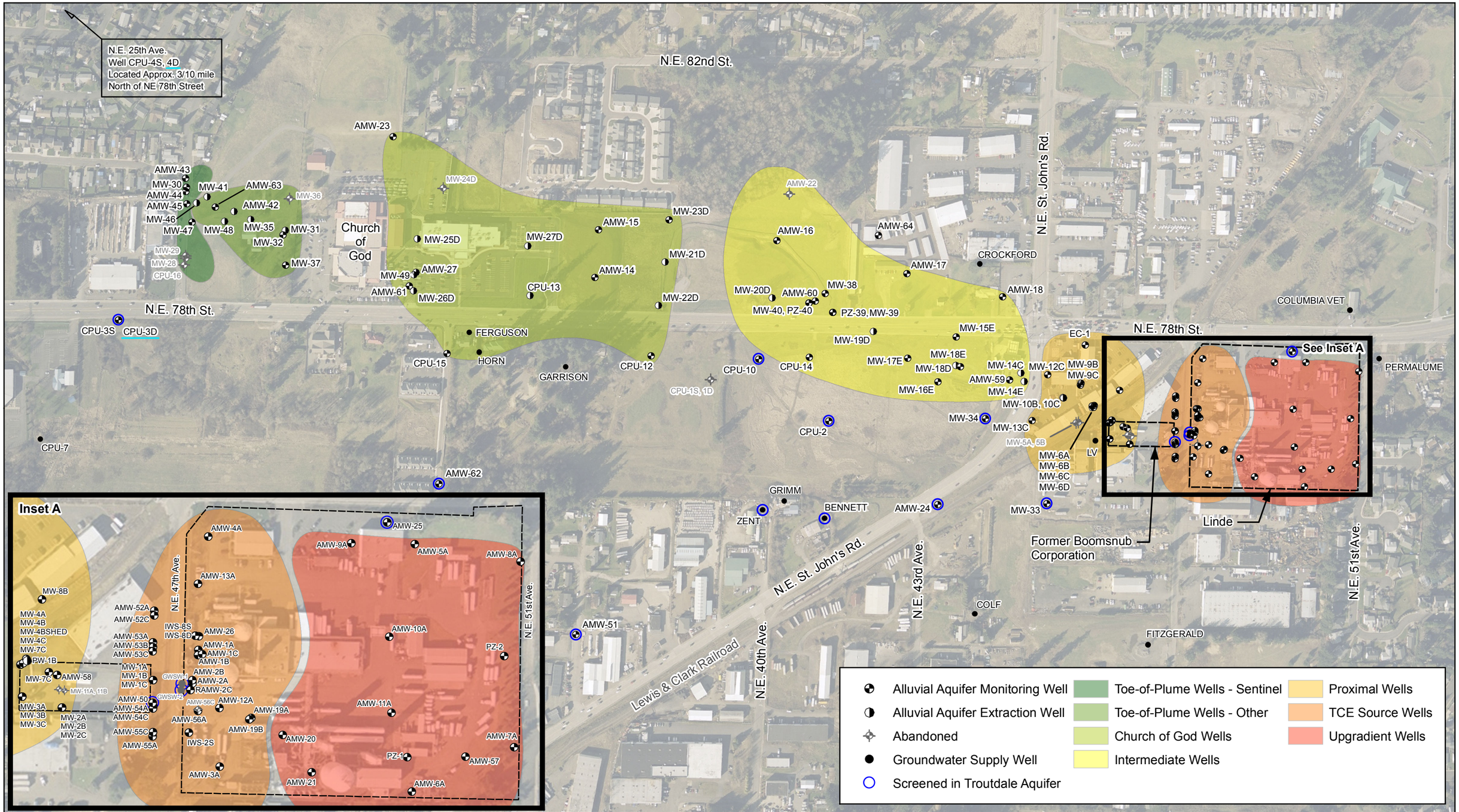

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FIGURE 3
EXTRACTION AND MONITORING WELL GROUPINGS

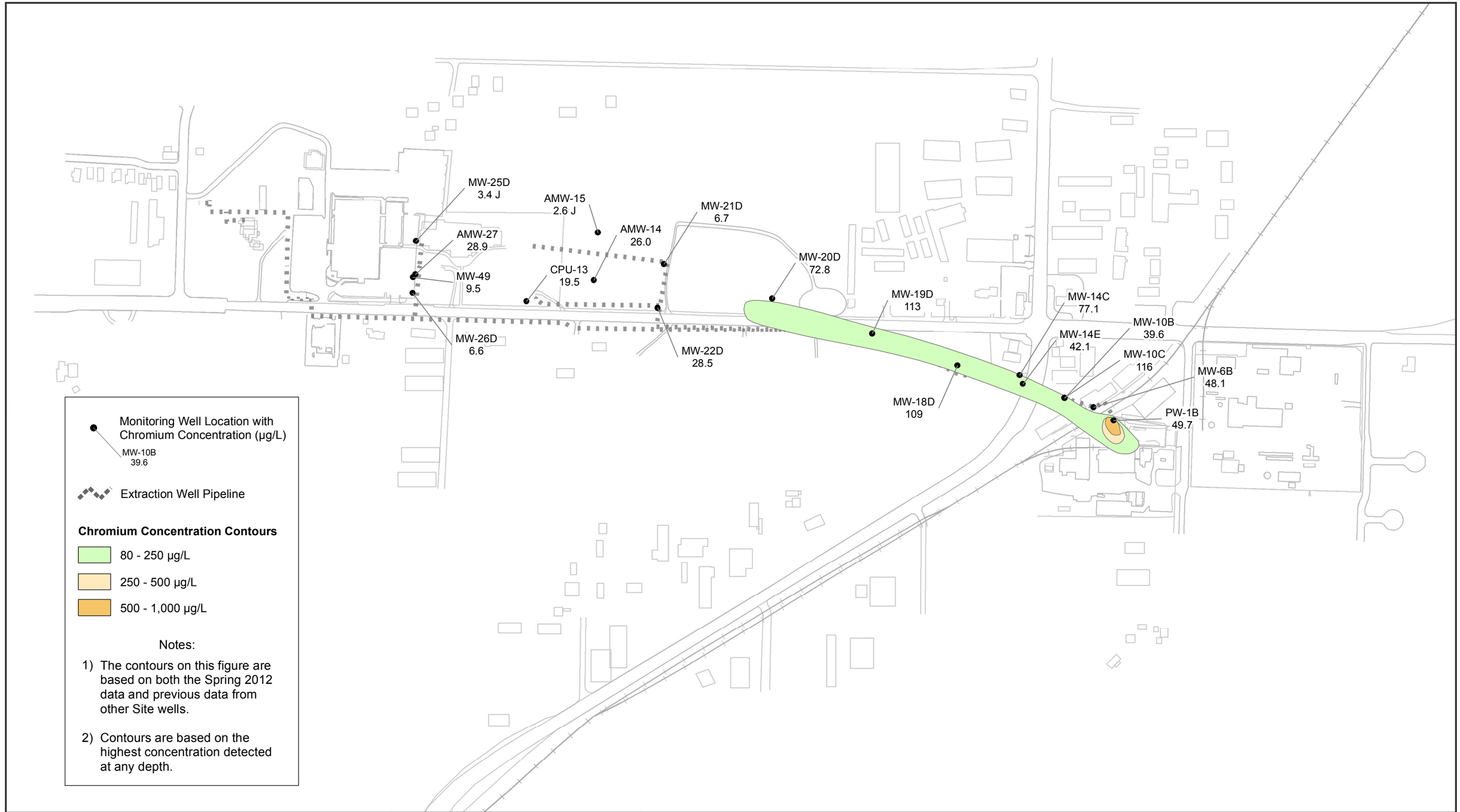

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FIGURE 4
CONTOUR MAP OF CHROMIUM CONCENTRATIONS
IN THE ALLUVIAL AQUIFER, SPRING 2012

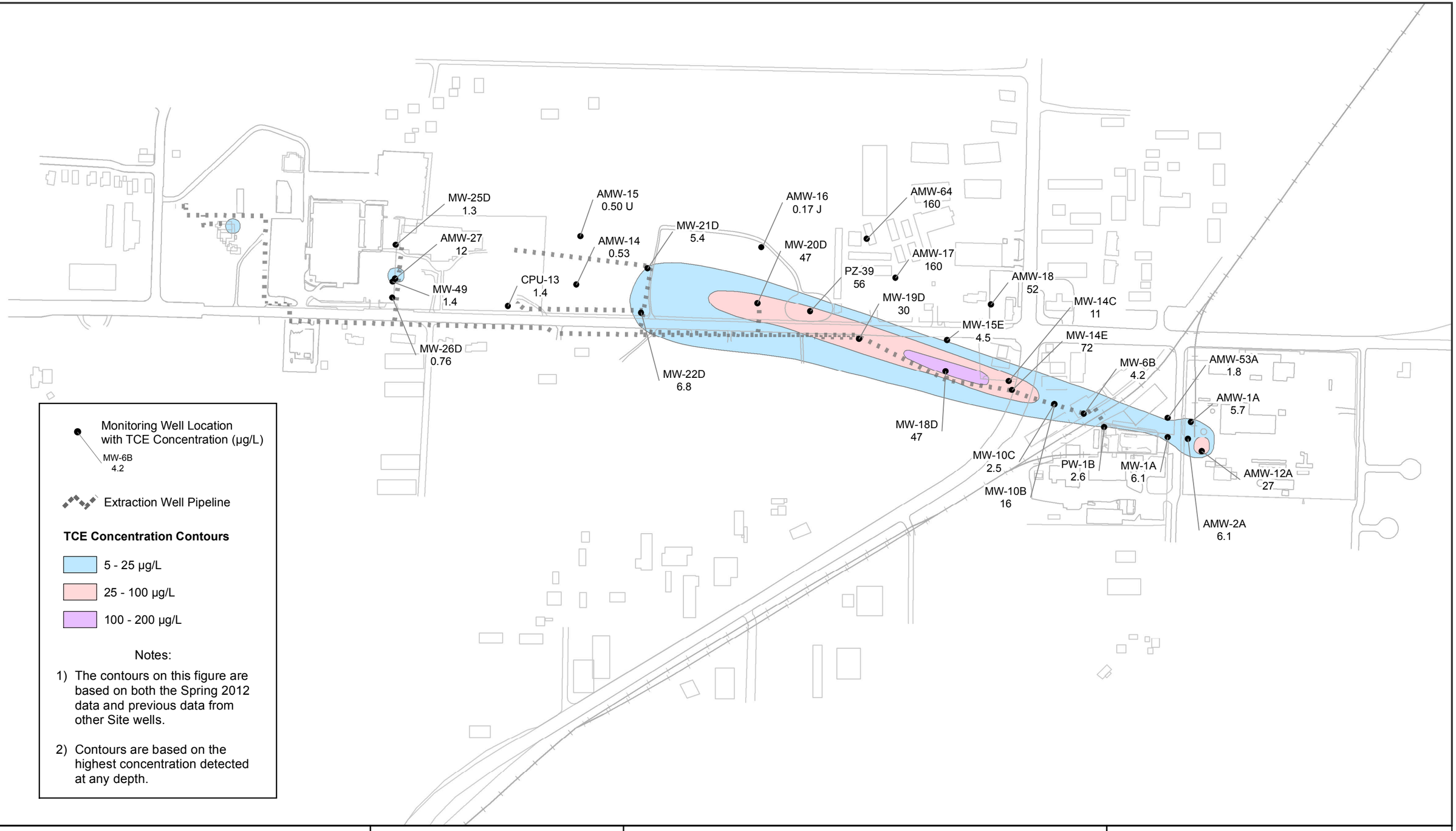

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FIGURE 5
CONTOUR MAP OF TRICHLOROETHENE CONCENTRATIONS IN THE ALLUVIAL AQUIFER (OU-3)
SPRING 2012

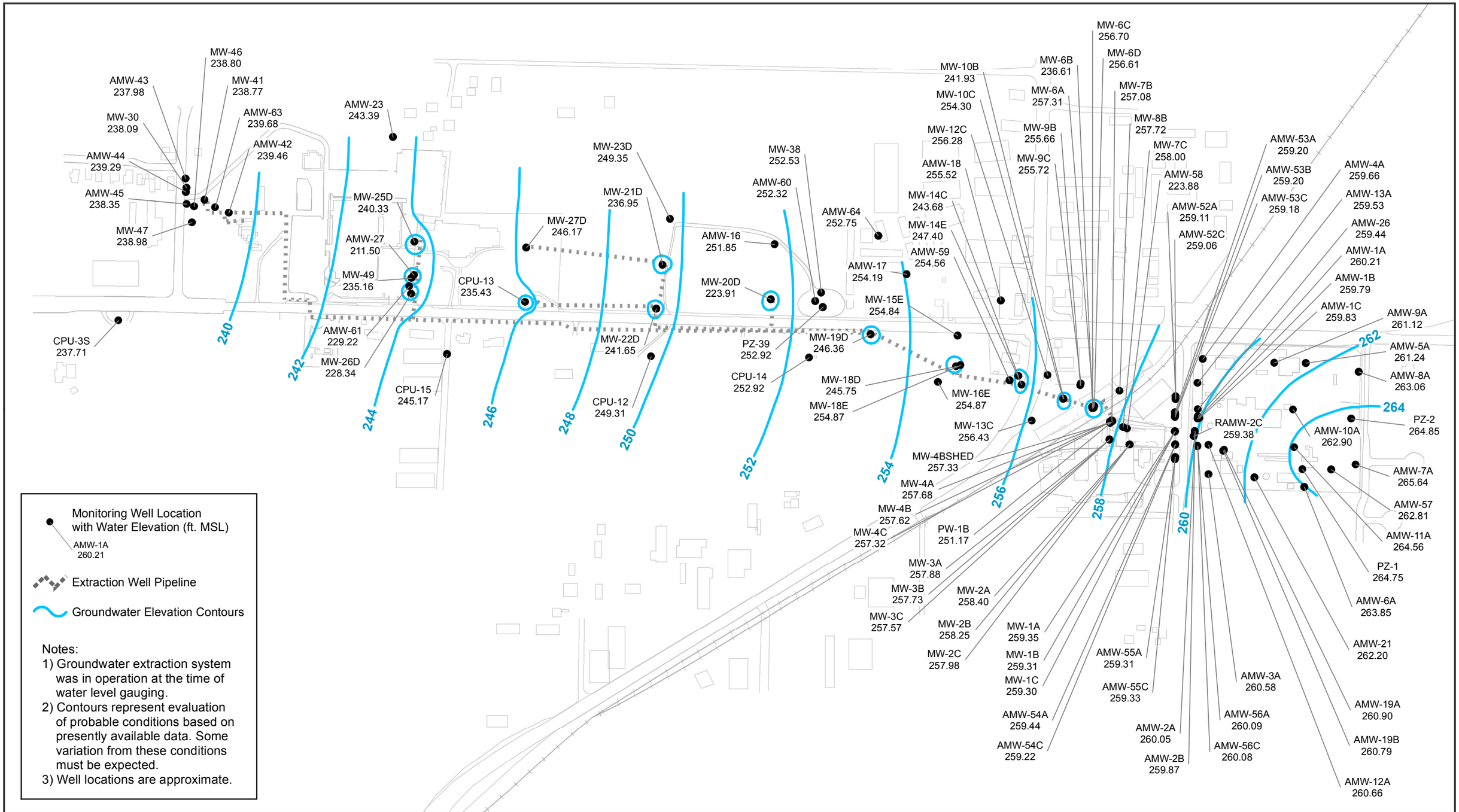

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FIGURE 6
ALLUVIAL AQUIFER GROUNDWATER CONTOURS
SPRING 2012

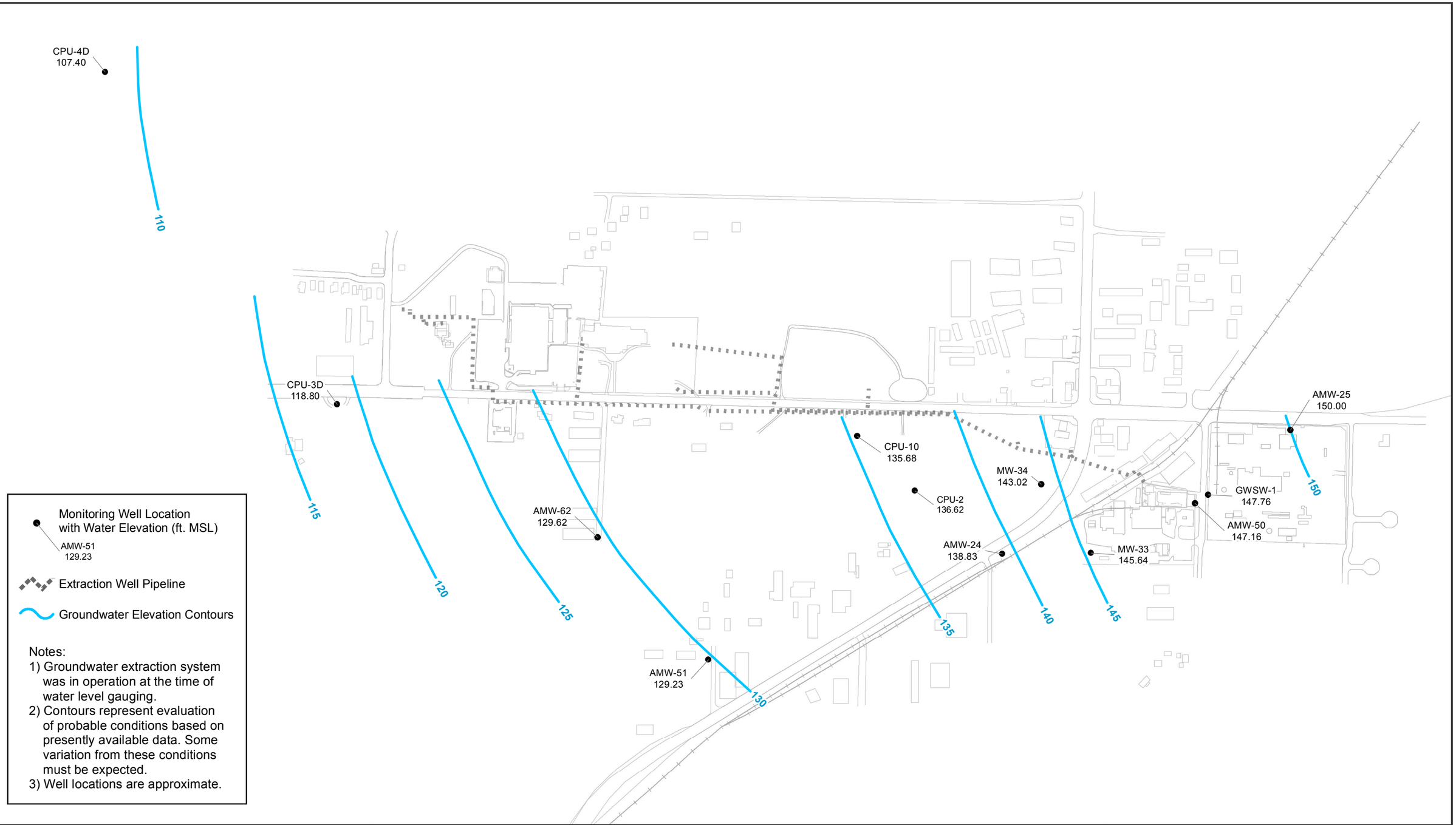

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FIGURE 7
TROUTDALE AQUIFER GROUNDWATER CONTOURS
SPRING 2012

Tables

Table 1. Extraction and Monitoring Well Groupings

Well Group	AMW Wells	MW Wells	Other Wells
Upgradient	AMW-6A AMW-7A AMW-8A AMW-10A AMW-11A		
TCE Source (OU-2)	**AMW-1A** **AMW-2A** AMW-2B AMW-3A **AMW-12A** AMW-13A AMW-19A AMW-26 AMW-26 AMW-52A **AMW-53A** AMW-54A AMW-55A AMW-56A	**MW-1A**	
Proximal	AMW-58	MW-2A MW-3A MW-4A MW-4B MW-6A **MW-6B** MW-7B MW-8B MW-9B **MW-10B** **MW-10C** MW-12C MW-13C	**PW-1B**
Intermediate	**AMW-16** **AMW-17** **AMW-18** AMW-59 **AMW-64**	**MW-14C** **MW-14E** **MW-15E** MW-16E **MW-18D** MW-18E **MW-19D** **MW-20D** MW-38	CPU-14 **PZ-39**
Church of God	**AMW-14** **AMW-15** **AMW-27** AMW-61	**MW-21D** **MW-22D** MW-23D **MW-25D** **MW-26D** MW-27D **MW-49**	CPU-12 **CPU-13**
Toe of Plume: Other Toe	AMW-42	MW-31 MW-35 MW-41	
Troutdale Aquifer	AMW-24 AMW-25 AMW-50 AMW-51 AMW-62	MW-33 MW-34	**Bennett** CPU-2 CPU-3D CPU-10

NOTES:
- Wells shown in **bold** and shaded were sampled during the Spring 2012 semiannual monitoring event.
- AMW wells were installed by Linde LLC.
- MW wells were installed by the U.S. Environmental Protection Agency or Washington Department of Ecology.
- CPU wells were installed by Clark Public Utilities.
- Only wells being sampled as part of the current monitoring plan are listed on this table.

Table 2. Summary of Chromium and Selected VOC Concentrations in Groundwater Samples—Spring 2012 (in µg/L) [a]

Well Group	Well	Chromium	TCE	PCE	CFC-11	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE
TCE Source (OU-2)	AMW-1A	NA	**5.7**	0.20 J	1.5	0.61	0.11 J	0.07 J
	AMW-2A	NA	**6.1**	0.51	3.6	0.19 J	0.50 U	0.07 J
	AMW-12A	NA	**27**	0.43 J	0.38 J	0.12 J	0.42 J	0.20 J
	AMW-53A	NA	1.8	0.13 J	0.74	0.50	0.50 U	0.08 J
	MW-1A	NA	**6.1**	0.99	0.51	0.14 J	0.50 U	0.50 U
Proximal	MW-6B	48.1	4.2	0.69	0.33 J	0.12 J	0.50 U	0.09 J
	MW-10B	39.6	**16**	1.2	0.18 J	0.50 U	0.16 J	0.11 J
	MW-10C	**116**	2.5	0.80	0.56	0.50 U	0.50 U	0.50 U
	PW-1B	49.7	2.6	0.62	0.50 U	0.50 U	0.50 U	0.50 U
Intermediate	AMW-16	NA	0.17 J	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	MW-14C	77.1	**11**	0.90	0.15 J	0.50 U	0.50 U	0.50 U
	MW-14E	42.1	**72**	4.0	0.44 J	0.24 J	**3.5**	3.6
	MW-15E	NA	4.5	0.26 J	0.16 J	0.09 J	0.08 J	0.50 U
	MW-18D	**109**	**47**	2.3	1.1	0.29 J	0.79	0.51
	MW-19D	**113**	**30**	1.9	0.59	0.50 U	**1.4**	0.37 J
	MW-20D	72.8	**47**	1.3	0.45 J	0.12 J	**3.3**	0.61
	PZ-39	NA	**56**	1.5	8.9	0.97	**4.0**	1.1
Northern Plume	AMW-17	NA	**160**	0.85	0.50 U	1.3	0.76	0.50 U
	AMW-18	NA	**52**	0.19 J	0.53	0.29 J	0.09 J	0.50 U
	AMW-64	NA	**160**	0.31 J	0.50 U	1.7	**2.5**	0.43 J
Church of God	AMW-14	26	0.53	0.21 J	0.50 U	0.50 U	0.50 U	0.50 U
	AMW-15	2.6 J	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
	AMW-27	28.9	**12**	2.6	0.17 J	0.16 J	0.71	0.09 J
	CPU-13	19.5	1.4	0.54	0.27 J	0.50 U	0.50 U	0.50 U
	MW-21D	6.7	**5.4**	0.15 J	0.44 J	0.16 J	0.99	0.48 J
	MW-22D	28.5	**6.8**	2.3	0.30 J	0.50 U	0.27 J	0.50 U
	MW-25D	3.4 J	1.3	0.50 U	0.50 U	0.12 J	0.19 J	0.24 J
	MW-26D	6.6	0.76	0.27 J	0.20 J	0.50 U	0.50 U	0.50 U
	MW-49	9.5	1.4	0.30 J	0.50 U	0.50 U	0.50 U	0.50 U
Troutdale	BENNETT	5.0 U	3.8	0.50 U	0.50 U	0.16 J	0.63	1.2
Cleanup or Guidance Level		80	5	5	2,400	200	1	70

NOTES:

Results in **bold** are at or above the established cleanup or guidance level for the compound.

[a] The concentrations listed in the table are the maximum of the normal and duplicate samples (as applicable).

J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.

NA = The sample was not analyzed for the specified compound.

PCE = Tetrachloroethene.

1,1,1-TCA = 1,1,1-Trichloroethane.

TCE = Trichloroethene.

CFC-11 = Trichlorofluoromethane.

µg/L = Micrograms per liter.

1,1-DCE = 1,1-Dichloroethene.

Cis-1,2-DCE = cis-1,2-Dichloroethene.

U = Analyte not detected above the specified reporting limit.

Table 3. Wells with Analytical Results at or Above Cleanup Levels—Spring 2012

Well Group [a]	Chromium (80 µg/L)[b]	TCE (5 µg/L)[b]	1,1-DCE (1 µg/L)[b]
TCE Source (5)	NS	AMW-1A AMW-2A AMW-12A MW-1A	NR
Proximal (4)	MW-10C	MW-10B	NR
Intermediate (11)	MW-18D MW-19D	AMW-17 AMW-18 AMW-64 MW-14C MW-14E MW-18D MW-19D MW-20D PZ-39	AMW-64 MW-14E MW-19D MW-20D PZ-39
Church of God (9)	NR	AMW-27 MW-21D MW-22D	NR
Troutdale Aquifer (1)	NR	NR	NR

NOTES:

[a] Numbers in parentheses are the total number of wells sampled during the Spring 2012 sampling event.
[b] Site clean-up criteria established in the Record of Decision (EPA 2000).

1,1-DCE = 1,1-Dichloroethene.
PCE = Tetrachloroethene.
NR = None reported at or above the clean-up criteria.
NS = None sampled.
TCE = Trichloroethene.
µg/L = Micrograms per liter.

Table 4. Summary of Recent Chromium Concentrations

Well Group	Well	Fall 2010	Spring 2011	Fall 2011	Spring 2012
Proximal	MW-6B	28.2	50.9	18	48.1
	MW-10B	45.2	46.4	34.7	39.6
	MW-10C	67.2	**99.9**	70	**116**
	PW-1B	52.9	46.8	61.9	49.7
Intermediate	MW-14C	**94.7**	**91.9**	77	77.1
	MW-14E	54.7	57.1	48.3	42.1
	MW-18D	**161**	**133**	**128**	**109**
	MW-19D	**143**	**140**	**126**	**113**
	MW-20D	76.7	75.3	78.1	72.8
Church of God	AMW-14	55	NS	45.3	26*
	AMW-15	NS	NS	NS	2.6 J*
	AMW-27	49.3	**46.7 J**	38.6	28.9
	CPU-13	20.1	18.8	18.4	19.5
	MW-21D	16.1	13.5	12.8	6.7
	MW-22D	50.6	44	35.9	28.5
	MW-25D	3.7 J	2.1 J	5.0 U	3.4 J
	MW-26D	12.1	7.6	10.7	6.6
	MW-49	17.4	11.9	11.9	9.5
Troutdale Aquifer	BENNETT	5.0 U	5.0 U	5.0 U	5.0 U

NOTES:

Only wells sampled for chromium during Spring 2012 are included in this table.
Results are in micrograms per liter (µg/L).
Results are for total chromium, unless otherwise noted.
Results shown in **bold** are at or above the cleanup level of 80 µg/L.

NS = Well not sampled during that monitoring event.
U = Analyte not detected above the specified reporting limit.
J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.
* = A sample was also collected for dissolved chromium from this well. The dissolved chromium concentration in well AMW-14 was 22.4 µg/L and in well AMW-15 was 5.0 U µg/L.

Table 5. Summary of Recent Trichloroethene Concentrations

Well Group	Well	Fall 2010	Spring 2011	Fall 2011	Spring 2012
TCE Source (OU-2)	AMW-1A	**28**	1.7	**44**	**5.7**
	AMW-2A	**29**	**18**	**55**	**6.1**
	AMW-12A	**29**	**30**	**38**	**27**
	AMW-53A	**11**	0.86	**6**	1.8
	MW-1A	**7.9**	4.8	**5.2**	**6.1**
Proximal	MW-6B	4.7	4.5	4.2	4.2
	MW-10B	**18**	**21**	**18**	**16**
	MW-10C	3.6	3.6	3.3	2.5
	PW-1B	2.8	3.1	2.9	2.6
Intermediate	AMW-16	1.7	NS	1.6	0.17 J
	MW-14C	**22**	**24**	**15**	**11**
	MW-14E	**76**	**83**	**78**	**72**
	MW-15E	**6**	**5.5**	**5.1**	4.5
	MW-18D	**66**	**63**	**52**	**47**
	MW-19D	**34**	**34**	**32**	**30**
	MW-20D	**43**	**50**	**58**	**47**
	PZ-39	**97**	**56**	**56**	**56**
Northern Plume	AMW-17	**28**	**29**	**140**	**160**
	AMW-18	**130**	**75**	**68**	**52**
	AMW-64	--	--	--	**160**
First Church of God	AMW-14	0.85 UJ	NS	0.64	0.53
	AMW-15	NS	NS	NS	0.50 U
	AMW-27	**16**	**15**	**14**	**12**
	CPU-13	1.6	1.8	1.5	1.4
	MW-21D	**7**	**7.3**	**6.2**	**5.4**
	MW-22D	**8**	**8.4**	**6.5**	**6.8**
	MW-25D	1.3	1.3	1.5	1.3
	MW-26D	0.78	0.79	0.72	0.76
	MW-49	1.8	1.7	1.4	1.4
Troutdale	BENNETT	**8.6**	4	**6.2**	3.8

NOTES:

Only wells sampled for TCE during Spring 2012 are included in this table.
Results are in micrograms per liter (µg/L).
Results shown in **bold** are at or above the cleanup level of 5 µg/L.

B or J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.
NS = Well not sampled during that monitoring event.
TCE = Trichloroethene.
U = Analyte not detected above the specified reporting limit.
-- = Well installed in 2012.

Table 6. Comparison of VOC and Chromium Concentrations for Normal and Duplicate Groundwater Samples—Spring 2012

Compound	Result (in µg/L)	AMW-14	AMW-27	MW-19D	AMW-2A
Total Chromium	Primary	22.2	26.7	106	NA
	Duplicate	26.0	28.9	113	NA
	RPD (%)	15.8	7.9	6.4	NA
Trichlorofluoromethane (CFC-11)	Primary	0.12 U	0.16 J	0.59	3.5
	Duplicate	0.12 U	0.17 J	0.56	3.6
	RPD (%)	NC	6.1	5.2	2.8
1,1-Dichloroethene (1,1-DCE)	Primary	0.080 U	0.63	1.4	0.080 U
	Duplicate	0.080 U	0.71	1.4	0.080 U
	RPD (%)	NC	11.9	0.0	NC
cis-1,2-Dichloroethene (cis-1,2-DCE)	Primary	0.067 U	0.080 J	0.32 J	0.070 J
	Duplicate	0.067 U	0.090 J	0.37 J	0.50 U
	RPD (%)	NC	11.8	14.5	NC
1,1,1-Trichloroethane (TCA)	Primary	0.075 U	0.15 J	0.075 U	0.19 J
	Duplicate	0.075 U	0.16 J	0.075 U	0.19 J
	RPD (%)	NC	6.5	NC	0.0
1,2-Dichloroethane (EDC)	Primary	0.080 U	0.080 J	0.080 U	0.080 U
	Duplicate	0.080 U	0.080 U	0.080 U	0.080 U
	RPD (%)	NC	NC	NC	NC
Trichloroethene (TCE)	Primary	0.48 J	12	30	6.1
	Duplicate	0.53	12	29	5.4
	RPD (%)	9.9	0.0	3.4	12.2
Tetrachloroethene (PCE)	Primary	0.14 J	2.6	1.8	0.51
	Duplicate	0.21 J	2.5	1.9	0.48 J
	RPD (%)	40.0	3.9	5.4	6.1

NOTES:
Results are shown in micrograms per liter (µg/L).
J = The result is an estimated concentration that is less than the method reporting limit but greater than or equal to the method detection limit.
NA = Not analyzed
NC = Not calculable
RPD = Relative percent difference
VOC = Volatile Organic Compound
U = Analyte not Detected above the specified reporting limit.

Appendix A

Summary of Water Level Gauging Data and Groundwater Surface Elevations

Appendix A. Summary of Water Level Gauging Data and Groundwater Surface Elevations, Spring 2012

Well ID	Well Type	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-1A	M	34.54	24.24	34.24	10	284.09	23.88	260.21
AMW-1B	M	56.49	46.49	56.49	10	284.11	24.32	259.79
AMW-1C	M	79	69	79	10	284.06	24.23	259.83
AMW-2A	M	34.2	24.2	34.2	10	284.03	23.98	260.05
AMW-2B	M	59	47	57	10	284.11	24.24	259.87
RAMW-2C	M	70.55	60.55	70.55	10	283.23	23.85	259.38
AMW-3A	M	34	24.5	34.5	10	283.92	23.34	260.58
AMW-4A	M	34.2	23.9	33.9	10	283.74	24.08	259.66
AMW-5A	M	34.5	24.5	34.5	10	284.14	22.9	261.24
AMW-6A	M/D	33.87	24	34	10	284.56	20.71	263.85
AMW-7A	M/D	34.09	24.25	34.25	10	285.02	19.38	265.64
AMW-8A	M	34.5	24.5	34.5	10	285.49	22.43	263.06
AMW-9A	M	34.5	24.5	34.5	10	283.92	22.8	261.12
AMW-10A	M/D	31.5	21.5	31.5	10	284.01	21.11	262.9
AMW-11A	M/D	33.84	24	34	10	283.21	18.65	264.56
AMW-12A	M	34.55	24.05	34.05	10	283.74	23.08	260.66
AMW-13A	M	34.3	23.8	33.8	10	283.88	24.35	259.53
AMW-16	M	91.3	80.3	90.3	10	265.29	13.44	251.85
AMW-17	M/D	92	81	91	10	261.87	7.68	254.19
AMW-18	M	103.65	92.65	102.65	10	278.8	23.28	255.52
AMW-19A	M	35	25	35	10	283.94	23.04	260.9
AMW-19B	M	54.5	44.5	54.5	10	283.97	23.18	260.79
AMW-21	M	35	25	35	10	284.45	22.25	262.2
AMW-23	M	85	75	85	10	278.26	34.87	243.39
AMW-24	M/D	200	190	200	10	264.72	125.89	138.83
AMW-25	M/D	225	215	225	10	282.94	132.94	150
AMW-26	M/D	34.5	24.2	34.2	10	283.02	23.58	259.44
AMW-27	E	88	78	88	10	284.45	72.95	211.5
AMW-42	E	102	87	102	15	255.88	16.42	239.46
AMW-43	M/D	85	72	85	13	247.71	9.73	237.98

Appendix A. Summary of Water Level Gauging Data and Groundwater Surface Elevations, Spring 2012

Well ID	Well Type	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-44	M/D	81	71	81	10	247.82	8.53	239.29
AMW-45	M/D	77	67	77	10	244.87	6.52	238.35
AMW-51	M/D	195.19	185.19	195.19	10	282.78	135.62	147.16
AMW-52A	M/D	195.7	185.7	195.7	10	258.44	129.21	129.23
AMW-52C	M	34.55	24.55	34.55	10	280.4	21.29	259.11
AMW-53A	M	73.63	63.63	73.63	10	280.38	21.32	259.06
AMW-53B	M	32.2	22.2	32.2	10	281.05	21.85	259.2
AMW-53C	M	54.55	44.55	54.55	10	281.2	22	259.2
AMW-54A	M	74.21	64.21	74.21	10	281.41	22.23	259.18
AMW-54C	M	34.3	24.3	34.3	10	283.31	23.87	259.44
AMW-55A	M	74.74	64.74	74.74	10	283.12	23.9	259.22
AMW-55C	M	30.83	20.83	30.83	10	282.11	22.8	259.31
AMW-56A	M	68.45	58.45	68.45	10	282.71	23.38	259.33
AMW-56C	M	35.24	25.24	35.24	10	283.67	23.58	260.09
AMW-57	M	67.4	57.4	67.4	10	283.67	23.59	260.08
AMW-58	M	75.38	70.08	75.08	5	285.68	22.87	262.81
AMW-59	M	114.73	109.43	114.43	5	280.08	56.2	223.88
AMW-60	M	109.5	104.2	109.2	5	266.45	14.13	252.32
AMW-61	M	97.16	91.86	96.86	5	273.78	44.56	229.22
AMW-62	M/D	196.03	185.73	195.73	10	258.78	129.16	129.62
AMW-63	M	86.43	76.13	86.13	10	257.69	18.01	239.68
AMW-64	M	98.93	88.68	98.68	10	266.13	13.38	252.75
CPU-2	M	197.2	186.2	196.2	10	259.57	122.95	136.62
CPU-3D	M/D	219.38	212.38	217.38	5	246.77	127.97	118.8
CPU-3S	M	72.72	65.72	70.72	5	246.77	9.06	237.71
CPU-4D	M	69.3	62.3	67.3	5	234.1	8.62	225.48
CPU-4S	M	210	203	208	5	234.05	126.65	107.4
CPU-10	M	197.9	186.9	196.9	10	261.24	125.56	135.68
CPU-12	M	72.12	61.12	71.12	10	275.23	25.92	249.31

Appendix A. Summary of Water Level Gauging Data and Groundwater Surface Elevations, Spring 2012

Well ID	Well Type	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
CPU-13	E	82.7	71.7	81.7	10	278.99	43.56	235.43
CPU-14	M	71.43	60.43	70.43	10	257.56	4.64	252.92
CPU-15	M	89.49	78.49	88.49	10	275.87	30.7	245.17
MW-1A	M	38.56	28.36	38.26	9.9	285.49	26.14	259.35
MW-1B	M	59.79	54.49	59.49	5	285.47	26.16	259.31
MW-1C	M	77.44	72.14	77.14	5	285.45	26.15	259.3
MW-2A	M	37.39	32.09	37.09	5	282.57	24.17	258.4
MW-2B	M	57.94	52.64	57.64	5	282.49	24.24	258.25
MW-2C	M	86.94	81.64	86.64	5	282.43	24.45	257.98
MW-3A	M	32.64	22.34	32.34	10	280.21	22.33	257.88
MW-3B	M	56.69	51.39	56.39	5	280.33	22.6	257.73
MW-3C	M	83.69	78.39	83.39	5	280.35	22.78	257.57
MW-4A	M	37.11	26.81	36.81	10	280.3	22.62	257.68
MW-4B	M	45	39.7	44.7	5	280.15	22.53	257.62
MW-4BSHED	M	58.2	52.9	57.9	5	280.47	23.14	257.33
MW-4C	M	80	74.7	79.7	5	279.91	22.59	257.32
MW-6A	M	31.5	18.25	28.25	10	278.77	21.46	257.31
MW-6B	E	59	45.75	55.75	10	273.32	36.71	236.61
MW-6C	M	84.8	71.55	81.55	10	278.65	21.95	256.7
MW-6D	M	113.7	100.45	110.45	10	278.9	22.29	256.61
MW-7B	M	57.7	47	57	10	280.02	22.94	257.08
MW-7C	M	80.5	69	79	10	279.94	21.94	258
MW-8B	M	60	46.9	56.9	10	280.7	22.98	257.72
MW-9B	M	58	44.9	54.9	10	275.42	19.76	255.66
MW-9C	M	76.5	65	75	10	275.44	19.72	255.72
MW-10B	E	61.5	48	58	10	273.24	31.31	241.93
MW-10C	E	81.5	70	80	10	273.25	18.95	254.3
MW-12C	M	82.7	71.2	81.2	10	274.31	18.03	256.28
MW-13C	M	76.53	65.03	75.03	10	271.97	15.54	256.43

Appendix A. Summary of Water Level Gauging Data and Groundwater Surface Elevations, Spring 2012

Well ID	Well Type	Total Depth (ft bgs)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
MW-14C	E	81.5	70	80	10	271.22	27.54	243.68
MW-14E	E	126	115	125	10	268.95	21.55	247.4
MW-15E	M	107.23	96.23	106.23	10	265.73	10.89	254.84
MW-16E	M	110.69	99.69	109.69	10	258.35	3.48	254.87
MW-17E	M	110.9	99.9	109.9	10	259.32	14.99	244.33
MW-18D	E	94.4	73.4	93.4	20	262.74	16.99	245.75
MW-18E	M/D	123.57	112.57	122.57	10	261.77	6.9	254.87
MW-19D	E	92.2	76.2	91.2	15	257.98	11.62	246.36
MW-20D	E	87	76	86	10	269.43	45.52	223.91
MW-21D	E	67	56	66	10	257.56	20.61	236.95
MW-22D	E	65.2	54	64	10	269.02	27.37	241.65
MW-23D	M	90.23	74.03	89.03	15	265.33	15.98	249.35
MW-25D	E	79.05	67.85	77.85	10	272.13	31.8	240.33
MW-26D	E	94.2	83	93	10	272.86	44.52	228.34
MW-27D	E	72.3	61.1	71.1	10	269.25	23.08	246.17
MW-30	M/D	63	51	61	10	246.75	8.66	238.09
MW-33	M/D	215	205	215	10	272.55	126.91	145.64
MW-34	M/D	205	195	205	10	267.33	124.31	143.02
MW-38	M	82	77	82	5	263.92	11.39	252.53
MW-41	E/M	81.7	71.7	81.7	10	253.08	14.31	238.77
MW-46	E/M	80.3	70	80	10	247.79	8.99	238.8
MW-47	M/D	83	72.7	82.7	10	246.39	7.41	238.98
MW-49	E	81.5	71.2	81.2	10	271.68	36.52	235.16
PW-1B	E	58	48	58	10	276.56	25.39	251.17
PZ-1	M	38.79	23.79	38.79	15	284.15	19.4	264.75
PZ-2	M	42.97	27.97	42.97	15	286.54	21.69	264.85
PZ-39	M	91.2	89.2	91.2	2	265.41	12.49	252.92

Appendix A. Summary of Water Level Gauging Data and Groundwater Surface Elevations, Spring 2012

NOTES:

bgs	=	Below ground surface.
btoc	=	Below top of casing.
E	=	Extraction well.
E/M	=	Extraction well (inactive) with pump pulled; sampled using monitoring well techniques.
ft	=	Feet.
M	=	Monitoring well.
M/D	=	Monitoring well with dedicated pump.
MSL	=	Mean sea level.
PZ	=	Piezometer.
TOC	=	Top of casing.

Groundwater surface elevation is determined by subtracting the depth to water from the top of casing elevation.

Appendix B

Groundwater Purge and Sampling Forms

PDBS FIELD FORM

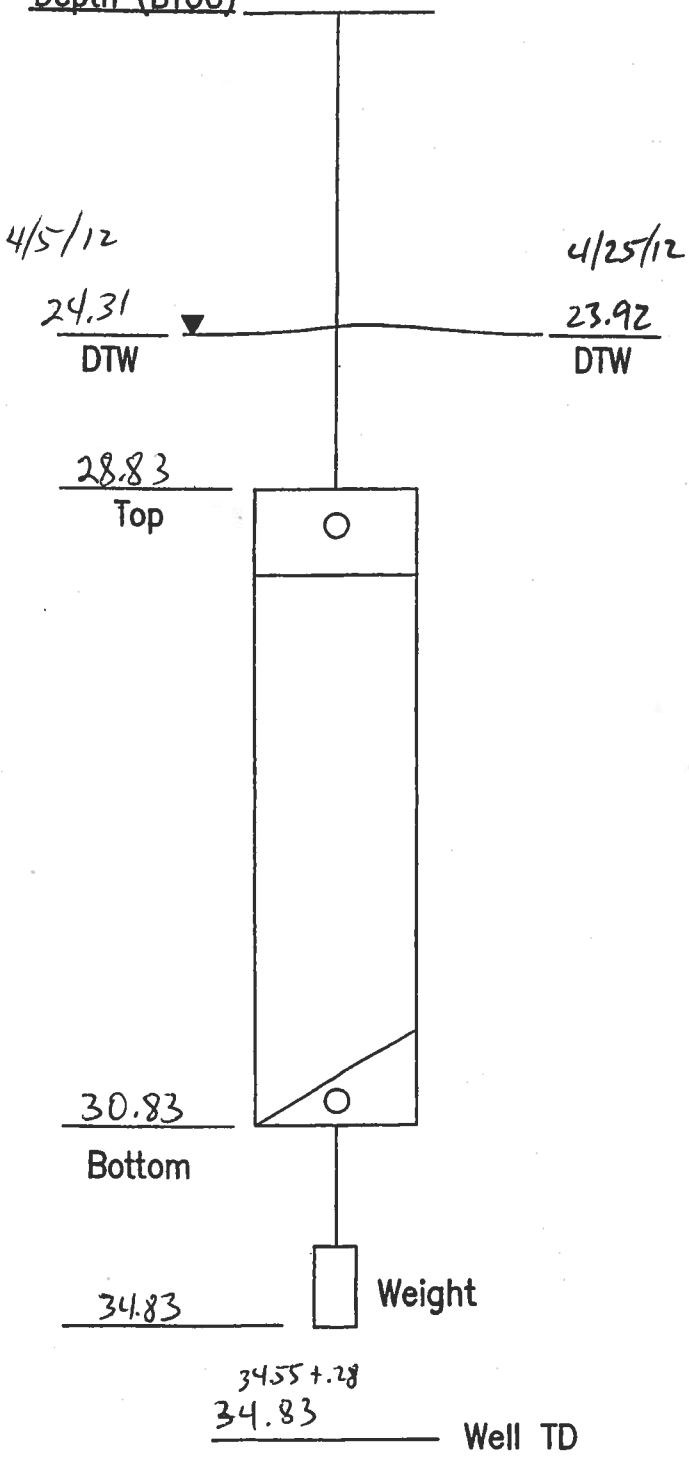
Well # AMW-1A

Well Diameter 2"

Installation Date 4/5/12

Installation Time 1614

Job# 41495.05 2012 0013



SAMPLE INFORMATION

Sample No. 1217031

Sample Time 1409

Sample Date 4/25/12

Analysis 8260

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

PDBS FIELD FORM

Duplicate.

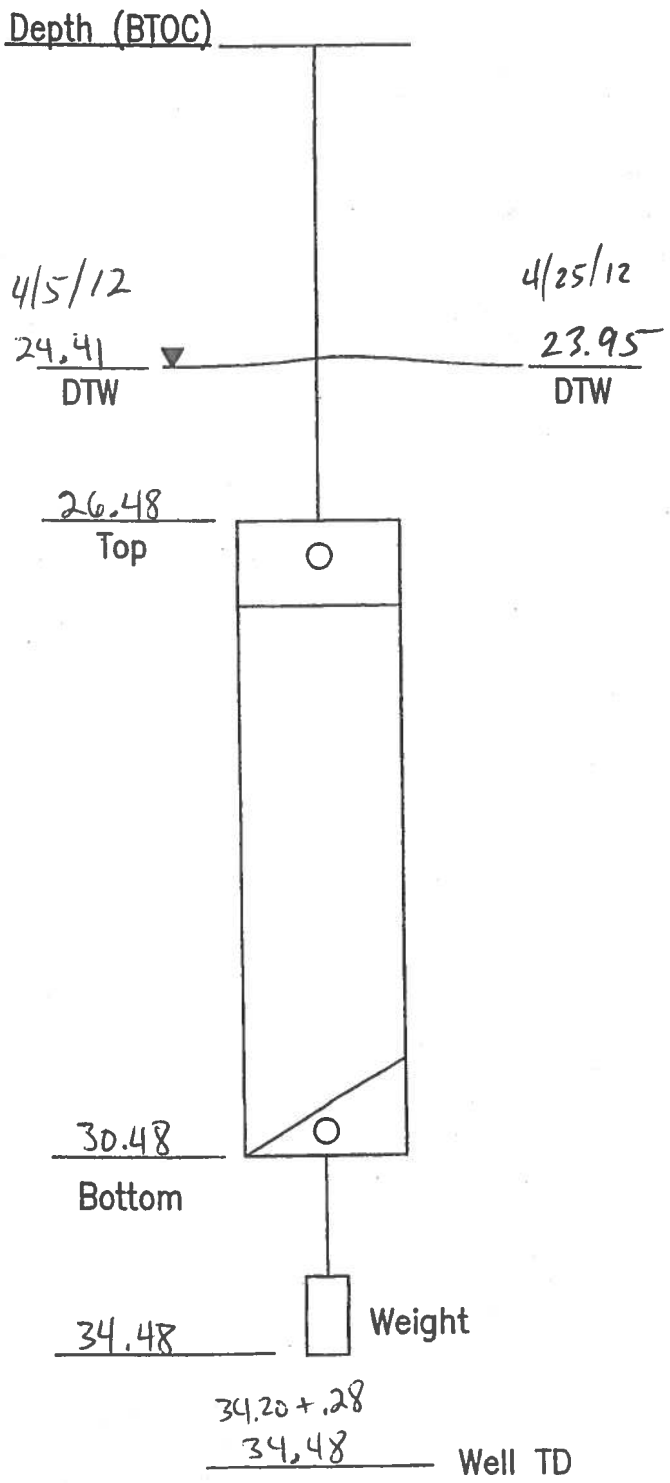
Well # AMW-2A

Well Diameter 2"

Installation Date 4/5/12

Installation Time 1637

Job# 14495.05-2012 0013



SAMPLE INFORMATION

Sample No. 1217032 / 1217033 DUP

Sample Time 1420 / 1430 DUP.

Sample Date 4/25/12

Analysis 8260

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

PDBS FIELD FORM

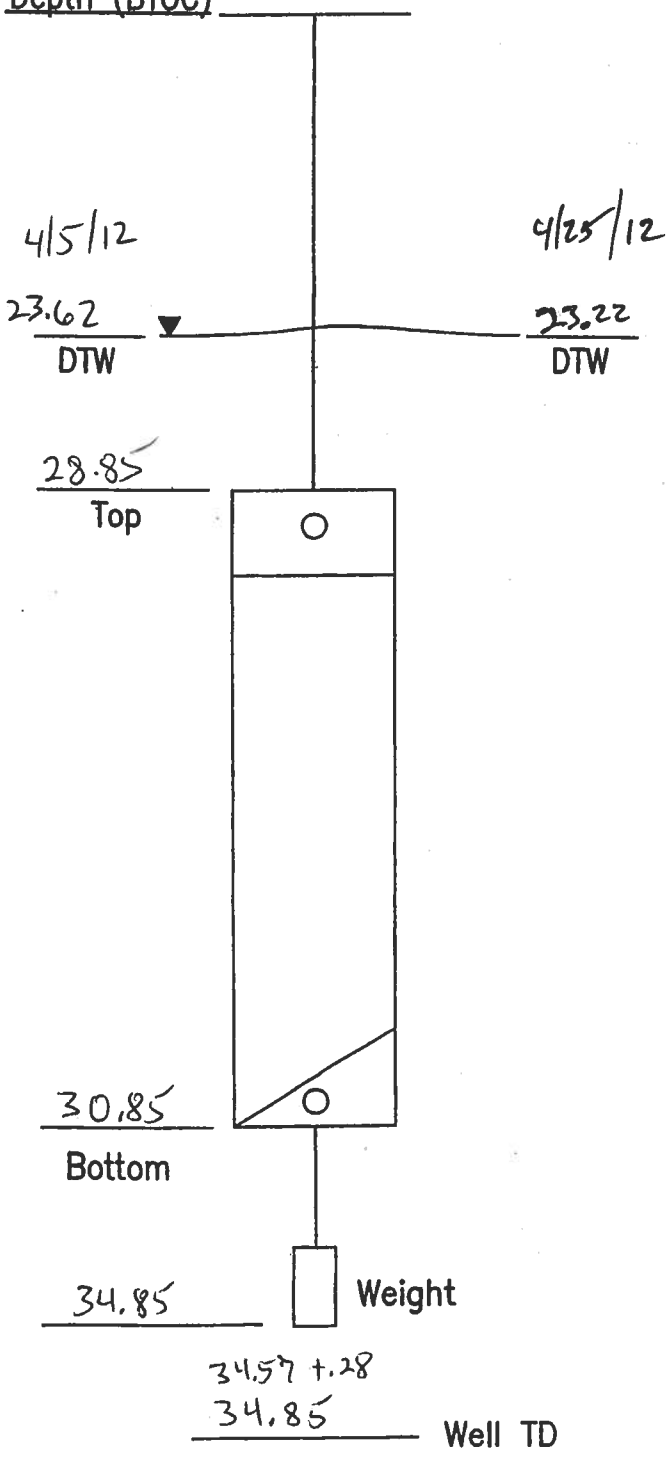
Well # AMW-12A

Well Diameter 4"

Installation Date 4/5/12

Installation Time 1700

Job# 14495.05.2012.0013



SAMPLE INFORMATION

Sample No. 1217034

Sample Time 1440

Sample Date 4/25/12

Analysis 8260

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

Ground Water Purge and Sampling Form

Well Identification	AMW-14
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WAC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm) (Vaults, source area wells)	—
Well Total Depth (ft btoc) ~1664.28	76.92'

Site Location: Boomsnub Date: 4/6/12

Project Number: 14495.05 2012 Personnel: MBB, RR

Purge Method: X Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well X Redi-flo Pump #3 (~~D~~) X Other

Sampling Equipment: ___Extraction Well X Redi-flo Pump ___Diffusion Bag

Weather Conditions: Overcast.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1350	1355	1400	1405	1410	1415	1420			
Depth to Ground water (ft btoc) 26.57	—	26.87	26.98	26.91	26.92	26.92	26.92			
Total Groundwater Purged(gallons, liters, other)	—	1	—	2	—	3	3.75			
Purge Rate (gpm, ft³/min, ml/min, other)	450	450	375	375	375	375	375			
pH	5.21	5.44	5.47	5.49	5.51	5.56	5.58			
Conductivity (mS/cm)	.082	.075	.073	.075	.076	.077	.079			
Turbidity (NTU) HF Scientific	38	32	25	20	17	16	13			
Disssolved Oxygen (mg/L)	6.56	6.47	6.43	6.46	6.47	6.49	6.52			
Temperature (°C)	11.9	12.2	12.5	12.3	12.3	12.4	12.7			
ORP/eH (mV)	102	99	87	77	74	72	70			
Color of Purged Water (gray, brown, red, clear)	clear	→								

Sample Identification: 1214002 / 1214003 DUP / 1214004 Dissolved Cr.

Time Sampled: (1423) (1430) (1435)

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	6
X Total Chromium	2
X Dissolved Chromium	1

Comments: Pump placed at 70'

Ground Water Purge and Sampling Form

Well Identification	AMW-15
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm) (Vaults, source area wells)	—
Well Total Depth (ft btoc) 86.91 + .28	87.19

Site Location: Boomsnub Date: 4/6/12

Project Number: 14405.05 2012 Personnel: MB, RR

Purge Method: X Low Flow ___ Conventional ___ None

Purge Equipment: ___ Extraction Well X Redi-flo Pump #3 (~~Bad~~) ___ Other

Sampling Equipment: ___ Extraction Well X Redi-flo Pump #3 ___ Diffusion Bag

Weather Conditions: Overcast.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1548	1553	1558	1603	1608	1613	1618	1623	1628	1633	1638
Depth to Ground water (ft btoc) 26.16	—	26.70	27.33	27.41	27.46	27.51	27.49	27.48	27.49	27.49	27.49
Total Groundwater Purged(gallons, liters, other)	—	—	1	—	2	—	—	3	—	—	—
Purge Rate (gpm, ft³/min, ml/min, other)	400	400	375	~~300~~ 300	300	300	300	300	300	300	300
pH	7.18	6.87	6.65	6.51	6.48	6.47	6.49	6.49	6.49	6.50	6.51
Conductivity (mS/cm)	.211	.251	.253	.264	.266	.269	.270	.270	.270	.267	.265
Turbidity (NTU)	17	19	18	14.6	13.1	11	9.8	9.2	8.0	7.1	6.3
Disssolved Oxygen (mg/L)	1.09	.49	0.25	0.34	0.47	0.66	0.72	0.83	0.97	1.10	1.31
Temperature (°C)	15.1	12.8	12.6	12.8	12.9	13.0	12.8	12.7	12.6	12.7	12.8
ORP/eH (mV)	166	142	120	104	96	90	78	72	66	57	55
Color of Purged Water (gray, brown, red, clear)	clear								clear.		

Sample Identification: 1214006 MS/MSD

Time Sampled: (1655) 1214007 Dissolved Cr. (1700)

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	9
X Total Chromium	3
___ Dissolved Chromium	___

Comments: Pump set @ 81' btoc. 1 bottle short for MS/MSD.

Ground Water Purge and Sampling Form

Well Identification	AMW-15	Site Location: Boomsnub							Date: 4/6/12		
Well Diameter (inches)		Project Number:							Personnel: MBB, RA		
Well Monument Locked and Good Condition?		Purge Method: ___Low Flow ___Conventional ___None									
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)		Purge Equipment: ___Extraction Well ___Redi-flo Pump (Ded) ___Other									
Well Casing Plug Locked and Good Condition?		Sampling Equipment: ___Extraction Well ___Redi-flo Pump ___Diffusion Bag									
PID Reading in Well (ppm) (Vaults, source area wells)		Weather Conditions:									
Well Total Depth (ft btoc)		Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons									
Time	1643	1648									
Depth to Ground water (ft btoc)	27.49	27.49									
Total Groundwater Purged(gallons, liters, other)	—	4									
Purge Rate (gpm, ft^3/min, ml/min, other)	300	300									
pH	6.51	6.51									
Conductivity (mS/cm)	.264	.264									
Turbidity (NTU)	6.1	6.3									
Disssolved Oxygen (mg/L)	1.38	1.43									
Temperature (°C)	12.8	12.9									
ORP/eH (mV)	55	55									
Color of Purged Water (gray, brown, red, clear)	clear	→									

Sample Identification:	Analysis	# of Bottles	Comments:
Time Sampled:	___ VOCs by 8260b	____	
	___ Total Chromium	____	
Purge water disposed To: Boomsnub	___ Dissolved Chromium	____	

PDBS FIELD FORM

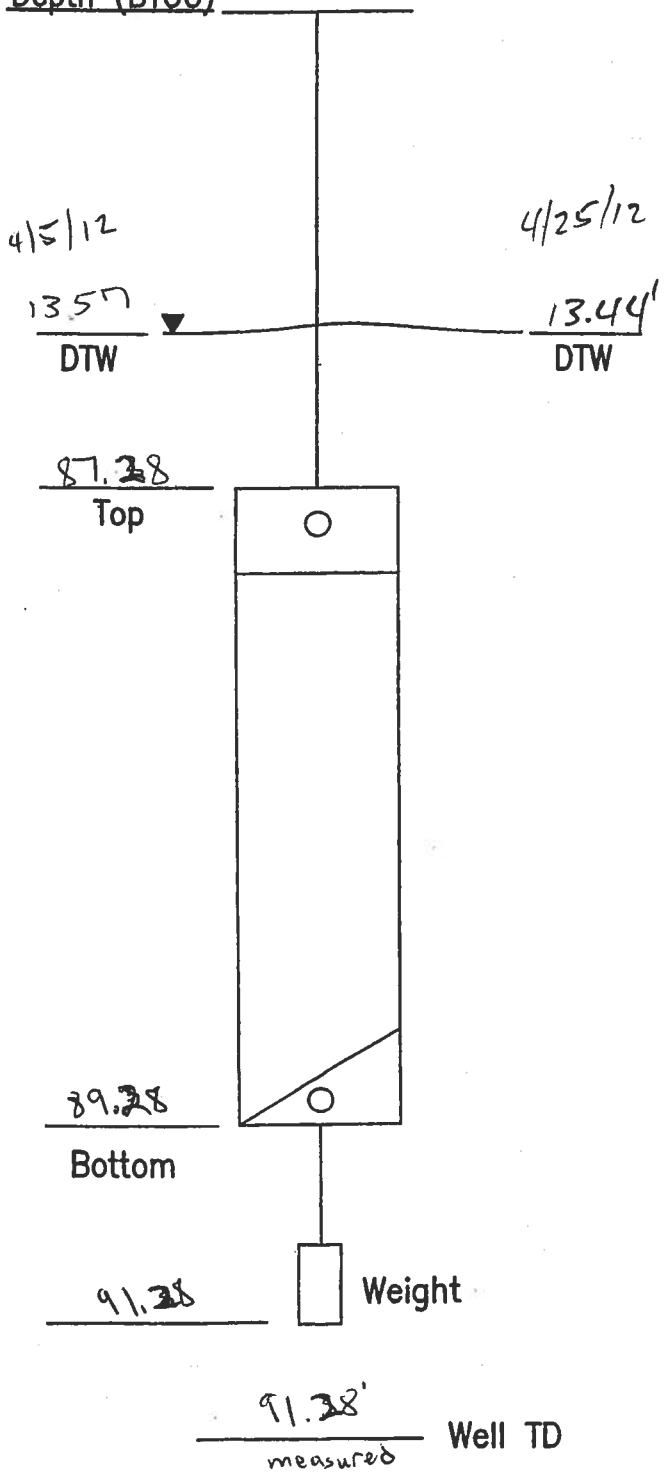
Well # AMW-16

Well Diameter 4"

Installation Date 4/5/12

Installation Time 1330

Job# 14495.05 2012 0013



SAMPLE INFORMATION

Sample No. 1217027

Sample Time 1000

Sample Date 11/25/12

Analysis 8260

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N/O

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

Ground Water Purge and Sampling Form

Well Identification	AMW-17
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc) QASP Table 1	92.00

Site Location: Boomsnub (~~Fall~~ Spring 2012)
Date: 4/24/12
Project Number: 14495.05 2012 0013
Personnel: RR, MB
Purge Method: X Low Flow ___Conventional ___None
Purge Equipment: ___Extraction Well ___X Redi-flo Pump (Dedi) ___Other
Sampling Equipment: ___Extraction Well ___X Redi-flo Pump ___Diffusion Bag
Weather Conditions: Overcast, 60°F

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1047	1055	1058	1101	1106	1111	1116	1121	1126	1131	1136
Depth to Ground water (ft btoc)	7.62	7.64	7.68	7.69	7.69	7.69	7.69	7.69	7.69	7.69	7.69
Total Groundwater Purged (gallons, liters)											14.35
Purge Rate (gpm, ft³/min, ml/min)		350	→	→	→	→	→	→	→	→	→
pH		6.47	5.86	5.72	5.69	5.65	5.65	5.65	5.65	5.65	5.66
Conductivity (mS/cm)		.150	.152	.152	.152	.152	.152	.152	.151	.151	.151
Turbidity (NTU)	HF Scientific	0.22	0.24	0.22	0.10	0.20	0.17	0.15	0.12	0.10	0.11
Disssolved Oxygen (mg/L)		4.71	1.60	0.79	0.51	0.31	0.24	0.20	0.17	0.14	0.12
Temperature (°C)		13.0	12.8	12.8	12.9	12.9	12.9	12.9	13.0	13.1	13.1
ORP/eH (mV)		287	330	330	326	309	300	290	279	268	257
Color of Purged Water (gray, brown, red, clear)		clear									

Sample Identification: 121702I
Time Sampled: 1200

# of bottles/analysis
3 VOCs by 8260b
— Total Chromium

Comments:

Purge water disposed To: Boomsnub

Ground Water Purge and Sampling Form

Well Identification	AMW-17
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	
Well Casing Plug Locked and Good Condition?	
PID Reading in Well (ppm)	
Well Total Depth (ft btoc)	

Site Location: Boomsnub (~~Fall~~ Spring 2012) Date: 4/24/12

Project Number: 14495.05 2012 0013 Personnel: RJ2, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well _X_Redi-flo Pump (Ded) ___Other

Sampling Equipment: ___Extraction Well _X_Redi-flo Pump ___Diffusion Bag

Weather Conditions: —

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1141	1146	1151								
Depth to Ground water (ft btoc)	7.69	7.69	7.69								
Total Groundwater Purged (gallons, liters)	—	—	19.6								
Purge Rate (gpm, ft^3/min, ml/min)	350	→	→								
pH	5.67	5.67	5.69								
Conductivity (mS/cm)	.150	.150	.150								
Turbidity (NTU)	0.11	0.10	0.09								
Disssolved Oxygen (mg/L)	0.11	0.10	0.10								
Temperature (°C)	13.2	13.3	13.3								
ORP/eH (mV)	247	241	237								
Color of Purged Water (gray, brown, red, clear)	clear	clear	clear								

Sample Identification: 1217021

Time Sampled: 1200

# of bottles/analysis

3 VOCs by 8260b

1 Total Chromium

Comments:

Purge water disposed To: Boomsnub

Ground Water Purge and Sampling Form

Well Identification	AMW-18
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc) QASP Table 1	103.65

Site Location: Boomsnub Date: 4/24/12

Project Number: 14495.05 2012 0012 Personnel: RR, MB

Purge Method: X Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well X Redi-flo Pump (#3 ~~Bred~~) ___Other

Sampling Equipment: ___Extraction Well X Redi-flo Pump ___Diffusion Bag

Weather Conditions: Overcast, 60's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time 13:52	1404	1409	1414	1419	1424	1429				
Depth to Ground water (ft btoc) 23.23'	23.32	23.32	23.33	23.33	23.33	23.33				
Total Groundwater Purged(gallons, liters, other)	—	—	—	—	—	8.75				
Purge Rate (gpm, ft³/min, ml/min, other)	350	→								
pH	6.21	5.90	5.85	5.80	5.72	5.72				
Conductivity (mS/cm)	.108	.147	.149	.151	.153	.155				
Turbidity (NTU) HF Scientific	20.5	24.0	21.0	17	14	12				
Disssolved Oxygen (mg/L)	2.06	0.48	0.42	0.47	0.50	0.49				
Temperature (°C)	15.2	14.5	14.4	14.4	14.3	14.3				
ORP/eH (mV)	256	187	179	170	166	163				
Color of Purged Water (gray, brown, red, clear)	clear	clear								

Sample Identification: 1217022

Time Sampled: 1440

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
___ Total Chromium	___
___ Other	___

Comments: Pump #3, placed @ 98' btoc.

Ground Water Purge and Sampling Form

Well Identification	AMW-27
Well Diameter (inches)	6"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub
Date: 4/23/12
Project Number: 14495.05 2012 0013
Personnel: RR, MB.
Purge Method: ___Low Flow ___Conventional ___None
Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other
Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag
Weather Conditions: Sunny, dry. 70's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1144									
Depth to Ground water (ft btoc)	72.00									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	1.0									
pH	6.70									
Conductivity (mS/cm)	.204									
Turbidity (NTU)	1.2									
Disssolved Oxygen (mg/L)	2.79									
Temperature (°C)	18.2									
ORP/eH (mV)	237									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 1217004 DUP ~~[illegible]~~ 1217005
Time Sampled: 1148 1150

Analysis	# of Bottles
X VOCs by 8260b	9
X Total Chromium	3
___ Other	

Comments: 873699 gal

Purge water disposed To: Boomsnub

\12040.77\2006\0013\Field Forms\purgesampleform.xls

PDBS FIELD FORM

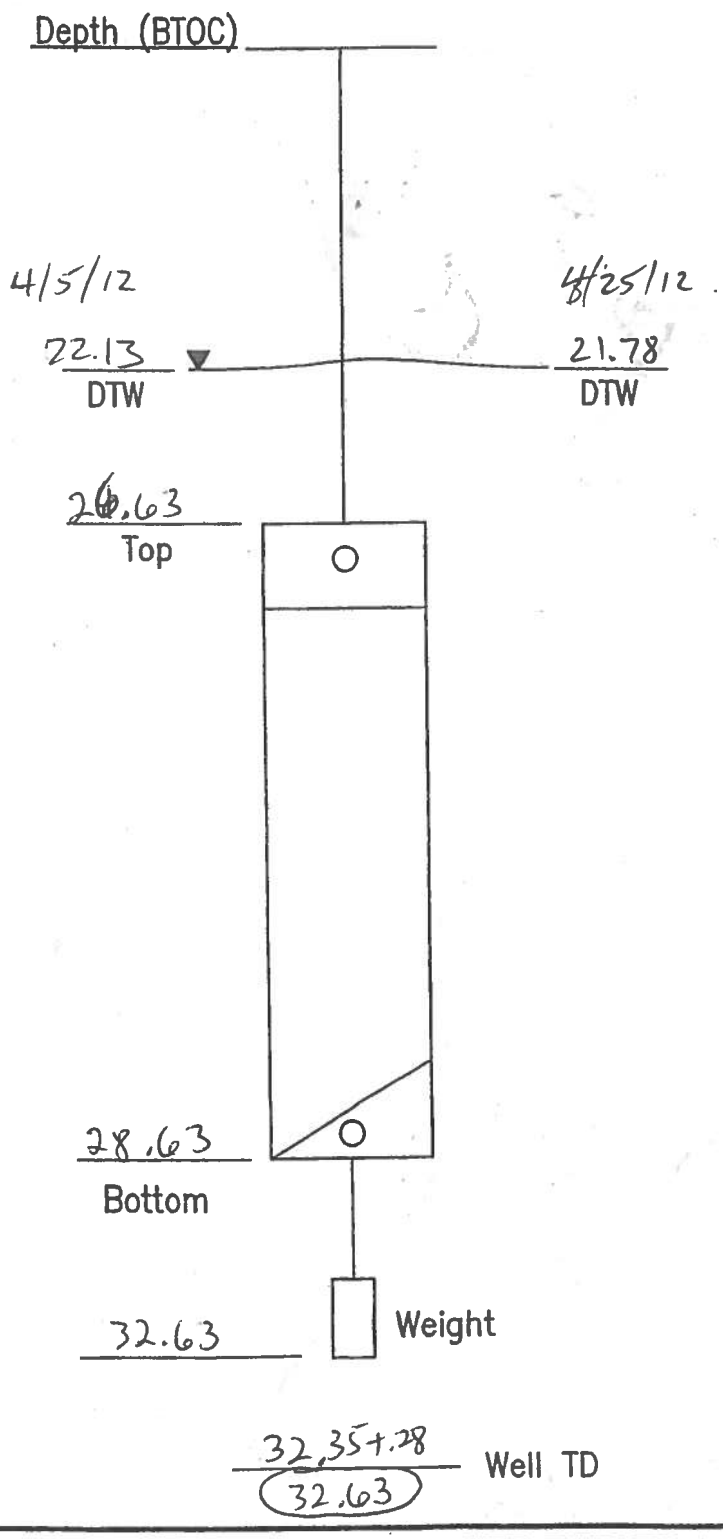
Well # ANW-53A

Well Diameter 4"

Installation Date 4/5/12

Installation Time 1725

Job# 144905.05-2012



SAMPLE INFORMATION

Sample No. 1217029

Sample Time 1045

Sample Date 4/25/12

Analysis 8260

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

Ground Water Purge and Sampling Form

Well Identification	AMW-64
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WAC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc) QAPP Table 1.	98.0

Site Location: Boomsnub Date: 4/24/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: X Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well X Redi-flo Pump #3 (~~Red~~) ___Other

Sampling Equipment: ___Extraction Well X Redi-flo Pump ___Diffusion Bag

Weather Conditions: Overcast, Drizzle

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1538	1540	1545	1550	1555	1600	1605				
Depth to Ground water (ft btoc)	13.35	13.34	13.36	13.40	13.46	13.71	13.90				
Total Groundwater Purged(gallons, liters, other)											
Purge Rate (gpm, ft³/min, ml/min, other)		300	200	200	200	200	200				
pH		6.91	6.85	6.79	6.78	6.76	6.75				
Conductivity (mS/cm)		.233	.214	.252	.255	.256	.257				
Turbidity (NTU)		11	~~10~~	11	11	8.4	8.1				
Disssolved Oxygen (mg/L)		1.416	0.5	.32	.24	.22	.20				
Temperature (°C)		14.3	13.9	13.7	13.5	13.4	13.3				
ORP/eH (mV)		-91	-206	-254	-263	-265	-261				
Color of Purged Water (gray, brown, red, clear)		clear	—				→				

Sample Identification: 121024

Time Sampled: 1615

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
___ Total Chromium	___
___ Other	___

Comments: - Pump @ 93' btoc.
- slight odor observed on water.

Ground Water Purge and Sampling Form

Well Identification	CPU-13
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, Dry. 70's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1230									
Depth to Ground water (ft btoc)	43.62									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	12.3									
pH	6.56									
Conductivity (mS/cm)	.206									
Turbidity (NTU)	:8									
Disssolved Oxygen (mg/L)	5.18									
Temperature (°C)	14.3									
ORP/eH (mV)	184									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 1217007

Time Sampled: 1240

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 490366 ft^3

PDBS FIELD FORM

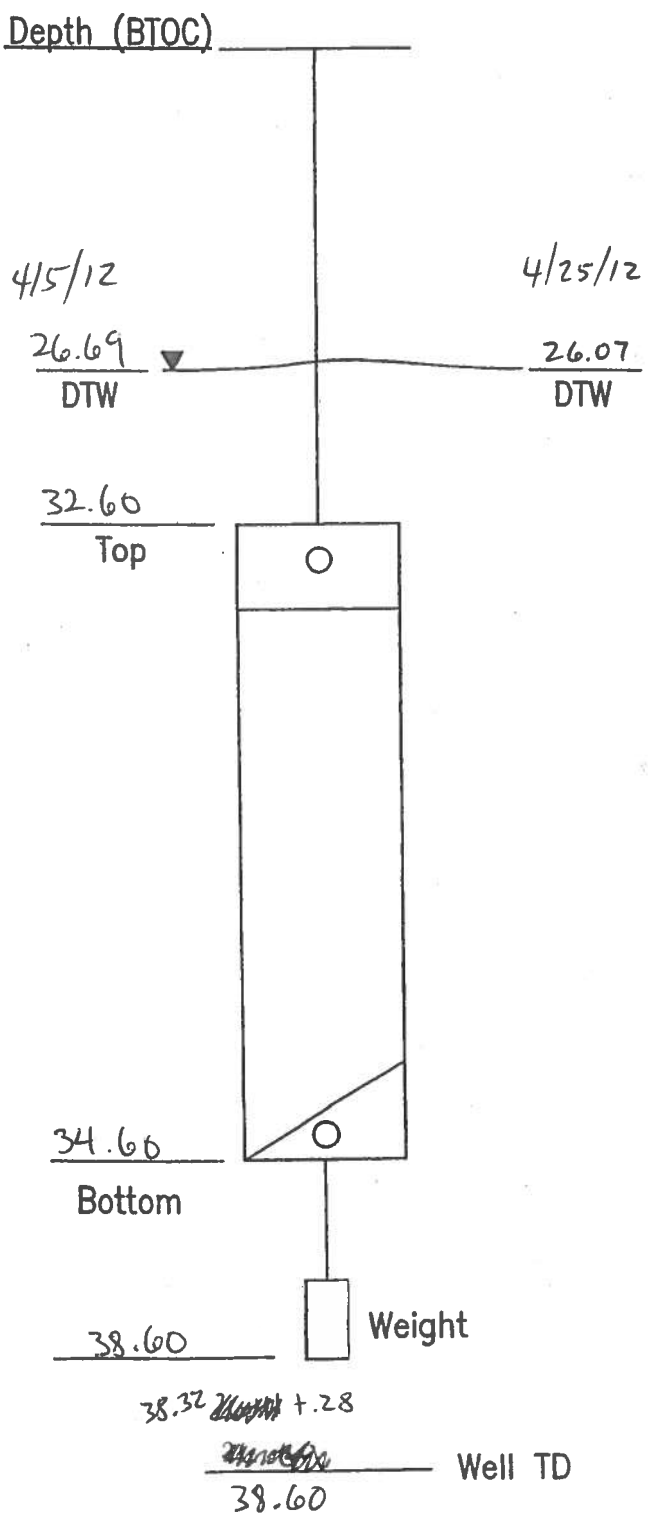
Well # MW-1A

Well Diameter 2"

Installation Date 4/5/12

Installation Time 17:35

Job# 14405.05 2012



SAMPLE INFORMATION

Sample No. 1217028

Sample Time 1035

Sample Date 4/25/12

Analysis 8260

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

Ground Water Purge and Sampling Form

Well Identification	MW-68
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, 70's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1408									
Depth to Ground water (ft btoc)	36.95									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	7.4									
pH	6.11									
Conductivity (mS/cm)	.123									
Turbidity (NTU) HF Scientific	0.2									
Disssolved Oxygen (mg/L)	9.71									
Temperature (°C)	15.3									
ORP/eH (mV)	294									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121700 9

Time Sampled: 1415

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 2,820,290 gal - Totalizer Meter

Ground Water Purge and Sampling Form

Well Identification	MW-10B
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, 70's.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	14:21									
Depth to Ground water (ft btoc)	31.95									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	8.4									
pH	6.10									
Conductivity (mS/cm)	.141									
Turbidity (NTU)	0.6									
Disssolved Oxygen (mg/L)	8.94									
Temperature (°C)	14.4									
ORP/eH (mV)	305									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121010

Time Sampled: 1430

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 3704070 gal

Ground Water Purge and Sampling Form

Well Identification	MW-10C
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 114405.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, 70's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1425									
Depth to Ground water (ft btoc)	18.86									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	10									
pH	5.83									
Conductivity (mS/cm)	.105									
Turbidity (NTU)	0.1									
Disssolved Oxygen (mg/L)	8.97									
Temperature (°C)	14.1									
ORP/eH (mV)	288									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121011

Time Sampled: 1440

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 2,502,550 gal

Ground Water Purge and Sampling Form

Well Identification	MW-14C
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, 70's.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1442									
Depth to Ground water (ft btoc)	27.31									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	12.2									
pH	5.84									
Conductivity (mS/cm)	.137									
Turbidity (NTU) HF Scientific	0.27									
Disssolved Oxygen (mg/L)	7.90									
Temperature (°C)	15.0									
ORP/eH (mV)	252									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121012

Time Sampled: 1445

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 6400960 gal.

Ground Water Purge and Sampling Form

Well Identification	MW-14E
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 120493.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, 70's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1450									
Depth to Ground water (ft btoc)	21.44									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	5.8									
pH	5.99									
Conductivity (mS/cm)	.221									
Turbidity (NTU)	0.7									
Disssolved Oxygen (mg/L)	2.32									
Temperature (°C)	14.3									
ORP/eH (mV)	242									
Color of Purged Water (gray, brown, red, clear)	clear.									

Sample Identification: 121703

Time Sampled: 1500

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 7,004,910 gal

PDBS FIELD FORM

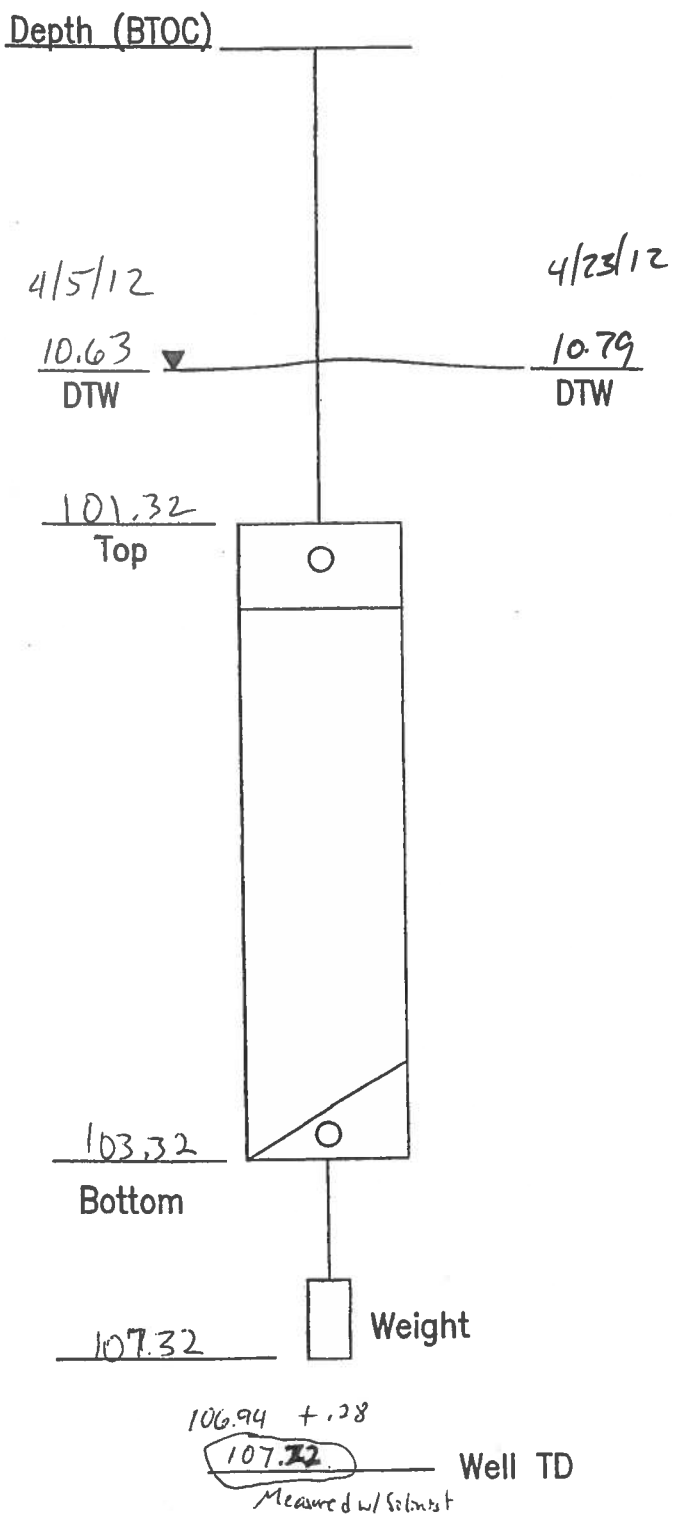
Well # MW-15E

Well Diameter 4"

Installation Date 4/5/12

Installation Time 1755

Job# 144905.2012



SAMPLE INFORMATION

Sample No. 1217017

Sample Time 1600

Sample Date 4/23/12

Analysis 8260 B

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) N

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

Ground Water Purge and Sampling Form

Well Identification	MW-18D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05-2512 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, ~78°F

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1540									
Depth to Ground water (ft btoc)	16.84									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	10.3									
pH	6.82									
Conductivity (mS/cm)	.185									
Turbidity (NTU) HF Scientific	0.46									
Disssolved Oxygen (mg/L)	2.96									
Temperature (°C)	15.3									
ORP/eH (mV)	291									
Color of Purged Water (gray, brown, red, clear)										

Sample Identification: 121014

Time Sampled: 1545

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 3,164090 gal.

Ground Water Purge and Sampling Form

Well Identification	MW-19D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RL, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, ~78°F

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1605									
Depth to Ground water (ft btoc)	11.61									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	12.0									
pH	6.71									
Conductivity (mS/cm)	.184									
Turbidity (NTU) HF Scientific	1.2									
Disssolved Oxygen (mg/L)	4.10									
Temperature (°C)	15.2									
ORP/eH (mV)	297									
Color of Purged Water (gray, brown, red, clear)	clear.									

Sample Identification: 121015 / 121016 Comments: 2720050

Time Sampled: 1615 / 1620 DUP

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	6
X Total Chromium	2
___ Other	

Ground Water Purge and Sampling Form

Well Identification	MW-20D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub (~~Fall~~ Spring 2012)
Date: 4/24/12
Project Number: 14495.05 2012 0013
Personnel: RR, MB
Purge Method: ___Low Flow ___Conventional ___None
Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other
Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag
Weather Conditions: Overcast, 50's.
Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0956									
Depth to Ground water (ft btoc)	42.41									
Total Groundwater Purged (gallons, liters)	—									
Purge Rate (gpm), ft^3/min, ml/min)	15.0									
pH	6.57									
Conductivity (mS/cm)	.201									
Turbidity (NTU)	0									
Disssolved Oxygen (mg/L)	6.20									
Temperature (°C)	13.1									
ORP/eH (mV)	311									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121020
Time Sampled: 1000

# of bottles/analysis
X VOCs by 8260b 3
X Total Chromium 1

Comments: 315,240 gft^3

Purge water disposed To: Boomsnub

Ground Water Purge and Sampling Form

Well Identification	MW-21D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub (~~Fall~~ Spring 2012)
Date: 4/24/12
Project Number: 14495.05 2012 0013
Personnel: RR, MB
Purge Method: ___Low Flow ___Conventional ___None
Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other
Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag
Weather Conditions: Overcast, 50's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0858									
Depth to Ground water (ft btoc)	19.90									
Total Groundwater Purged (gallons, liters)	—									
Purge Rate (gpm, ft^3/min, ml/min)	10.62									
pH	6.66									
Conductivity (mS/cm)	.182									
Turbidity (NTU) HF Scientific	0.2									
Disssolved Oxygen (mg/L)	4.03									
Temperature (°C)	13.2									
ORP/eH (mV)	383									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121018
Time Sampled: 0900

# of bottles/analysis
Y VOCs by 8260b
X Total Chromium

Comments: 105,397 ft^3

Purge water disposed To: Boomsnub

Ground Water Purge and Sampling Form

Well Identification	MW-22D
Well Diameter (inches)	4"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBE
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub (~~Fall~~ Spring 2012) Date: 4/24/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Overcast, 50's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	0912									
Depth to Ground water (ft btoc)	26.43'									
Total Groundwater Purged (gallons, liters)	—									
Purge Rate (gpm, ft^3/min, ml/min)	12.12									
pH	6.45									
Conductivity (mS/cm)	.218									
Turbidity (NTU) HF Scientific	0.7									
Disssolved Oxygen (mg/L)	3.05									
Temperature (°C)	12.6									
ORP/eH (mV)	362									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 1217019 MS/MSD

Time Sampled: 0920

# of bottles/analysis

X VOCs by 8260b

X Total Chromium

Comments: 647857 ft^3

Purge water disposed To: Boomsnub

Ground Water Purge and Sampling Form

Well Identification	MW-25D
Well Diameter (inches)	6"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 9/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, Dry. Warm.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1116									
Depth to Ground water (ft btoc)	31.92									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	9.3									
pH	7.11									
Conductivity (mS/cm)	.169									
Turbidity (NTU) HF scrub for	1.2									
Disssolved Oxygen (mg/L)	9.70									
Temperature (°C)	14.0									
ORP/eH (mV)	311									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121002

Time Sampled: 1125

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 787070 gal

Ground Water Purge and Sampling Form

Well Identification	MW-26D
Well Diameter (inches)	6"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: _X_Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: _X_Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, Dry ~70's

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1130									
Depth to Ground water (ft btoc)	44.18									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	9.0									
pH	6.62									
Conductivity (mS/cm)	.228									
Turbidity (NTU)	0.41									
Disssolved Oxygen (mg/L)	3.75									
Temperature (°C)	13.5									
ORP/eH (mV)	260									
Color of Purged Water (gray, brown, red, clear)	clear									

Sample Identification: 121003

Time Sampled: 1145

Purge water disposed To: Boomsnub

Analysis	# of Bottles
_X_ VOCs by 8260b	3
_X_ Total Chromium	1
___ Other	

Comments: 9191450

Ground Water Purge and Sampling Form

Well Identification	MW-49
Well Diameter (inches)	6"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	Yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14485.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny 75°

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1215									
Depth to Ground water (ft btoc)	36.50									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	13.0									
pH	7.32									
Conductivity (mS/cm)	.138									
Turbidity (NTU) HF Scientific	0.5									
Disssolved Oxygen (mg/L)	9.00									
Temperature (°C)	14.1									
ORP/eH (mV)	290									
Color of Purged Water (gray, brown, red, clear)	clear.									

Sample Identification: 1217 006 ms/msd

Time Sampled: 12:15

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	9
X Total Chromium	3
___ Other	

Comments: 7570800 Totalizer

Ground Water Purge and Sampling Form

Well Identification PW -	1B
Well Diameter (inches)	6"
Well Monument Locked and Good Condition?	yes
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	WBC
Well Casing Plug Locked and Good Condition?	yes
PID Reading in Well (ppm)	—
Well Total Depth (ft btoc)	—

Site Location: Boomsnub Date: 4/23/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: ___Low Flow ___Conventional ___None

Purge Equipment: X Extraction Well ___Redi-flo Pump (Ded) ___Other

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Sunny, 70's.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Time	1351									
Depth to Ground water (ft btoc)	25.34									
Total Groundwater Purged(gallons, liters, other)	—									
Purge Rate (gpm, ft^3/min, ml/min, other)	9.0									
pH	6.96									
Conductivity (mS/cm)	.127									
Turbidity (NTU)	0.4									
Disssolved Oxygen (mg/L)	10.54									
Temperature (°C)	15.5									
ORP/eH (mV)	255									
Color of Purged Water (gray, brown, red, clear)	clear.									

Sample Identification: 121008

Time Sampled: 1355

Purge water disposed To: Boomsnub

Analysis	# of Bottles
X VOCs by 8260b	3
X Total Chromium	1
___ Other	___

Comments: 858860 gal

PDBS FIELD FORM

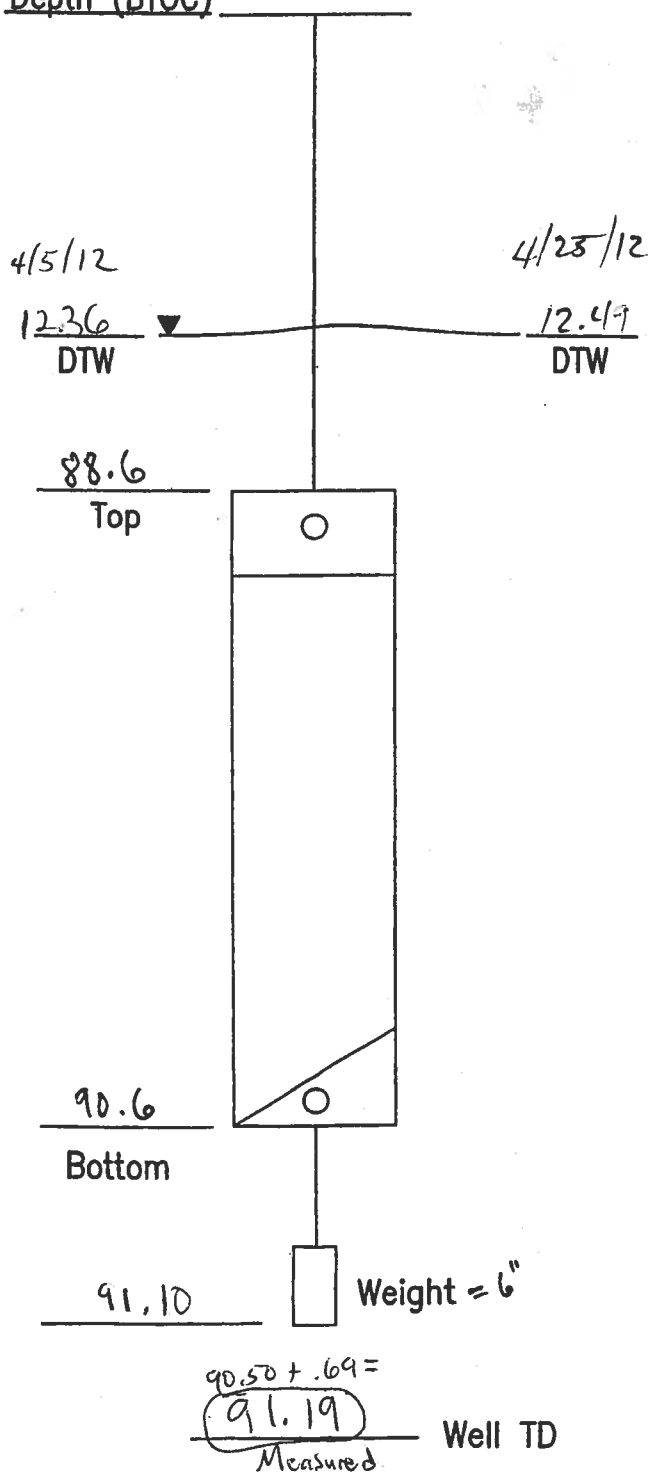
Well # PZ-3

Well Diameter 2"

Installation Date 4/5/12

Installation Time 1240

Job# 14495.05.2012 0013



SAMPLE INFORMATION

Sample No. 1217026

Sample Time 0940

Sample Date 4/25/12

Analysis 8260.

FIELD PARAMETERS

Dissolved Oxygen —

ORP —

pH —

Biofilm Present (Y/N) NO

Other —

DRAWING NAME: //projects/12040.77/BOC Field/BOC Field Forms/PDBSfieldform.dwg
DATE:01/25/2007 TIME:14:05 DRAWN BY: mbb

Ground Water Purge and Sampling Form

Well Identification	Bennett										
Well Diameter (inches)	6"										
Well Monument Locked and Good Condition?	~~NA~~										
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D										
Well Casing Plug Locked and Good Condition?	yes										
PID Reading in Well (ppm)	—										
Well Total Depth (ft btoc) QASP Table 1.	197.00										
Time	1305	1345									
Depth to Ground water (ft btoc)	131.45	—									
Total Groundwater Purged (gallons, liters)		—									
Purge Rate (gpm, ft^3/min, ml/min)		—									
pH		7.38									
Conductivity (mS/cm)		.143									
Turbidity (NTU)		2									
Disssolved Oxygen (mg/L)		3.62									
Temperature (^oC)		12.8									
ORP/eH (mV)		170									
Color of Purged Water (gray, brown, red, clear)		clear									

Site Location: Boomsnub (~~Fall~~ Spring 2012) Date: 4/25/12

Project Number: 14495.05 2012 0013 Personnel: RR, MB

Purge Method: 40 min. Low Flow ___Conventional ___None

Purge Equipment: ___Extraction Well ___Redi-flo Pump (Ded) X Other Residential

Sampling Equipment: X Extraction Well ___Redi-flo Pump ___Diffusion Bag

Weather Conditions: Overcast, Dry. ~60's.

Well Volume Calculation: 2"=.16, 4"=.64, 6"=1.44 gallons

Sample Identification: 121030

Time Sampled: 1350

# of bottles/analysis

3 VOCs by 8260b

1 Total Chromium

Comments: 1305 start well pumping, hose extended into bushes.

Purge water disposed To: Boomsnub

Appendix C

Chain-of-Custody Documentation

CHAIN OF CUSTODY

SR#: K1203215

Columbia Analytical Services™
1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PAGE 1 OF 1 COC #

PROJECT NAME	Boomsnub
PROJECT NUMBER	14495.05 2012
PROJECT MANAGER	Cathy Bohlke
COMPANY/ADDRESS	EA Engineering
	720 Sixth Street South, Suite 100
CITY/STATE/ZIP	Kirkland, WA. 98033
E-MAIL ADDRESS	Cbohlke@eaest.com
PHONE #	(425) 451-7400
FAX #	(425) 451-7800
SAMPLER'S SIGNATURE	Robert R. Read/Mark Blumstel

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☒	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	8021☐ BTEX☐	Fuel Fingerprint (FIO) NW-HCID☐	Oil & Grease/TRPH 1664 HEM☐	1664 SGT☐	PCB's Aroclors☐	Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals (Total/or Dissolved) (See list below)	Cyanide☐	Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐	AOX 1650☐ 506☐	REMARKS
1214001	4/6/12	NA		H_2O	2		X										X							
1214002		14:23			4		X										X							
1214003		14:30			4		X										X							
1214004		14:35			1		X										X							dissolved
1214005		15:15			4		X										X							
1214006		16:55			11		X										X							
1214007		17:00			1												X							dissolved

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

X III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

X V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: EA Engineering. Kirkland, WA 98033

TURNAROUND REQUIREMENTS

____ 24 hr. ____ 48 hr.

____ 5 Day

X Standard (10-15 working days)

____ Provide FAX Results

_____ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

Dissolved Cr Samples were field filtered

Temperature blank included.

Include PDF deliverable.

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard Read	Signature: [illegible]	Signature:	Signature:
Date/Time: 8:10/4/9/12	Date/Time: 4/9/12 1130	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: [illegible]	Printed Name:	Printed Name:
Firm: EA	Firm: ACS	Firm:	Firm:

RCOC #1 03/10

Cooler 1 of 2

CHAIN OF CUSTODY

SR#: Kh1203896

Columbia Analytical Services™
1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PAGE 1 OF 1 COC #

PROJECT NAME	Boomsnub
PROJECT NUMBER	14495.05 2012 0013
PROJECT MANAGER	Cathy Bohlke
COMPANY/ADDRESS	EA Engineering 720 Sixth Street South
CITY/STATE/ZIP	Kirkland, WA 98033
E-MAIL ADDRESS	cbohlke@eaest.com
PHONE #	425-451-7400
FAX #	~ 7800
SAMPLER'S SIGNATURE	Mark Bhuta

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐	Volatile Organics 624 ☐ 8260 X 8270LL ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐ BTEX ☐ 8021 ☐ ☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals (Total or Dissolved) (See list below)	Cyanide ☐ 220.7	Hex-Chrom ☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐				REMARKS
1217001	4/23/12	—		W	2			X																	
1217002		1125			4			X								X									
1217003		1145			4			X								X									
1217004		1148			4			X								X									
1217005		1150			4			X								X									
1217006		1215			12			X								X									MS/MSD
1217007		1240			4			X								X									
1217008		1355			4			X								X									
1217009		1415			4			X								X									
1217010		1430			4			X								X									

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
X III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
X V. EDD

INVOICE INFORMATION

P.O. # _____
Bill To: EA Engineering Kirkland, WA

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

Temp Blank Included.

Provide PDF Deliverable.

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Mark Bhuta	Signature: Kaila Smith	Signature:	Signature:
Date/Time: 4/26/12 0845	Date/Time: 4/26/12 1100	Date/Time:	Date/Time:
Printed Name: Mark Bhuta	Printed Name: Kaila Smith	Printed Name:	Printed Name:
Firm: EA Engineering	Firm: ALS	Firm:	Firm:

RCOC #1 03/10

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Columbia Analytical Services

CHAIN OF CUSTODY

Cooler Lot 2

SR#: K1203896

1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

PAGE 1 OF 2 COC #

PROJECT NAME	Boomsnub
PROJECT NUMBER	14495.05 2012 0013
PROJECT MANAGER	Cathy Bohlke
COMPANY/ADDRESS	EA Engineering
	720 Sixth Street South
CITY/STATE/ZIP	Kirkland, WA 98033
E-MAIL ADDRESS	cbohlke@eaest.com
PHONE #	FAX #
SAMPLER'S SIGNATURE	Mark Blinstrub

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260-HC 8021☐ BTEX☐	Hydrocarbons (see below) Gas☐ Diesel☐ Oil☐	☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, Total or Dissolved (See list below)	Cyanide☐ Hex-Chrom☐	pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ■ AOX 1650☐ 506☐	REMARKS
1217035	4/25/12	1500		W	2		X													

12

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

X III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

X V. EDD

INVOICE INFORMATION

P.O. #

Bill To: EA Engineering Kirkland, WA

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

X Standard (10-15 working days)

___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Mark Blinstrub	Signature: Karla Smith	Signature	Signature
Date/Time: 4/26/12 0845	Date/Time: 4/26/12 1100	Date/Time	Date/Time
Printed Name: Mark Blinstrub	Printed Name: Karla Smith	Printed Name	Printed Name
Firm: EA Engineering	Firm: ALS	Firm	Firm

RCOC #1 03/10

Columbia Analytical Services™
1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

CHAIN OF CUSTODY

Cooler 2 of 2

SR#: K1203896

PAGE 2 OF 2 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.05 2012 0013
PROJECT MANAGER: Cathy Bohlke
COMPANY/ADDRESS: EA Engineering, 720 Sixth Street South
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: cbohlke@eaest.com
PHONE #: 425-451-7400 FAX #:
SAMPLER'S SIGNATURE: Mark Blumstul

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ (8260)☒	Hydrocarbons (*see below) Gas☐ 8021☐ Diesel☐ Oil☐ BTEX☐	Fuel Fingerprint (FIQ) NW-HCID Screen	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, (Total) or Dissolved (See list below) 200.7	Cyanide☐ Hex-Chrom☐	pH, Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS (circle)	NH3-N, COD, Total-P, TKN, TOC, DOC (circle) NO2+NO3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
1217011	4/23/12	1440		W	4		X								X					
1217012	↓	1445		↓	4		X								X					
1217013		1500			4		X								X					
1217014		1545			4		X								X					
1217015		1615			4		X								X					
1217016		1620			4		X								X					
1217017		1600			3		X													
1217018	4/24/12	0900			4		X								X					
1217019	4/24/12	0920			12		X								X					MS/MSD
1217020	4/24/12	1000			4		X								X					

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required

___ II. Report Dup., MS, MSD as required

Y III. Data Validation Report (includes all raw data)

___ IV. CLP Deliverable Report

X V. EDD

INVOICE INFORMATION

P.O. # ___

Bill To: EA Engineering, Kirkland, WA 98033

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 Day

X Standard (10-15 working days)

___ Provide FAX Results

___ Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS: Temp Blank Included.

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Mark Blumstul; Date/Time: 4/26/12 0845	Signature: Karla Smith; Date/Time: 4/26/12 1100	Signature: ; Date/Time:	Signature: ; Date/Time:
Printed Name: Mark Blumstul; Firm: EA Engineering	Printed Name: Karla Smith; Firm: ALS	Printed Name: ; Firm:	Printed Name: ; Firm:

RCOC #1 03/10

Columbia Analytical Services™
1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

CHAIN OF CUSTODY

Cooler 3 of 3

SR#: K1203896

PAGE 1 OF 2 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: Cathy Bohlke
PROJECT MANAGER: 14495.05 2012 0013
COMPANY/ADDRESS: EA Engineering, 720 Sixth Street South
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: cbohlke@eaest.com
PHONE #: 425-451-7400 FAX #:
SAMPLER'S SIGNATURE: Mark Blunstub

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260☒	Hydrocarbons (*see below) Gas☐ 8021☐ BTEX☐ Diesel☐ Oil☐	Fuel Fingerprint (FIQ) ☐ NW-HCID Screen ☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, (Total) or Dissolved (See list below) 200.7	Cyanide☐ Hex-Chrom☐	pH, Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS (circle)	NH3-N, COD, Total-P, TKN, TOC, DOC (circle) NO2+NO3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
1217021	4/24/12	1200		W	3		X													
1217022	↓	1440		↓	3		X													
1217023	↓	1510		↓	3		X													
1217024	↓	1615		↓	3		X													
1217025	4/25/12	—		↓	2		X													
1217026	↓	0940		↓	3		X													
1217027	↓	1000		↓	3		X													
1217028	↓	1035		↓	3		X													
1217029	↓	1045		↓	3		X													
1217030	↓	1350		↓	4		X								X					

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
X III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
X V. EDD

INVOICE INFORMATION

P.O. #
Bill To: EA Engineering, Kirkland, WA

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
Requested Report Date

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Total Metals: Al As Sb Ba Be B Ca Cd Co (Cr) Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

Temp Blank Included

Provide PDF Deliverable

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Mark Blunstub; Date/Time: 4/26/12 0845	Signature: [signature]; Date/Time: 4/26/12 1100	Signature; Date/Time	Signature; Date/Time
Printed Name: Mark Blunstub; Firm: EA Engineering	Printed Name: [signature] Smith; Firm: ALS	Printed Name; Firm	Printed Name; Firm

10

RCOC #1 03/10

Columbia Analytical Services™
1317 South 13th Ave, Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

CHAIN OF CUSTODY

Cooler 3013

SR#: K1203896

PAGE 2 OF 2 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.05 2012 0013
PROJECT MANAGER: Cathy Bohlke
COMPANY/ADDRESS: EA Engineering
720 Sixth Street South
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: cbohlke@eaest.com
PHONE #: 425-451-7400 FAX #:
SAMPLER'S SIGNATURE: Mark Blumstal

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 XC	Hydrocarbons (see below) Gas ☐ 8021 ☐ BTEX ☐	Fuel Fingerprint (FIQ) NW-HCID Screen ☐ Diesel ☐ Oil ☐	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics Tri ☐ Tetra ☐ 8151M PCP ☐	PAHS 8310 ☐ SIM ☐	Metals, Total or Dissolved (See list below)	Cyanide ☐ Hex-Chrom ☐	pH, Cond., Cl, SO4, PO4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	REMARKS
1217031	4/25/12	1409		W	~~4~~ 3 MB		X													
1217032	↓	1420		↓	3		X													
1217033	↓	1430		↓	3		X													
1217034	↓	1440		↓	3		X													
~~1217035~~	~~4/25/12~~	~~1500~~		↓	~~2~~		~~X~~ MBB													

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
___ II. Report Dup., MS, MSD as required
X III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
X V. EDD

INVOICE INFORMATION

P.O. #
Bill To: EA Engineering
Kirkland, WA

TURNAROUND REQUIREMENTS

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___ Provide FAX Results

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Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_______ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Mark Blumstal Date/Time: 4/26/12 0845	Signature: Karla Smith Date/Time: 4/26/12 1100	Signature Date/Time	Signature Date/Time
Printed Name: Mark Blumstal Firm: EA Engineering	Printed Name: Karla Smith Firm: ALS	Printed Name Firm	Printed Name Firm

RCOC #1 03/10

Appendix D

Analytical Results Summary

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-1A
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217031

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.61		ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.11	J	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	1.5		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.07	J	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.2	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	5.7		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-2A
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217032

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.19	J	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	3.5		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.07	J	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.51		ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	6.1		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-2A
Sample Date: 4/25/2012
Sample Type: FD **Sampling Method:** PDBS
Sample ID: 1217033

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.19	J	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	3.6		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.48	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	5.4		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-12A
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217034

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.12	J	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.42	J	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.38	J	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.2	J	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.43	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	27		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-14
Sample Date: 4/6/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1214002

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	22.2		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.14	J	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	0.48	J	ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-14
Sample Date: 4/6/2012
Sample Type: FD **Sampling Method:** LOW FLOW
Sample ID: 1214003

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	26		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.21	J	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	0.53		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-14
Sample Date: 4/6/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1214004

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	D	CHROMIUM	22.4		ug/l	7440-47-3

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-15
Sample Date: 4/6/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1214006

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	2.6	J	ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-15
Sample Date: 4/6/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1214007

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	D	CHROMIUM	5	U	ug/l	7440-47-3

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-16
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217027

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	0.17	J	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-17
Sample Date: 4/24/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1217021

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	1.3		ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.76		ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.85		ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	160	D	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-18
Sample Date: 4/24/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1217022

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.29	J	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.09	J	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.53		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.19	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	52		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-27
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217004

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	26.7		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.15	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.63		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.08	J	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.16	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.08	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	2.6		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	12		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-27
Sample Date: 4/23/2012
Sample Type: FD **Sampling Method:** EXTRACTION WELL
Sample ID: 1217005

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	28.9		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.16	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.71		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.08	J	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.17	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.09	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	2.5		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	12		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-53A
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217029

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5		ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.74		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.08	J	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.13	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	1.8		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: AMW-64
Sample Date: 4/24/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1217024

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	1.7		ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	2.5		ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.43	J	ug/l	156-59-2
8260C	DICHLOROMETHANE	0.1	UJ	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.31	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	160	D	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: CPU-13
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217007

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	19.5		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.27	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.54		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	1.4		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-1A
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217028

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.14	J	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.51		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.99		ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	6.1		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-6B
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217009

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	48.1		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.12	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.33	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.09	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.69		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	4.2		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-10B
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217010

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	39.6		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.16	J	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.18	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.11	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	1.2		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	16		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-10C
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217011

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	116		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.56		ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.8		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	2.5		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-14C
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217012

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	77.1		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.15	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.9		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	11		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-14E
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217013

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	42.1		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.24	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	3.5		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.44	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	3.6		ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	4		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.09	J	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	72	D	ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-15E
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217017

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.09	J	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.08	J	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.16	J	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.26	J	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	4.5		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-18D
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217014

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	109		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.29	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.79		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	1.1		ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.51		ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	2.3		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	47		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-19D
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217015

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	106		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	1.4		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.59		ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.32	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	1.8		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	30		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-19D
Sample Date: 4/23/2012
Sample Type: FD **Sampling Method:** EXTRACTION WELL
Sample ID: 1217016

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	113		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	1.4		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.56		ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.37	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	1.9		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	29		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-20D
Sample Date: 4/24/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217020

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	72.8		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.12	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	3.3		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.45	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.61		ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	1.3		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	47		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-21D
Sample Date: 4/24/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217018

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	6.7		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.16	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.99		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.44	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.48	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.15	J	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	5.4		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-22D
Sample Date: 4/24/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217019

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	28.5		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.27	J	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.3	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	2.3		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	6.8		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-25D
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217002

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	3.4	J	ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.12	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.19	J	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.24	J	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	1.3		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-26D
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217003

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	6.6		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.2	J	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.27	J	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	0.76		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: MW-49
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217006

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	9.5		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.3	J	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	1.4		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: PW-1B
Sample Date: 4/23/2012
Sample Type: N **Sampling Method:** EXTRACTION WELL
Sample ID: 1217008

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	49.7		ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.62		ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	2.6		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: PZ-39
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** PDBS
Sample ID: 1217026

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.97		ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	4		ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	8.9		ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	1.1		ug/l	156-59-2
8260C	DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	1.5		ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	56		ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location: BENNETT
Sample Date: 4/25/2012
Sample Type: N **Sampling Method:** LOW FLOW
Sample ID: 1217030

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	5	U	ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.16	J	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.63		ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	1.2		ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	3.8		ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location:
Sample Date: 4/6/2012
Sample Type: FB **Sampling Method:**
Sample ID: 1214005

		Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
200.7	T	CHROMIUM	5	U	ug/l	7440-47-3
8260C		1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C		1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C		1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C		1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C		1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C		BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C		CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C		CFC-11	0.5	U	ug/l	75-69-4
8260C		CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C		CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C		DICHLOROMETHANE	2	U	ug/l	75-09-2
8260C		HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C		TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C		TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C		TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C		VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location:
Sample Date: 4/24/2012
Sample Type: FB **Sampling Method:** LOW FLOW
Sample ID: 1217023

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	0.12	J	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location:
Sample Date: 4/6/2012
Sample Type: TB **Sampling Method:**
Sample ID: 1214001

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	1.1	J	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location:
Sample Date: 4/23/2012
Sample Type: TB **Sampling Method:**
Sample ID: 1217001

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	0.14	J	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location:
Sample Date: 4/25/2012
Sample Type: TB **Sampling Method:**
Sample ID: 1217025

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	0.13	J	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Groundwater Analysis for Metals and VOCs

Sampling Location:
Sample Date: 4/25/2012
Sample Type: TB **Sampling Method:**
Sample ID: 1217035

	Analyte	Result	Lab/Validation Qualifier	Unit of Measure	CAS Number
8260C	1,1,1-TRICHLOROETHANE	0.5	U	ug/l	71-55-6
8260C	1,1,2,2-TETRACHLOROETHANE	0.5	U	ug/l	79-34-5
8260C	1,1-DICHLOROETHYLENE	0.5	U	ug/l	75-35-4
8260C	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	2	U	ug/l	96-12-8
8260C	1,2-DICHLOROETHANE	0.5	U	ug/l	107-06-2
8260C	BROMODICHLOROMETHANE	0.5	U	ug/l	75-27-4
8260C	CARBON TETRACHLORIDE	0.5	U	ug/l	56-23-5
8260C	CFC-11	0.5	U	ug/l	75-69-4
8260C	CHLORODIBROMOMETHANE	0.5	U	ug/l	124-48-1
8260C	CIS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-59-2
8260C	DICHLOROMETHANE	0.13	J	ug/l	75-09-2
8260C	HEXACHLORO-1,3-BUTADIENE	2	U	ug/l	87-68-3
8260C	TETRACHLOROETHENE	0.5	U	ug/l	127-18-4
8260C	TRANS-1,2-DICHLOROETHENE	0.5	U	ug/l	156-60-5
8260C	TRICHLOROETHYLENE	0.5	U	ug/l	79-01-6
8260C	VINYL CHLORIDE	0.5	U	ug/l	75-01-4

Appendix E

Northern Plume Investigation Summary

APPENDIX E
NORTHERN PLUME INVESTIGATION SUMMARY

1. INTRODUCTION

This summary provides the analytical results from the latest round of sampling of monitoring wells in the area of the Northern Plume. This plume is north of the Boomsnub/Airco Superfund Site (Site) Operable Unit (OU)-3 trichloroethene (TCE) and chromium plumes, which are referred to collectively as the OU-3 plume. Previous sampling results for wells in the Northern Plume area were reported in the letter report, *Results of Quarterly Monitoring Well Sampling – Winter 2012, Northern Plume Area* (EA 2012a[1]).

Monitoring data indicate that the OU-3 TCE and chromium plumes have shown significant decreases in concentration and size since 1995 (EA 2012b[2]). In 2007 and 2008, however, routine monitoring data showed an unexpected increase in the TCE concentration in groundwater samples from well AMW-18, located north of the boundary of the OU-3 Plume.

In May 2008, a direct push drilling and sampling investigation was performed to evaluate the depth and concentration of TCE in groundwater in the vicinity of well AMW-18, and to evaluate possible source areas for the TCE detected in this well. The source of the TCE groundwater contamination in this area was not identified; however, based on the data, it was concluded that the source does not appear to be the same as for the OU-3 plume (EA 2008[3]).

Well AMW-17 is located approximately 400 ft downgradient of well AMW-18. TCE concentrations in this well had been below the Boomsnub/Airco Site-specific cleanup level since 1999. However, in Fall 2010, TCE in groundwater from this well increased to a concentration exceeding the Site cleanup level, indicating the apparent arrival of the Northern Plume at the AMW-17 location. The TCE concentration in groundwater from this well increased significantly during subsequent sampling events.

The U.S. Environmental Protection Agency (EPA) and Linde performed a joint investigation of the Northern Plume area in May 2011 to get a better understanding of the source, extent, and concentrations of VOCs in this plume. Results were provided in a separate report (EA 2011[4]).

A new monitoring well (AMW-64) was installed in February 2012, at the request of the EPA, to monitor the Northern Plume northwest of well AMW-17. The Northern Plume continues to be

[1] EA 2012a. *Results of Quarterly Monitoring Well Sampling – Winter 2012, Northern Plume Area, Hazel Dell, Washington*. 10 April.
[2] EA 2012b. *2011 Annual Status Report for the Boomsnub/Airco Superfund Site, Hazel Dell, Washington.* Revision 0. April.
[3] EA 2008. *AMW-18 Area Investigation Report, Boomsnub/Airco Superfund Site, Hazel Dell, Washington*. Revision 0. August.
[4] EA 2011. *Northern Plume Investigation Report, Hazel Dell, Washington*. Revision 1. December.

monitored along with the OU-3 plume to evaluate potential impacts to the Site and treatment system.

Wells AMW-17, AMW-18, and AMW-64 were sampled in early March 2012, shortly after the installation of well AMW-64. The wells were sampled again in late April 2012 in conjunction with the Spring 2012 semiannual event. Well AMW-17 was sampled using a dedicated submersible pump. The other two wells were sampled using non-dedicated submersible pumps.

2. ANALYTICAL RESULTS

The analytical results for Spring 2012, along with previous sampling results, are summarized in Table E-1 (well AMW-18), Table E-2 (well AMW-17), and Table E-3 (well AMW-64). No quality assurance/quality control issues were noted which would impact the analytical results.

3.1 Well AMW-18

TCE was detected at a concentration of 52 micrograms per liter (μg/L) in groundwater from well AMW-18 in Spring 2012 (Table E-1). This is the same concentration as detected in March 2012. Three other VOCs were detected at concentrations similar to or lower than previous results and below the cleanup levels: tetrachloroethene (PCE) at a concentration of 0.19 J μg/L; 1,1,1-trichloroethane (1,1,1-TCA) at a concentration of 0.29 J μg/L; and 1,1-dichloroethene (1,1-DCE) at a concentration of 0.09 J μg/L. Results for these three VOCs were reported as estimated concentrations, less than the method reporting limit but greater than or equal to the method detection limit, and qualified with a "J". Additionally, trichlorofluoromethane (CFC-11) was detected at a concentration of 0.53 μg/L. Trace concentrations of CFC-11 have been detected in groundwater from this well only since October 2011.

3.2 Well AMW-17

TCE was detected at a concentration of 160 μg/L in the groundwater sample collected from well AMW-17 in Spring 2012 (Table E-2). This is the same concentration as detected in March 2012. Concentrations of PCE (0.85 μg/L), 1,1,1-TCA (1.3 μg/L), and 1,1-DCE (0.76 μg/L) were similar to previous results and below the cleanup levels. CFC-11 has not been detected in any samples collected from this well.

3.3 Well AMW-64

TCE was detected at a concentration of 160 μg/L in the groundwater sample collected from well AMW-64 in Spring 2012 (Table E-3). This is slightly lower than the previous TCE concentration detected in March 2012 (190 μg/L). Four other VOCs were detected at concentrations similar to the last sampling event for this well: PCE at 0.31 J μg/L, 1,1,1-TCA at 1.7 μg/L, 1,1-DCE at 2.5 μg/L, and cis-1,2-dichloroethene (cis-1,2-DCE) at 0.43 J μg/L. The 1,1-DCE concentration exceeded the Site cleanup level of 1 μg/L. CFC-11 was not detected in any of the samples collected from this well.

3. CONCLUSIONS

A review of the historical TCE results for groundwater samples collected from well AMW-18 (Table E-1) shows that the concentration was 1.1 µg/L or less, prior to October 2006. The TCE concentration increased rapidly between October 2006 (5.1 µg/L) and October 2007 (330 µg/L). TCE concentrations in this well peaked in January and May 2008 (both at 460 µg/L). TCE concentrations in groundwater from well AMW-18 have decreased significantly between May 2008 and the most recent sampling event (Spring 2012). However, the current concentration of 52 µg/L remains well above the cleanup level of 5 µg/L. Detected concentrations of PCE, 1,1,1-TCA, 1,1-DCE, and CFC-11 do not exceed the cleanup levels.

Historical TCE results for groundwater samples collected from well AMW-17 (Table E-2) indicate that TCE concentrations were below the cleanup level from October 1999 through April 2010. However, in October 2010, the TCE concentration increased to 28 µg/L, above the 5 µg/L cleanup level. The TCE concentration has since continued to increase to 160 µg/L. Detected concentrations of PCE, 1,1,1-TCA, and 1,1-DCE do not currently exceed the cleanup levels.

Well AMW-64 has been sampled twice since it was installed in February 2012. The TCE concentration detected in March 2012, the first time the well was sampled, was 190 µg/L. The TCE concentration in the April 2012 groundwater sample from this well was 160 µg/L, well above the Site cleanup level. The VOC 1,1-DCE was also detected at a concentration above the Site cleanup level (1 µg/L) during both sampling events. Detected concentrations of PCE, 1,1,1-TCA, and cis-1,2-DCE did not exceed the cleanup levels during either sampling event. Insufficient data are available for this well to determine the concentration trends.

Wells AMW-17, AMW-18, and AMW-64 are currently sampled on a quarterly frequency with the next sampling event scheduled for July 2012. Results of that sampling event will be summarized in a letter report to EPA.

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Table E-1. Historical VOC Concentrations in Well AMW-18 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	cis-1,2-DCE	CFC-11
Apr-95	0.73 J	1.0 U	2.9	0.87 J	1.0 U	1.0 UJ
Oct-95	0.3 J	1.0 U	1.0	0.53 J	1.0 U	1.0 U
May-96	1.0 U	1.0 U	0.52 J	1.0 U	1.0 U	1.0 U
Oct-96	0.31 J	1.0 U	0.48 J	1.0 U	1.0 U	1.0 U
May-97	0.43 J	1.0 U	0.44 J	1.0 U	1.0 U	1.0 UJ
Oct. 97	0.3 U	0.4 U	0.4 U	0.4 U	--	0.50 U
May-98	0.5 U	0.6 U	2.0 U	1.0 U	0.70 U	2.0 U
Oct-01	1.1	0.15 J	0.19 J	0.12 J	0.50 U	0.50 U
Oct-02	1.1	0.26 J	0.25 J	0.5 U	0.50 U	0.50 U
Oct-03	0.95	0.29 J	0.17 J	0.5 U	0.50 U	0.50 U
Oct-04	0.64	0.28 J	0.17 J	0.5 U	0.50 U	0.50 U
Oct-05	0.62	0.24 J	0.78	0.13 J	0.50 U	0.50 U
Oct-06	**5.1**	0.43 J	2.4	0.78	0.50 U	0.50 U
Oct-07	**330**	1.6	6.5	**2.7**	0.50 U	0.50 U
Dec-07	**410**	2.1	7.5	**2.9**	0.50 U	0.50 U
Jan-08 shallow [a]	**430**	1.9	6.9	**2.6**	1.0 U	1.0 U
Jan-08 deep [a]	**460**	1.9	6.9	**2.7**	1.0 U	1.0 U
May-08	**460**	2.3	6.0	**2.4**	0.50 U	0.50 U
Jul-08	**410**	1.4	4.8	**1.7**	1.0 U	1.0 U
Oct-08 [b]	**390**	1.4	4.5	**1.4**	1.0 U	1.0 U
Jan-09	**300**	1.5	3.2	**1.3**	0.50 U	0.50 U
May-09	**320**	1.4	2.6	**1.1**	0.50 U	0.50 U
Oct-09	**210**	0.75	1.8	0.75	0.50 U	0.50 U
Apr-10	**200**	0.66	2.1	0.61	0.50 U	0.50 U
Oct-10	**130**	0.47 J	0.85	0.35 J	0.50 U	0.50 U
Apr-11	**75**	0.31 J	0.71	0.18 J	0.50 U	0.50 U
Oct-11	**68**	0.29 J	0.56	0.18 J	0.50 U	0.22 J
Mar-12	**52**	0.20 J	0.37 J	0.09 J	0.50 U	0.50
Apr-12	**52**	0.19 J	0.29 J	0.09 J	0.50 U	0.53
Cleanup Level	5	5	200	1	70	2,400

NOTES:
Only detected compounds are included in this table.
BOLD results exceed the Boomsnub/Airco Site-specific cleanup level.
-- = Not available
CFC-11 = Trichlorofluoromethane
cis-1,2-DCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.
PCE = Tetrachloroethene
TCE = Trichloroethene
U = Analyte was not detected above the specified reporting limit.
UJ = The analyte was not detected, but the associated limit of quantitation is estimated.
µg/L = Micrograms per liter
VOC = Volatile organic compound
[a] = Two samples were collected using PDBs in January 2008 - one near the top of the screened interval (shallow) and one near the bottom (deep).
[b] = Concentrations presented are the highest of the sample and duplicate results.

Table E-2. Historical VOC Concentrations in Well AMW-17 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	**66.9**	1.0 U	5.8	**1.6 J**	21	10.6
Oct-95	**42.5**	1.0 U	36.1	**5.4**	12.7	19.2 J
May-96	**39.6**	1.0 U	52.6	**9.7**	9.2	10.1
Oct-96	**20.5**	1.0 U	169	**25.9**	3.5	19.7
May-97	**17.3**	1.0 U	89.6	**23.8**	2.1	23.3
Oct. 97	**12**	0.4 U	67	**9.0**	--	14.0
May-98	**7.0**	0.6 U	48	**9.0**	0.70 U	9.0
Sep-98	**8.0**	0.6 U	52	**9.0**	0.70 U	6.0
May-99	**5.0**	0.6 UJ	12 J	**8.0 J**	0.70 UJ	5.0 J
Oct-99	3.4	0.5 U	3	**1.2**	0.50 U	0.50
Oct-01	2.7	0.5 U	4.2	**1.8**	0.39 J	0.52
Oct-02	2.3	0.5 U	2.2	0.74	0.22 J	0.35 J
Oct-03	2.2	0.5 U	1.1	0.45 J	0.12 J	0.25 J
Oct-04	1.8	0.5 U	0.9	0.32 J	0.50 U	0.19 J
Oct-05	1.9	0.5 U	0.85	0.29 J	0.50 U	0.50 U
Oct-06	1.5	0.5 U	0.69	0.23 J	0.50 U	0.50 U
Oct-07	1.5	0.5 U	1.1	0.50 U	0.50 U	0.50 U
Oct-08	1.2	0.09 J	0.20 J	0.50 U	0.50 U	0.50 U
Jan-09	1.1	0.09 J	0.17 J	0.50 U	0.50 U	0.50 U
May-09	1.3	0.08 J	0.31 J	0.13 J	0.50 U	0.50 U
Oct-09	1.2	0.07 J	0.8	0.22 J	0.50 U	0.50 U
Apr-10	1.1	0.09 J	1.0	0.33 J	0.50 U	0.50 U
Oct-10	**28**	0.21 J	2.6	**1.4**	0.50 U	0.50 U
Apr-11	**29**	0.27 J	1.3	0.89	0.50 U	0.50 U
Oct-11	**140**	0.68	2.3	**1.0**	0.50 U	0.50 U
Mar-12	**160**	0.81	1.5	0.82	0.50 U	0.50 U
Apr-12	**160**	0.85	1.3	0.76	0.50 U	0.50 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:
BOLD results exceed the Boomsnub/Airco Site-specific cleanup level.
Concentrations presented are the highest of the sample and duplicate results, where applicable.
-- = Not available
CFC-11 = Trichlorofluoromethane
cis-1,2-DCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.
PCE = Tetrachloroethene
TCE = Trichloroethene
U = Analyte was not detected above the specified reporting limit.
UJ - The analyte was not detected, but the associated limit of quantitation is estimated.
µg/L = Micrograms per liter
VOC = Volatile organic compound

Table E-3. VOC Concentrations in Well AMW-64 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Mar-12	**190**	0.27 J	3.5	**2.7**	0.11 J	0.50 U
Apr-12	**160**	0.31 J	1.7	**2.5**	0.43 J	0.50 U
Cleanup Level	5	5	200	1	70	2,400

NOTES:
BOLD results exceed the Boomsnub/Airco Site-specific cleanup level.
Concentrations presented are the highest of the sample and duplicate results, where applicable.
CFC-11 = Trichlorofluoromethane
cis-1,2-DCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.
PCE = Tetrachloroethene
TCE = Trichloroethene
U = Analyte was not detected above the specified reporting limit.
µg/L = Micrograms per liter
VOC = Volatile organic compound