Progress Report
October 2011 — March 2012
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Prepared for

Linde LLC
575 Mountain Avenue
Murray Hill, New Jersey 07974

Prepared by

EA Engineering, Science, and Technology, Inc.
720 Sixth Street South, Suite 100
Kirkland, Washington 98033

September 2012
Revision: 1
Project No. 14495.05

TABLE OF CONTENTS

Page

LIST OF ACRONYMS

CAS	Columbia Analytical Services
City	City of Vancouver
Church	First Church of God
DSL	Digital Subscriber Line
EA	EA Engineering, Science, and Technology, Inc.
EPA	United States Environmental Protection Agency
IWS	In-Well Stripping
IX	Ion Exchange
lb	Pound(s)
Linde	Linde LLC
O&M	Operation and Maintenance
OU	Operable Unit
QASP	Quality Assurance and Sampling Plan
SCADA	Supervisory Control and Data Acquisition
Site	Boomsnub/Airco Superfund Site
TCE	Trichloroethene

PROGRESS REPORT

Site Name: Boomsnub/Airco Superfund Site, Hazel Dell, Washington (Site)
Prepared By: EA Engineering, Science, and Technology, Inc. (EA)
Date: September 2012 (Revision 1)
Reporting Period: October 2011 through March 2012.

A. PROGRESS MADE THIS PERIOD

Daily Operation and Maintenance (O&M) activities are discussed in Appendix A.

A.1 SYSTEM OPERATIONS AND AVAILABILITY

Figure 1 is a site map which identifies Operable Unit (OU) -1 (chromium source area), OU-2 (trichloroethene [TCE] source area) and OU-3 (site-wide groundwater), along with other project areas. Well locations are identified on Figure 2. OU-2 and OU-3 system availability is discussed in the following subsections.

A.1.1 OU-2 TCE Source Area System

General O&M activities continued throughout the reporting period as specified in the O&M Manual, with modifications approved by the United States Environmental Protection Agency (EPA). Appendix B provides copies of the monthly operating field forms for the OU-2 system.

The OU-2 in-well stripping (IWS) system availability over this reporting period was as follows:

Total hours available from 1 October 2011 to 31 March 2012: 4,418
Total hours of IWS system downtime: 30
Total operating hours: 4,388
System availability: over 99 percent

A.1.2 OU-3 Site-wide Groundwater Extraction and Treatment System

Copies of the completed OU-3 Bi-weekly System Monitoring Checklists are provided in Appendix C.1. System operation tables are provided in Appendix C.2 and include the following:

- Tables 1A through 1F summarize the groundwater flow information for October 2011 through March 2012.
- Tables 2A through 2F present the pumping rates for each of the extraction wells during this period.
- Table 3 presents a summary of the monthly system sampling analytical results.

The treated groundwater was discharged to the infiltration gallery on Linde LLC (Linde) property. There were no discharges made to the City of Vancouver (City) sanitary sewer during the reporting period. The treatment system operated for 4,379 hours, more than 99 percent of the reporting period, exceeding the 90 percent requirement of the Consent Decree.

From 1 October 2011 to 31 March 2012, 40,525,063 gallons of groundwater were treated, removing 5.6 pounds (lb) of TCE and 17.6 lb of total chromium from the groundwater. Appendix C.3 provides mass removal tables and charts.

Included in Appendix C.4 is a copy of the Semiannual Self Monitoring Report delivered to the City for July through December 2011. Monthly influent and effluent sampling data are submitted to the City with the Semiannual Self Monitoring Report. The reporting periods are different for the Semiannual Self Monitoring Report and this Progress Report, therefore, three months of data (July through September 2011) submitted with the Semiannual Self Monitoring Report are included in the previous Progress Report. Monthly influent and effluent analytical data for the Progress Report reporting period, 1 October 2011 through 31 March 2012, are included in Appendix C.4

Synopsis of OU-3 System Downtime

Unscheduled system shut-downs and system maintenance shut-offs are listed on the table below. System downtime details are discussed in the Daily Operation and Maintenance Summary in Appendix A.

Synopsis of OU-3 System Downtime

Date	System Downtime	Type	Reason
October 2011			
Total October Downtime: The system was in operation 100% of the time during the month of October.			
November 2011			
10 November	2 hours, 10 minutes	Unscheduled	Power outage.
18 November	33 minutes	Maintenance	Pumped water out of vaults.
22 November	4 hours, 51 minutes	Unscheduled	Record precipitation caused flooding and system shutdown. Pumped vaults, cleared faults and controlled stormwater.
23 November	3 hours	Unscheduled	Record precipitation caused flooding. Replaced the ion exchange (IX) filters and fluffed the resin. Replaced circuit breaker.
28 November	10 minutes	Unscheduled	Influent tank high level fault. Temporarily turned off pump in MW-6B to reduce influent flow.
29 November	2 minutes	Maintenance	Located the cause of the influent tank high level issue. Adjusted the variable frequency drive.
Total November Downtime: Unscheduled; 10 hours 13 minutes, Maintenance; 35 minutes.			

December 2011			
2 December	6 minutes	Maintenance	Pumped water out of vaults.
6 December	1 hour, 30 minutes	Maintenance	Removed the broken sump pump in CV-3.
29 December	11 minutes	Maintenance	Pumped water out of vaults.
Total December Downtime: Maintenance; 1 hour, 47 minutes.			
January 2012			
18 January	35 minutes	Unscheduled	Flooding of containment vaults caused system shutdown. Shoveled snow away from vaults
19 January	45 minutes	Unscheduled	Flooding of containment vaults caused system shutdown. Pumped water out of vaults.
31 January	16 minutes	Maintenance	Pumped water out of vaults.
Total January Downtime: Unscheduled; 1 hour, 20 minutes, Maintenance; 16 minutes			
February 2012			
8 February	1 hour, 36 minutes	Unscheduled	High water in CV-3 and CV-18.
Total February Downtime: Unscheduled; 1 hour, 36 minutes.			
March2012			
9 March	40 minutes	Maintenance	Pumped water out containment vaults.
30 March	34 minutes	Maintenance	Pumped water out containment vaults.
Total March Downtime: Maintenance; 1 hour, 14 minutes.			
Notes: Unscheduled shutdowns occur when a problem causes the system to shut itself off. Maintenance shutoffs occur when the system operator shuts the system off for maintenance activities.			

A.2 SYSTEM MODIFICATIONS

OU-2 – The IWS system has reached asymptotic removal rates and TCE concentrations have not decreased significantly in the last three years. There were no modifications to the IWS system during this reporting period.

OU-3 – The First Church of God (Church) notified EA in late March that they were about to start construction of athletic fields on the eastern portion of their property. This will require modifications to pipelines, monitoring wells and extraction wells on their property. Details of the required modifications will be determined in conjunction with the Church and EPA.

A.3 OU-3 SAMPLING

Monthly influent and effluent sampling of the OU-3 groundwater treatment system was completed in accordance with the Site-specific Quality Assurance and Sampling Plan (QASP) (EA 2004). Volatile Organic Compound analyses were conducted using EPA Method 8260C, total chromium analyses using EPA Method 200.7, and pH analyses using Standard

Method 4500-H+B. Samples were sent to Columbia Analytical Services (CAS) in Kelso Washington for these analyses. Field analysis of pH was also conducted.

Effluent samples were collected by EA on 7 October, 7 November, and 6 December 2011, and on 4 January, 8 February, and 6 March 2012. Based on the analytical results for these samples, effluent water quality met both the City discharge permit limits and the infiltration gallery discharge limits during the reporting period. Table 3 in Appendix C.2 provides a summary of influent and effluent analytical data from the reporting period, along with the applicable discharge limits.

A.4 MEETINGS

- **6 October –** Attendees: Jennifer Byrne, Claire Hong and Bernie Zavala (EPA); Mohsen Kourehdar (Washington Department of Ecology); Cathy Böhlke and Jil Frain (EA); Brian Thiesse and Dave Grupp (Linde). Purpose: To discuss the current understanding and next steps regarding the offsite Northern Plume.

A.5 MISCELLANEOUS

EA continues to pursue easement agreements and restrictive covenants with neighboring property owners. EPA assistance has been requested to obtain agreements with the remaining property owners.

A new monitoring well (AMW-64) was installed in the Northern Plume area on 1 February 2012, as directed by EPA.

Quarterly monitoring of the Northern Plume monitoring wells (AMW-17, AMW-18 and AMW-64) will continue through 2012, as directed by EPA.

B. ANTICIPATED PROBLEM AREAS AND RECOMMENDED SOLUTIONS

A crack was noticed in containment vault CV-18. It is recommended that repairs be made when the ground is dry.

C. PROBLEMS RESOLVED

For more efficient remote access, a digital subscriber line (DSL) internet hookup and Ethernet converter for the supervisory control and data acquisition (SCADA) unit is in the process of being installed at the site. This will save time and allow the operator to better monitor the system remotely while away from the site.

D. DELIVERABLES

D.1 DELIVERABLES SUBMITTED

- **4 October 2011 –** Northern Plume Investigation Report submitted to EPA.
- **10 November 2011 –** Results of direct push groundwater sampling in the Northern Plume area sent to property owners.
- **15 November 2011 –** Work Plan for Monitoring Well Installation and Sampling in the Northern Plume Area, Revision 0, submitted to EPA.
- **18 November –** Progress Report, April through September 2011, submitted to EPA.
- **2 December 2011 –** Response to comments, Northern Plume Investigation Report, Revision 0, submitted to EPA**.**
- **14 December 2011 –** Response to comments, Work Plan for Monitoring Well Installation and Sampling in the Northern Plume Area, Revision 0, submitted to EPA.
- **15 December 2011 –** Response to Comments and Northern Plume Investigation Report, Revision 1, submitted to EPA.
- **11 January 2012 –** Semi-Annual Self-Monitoring Report – 31 December 2011, submitted to the City.
- **24 January 2012 –** Work Plan, Monitoring Well Installation and Sampling in the Northern Plume Area, Revision 1, submitted to EPA.
- **2 February 2012 –** Notification letters for the winter quarterly Northern Plume sampling event mailed to the property owners.
- **13 February 2012 –** 2011 Dangerous Waste Annual Reports submitted to the Washington Department of Ecology.
- **16 February 2012 –** Fall 2011 Semiannual Groundwater Sampling Report, Revision 0, submitted to EPA.
- **17 February 2012 –** QASP Addendum for the Spring 2012 Semiannual Sampling Event, Revision 0, submitted to EPA.
- **8 March 2012 –** Well AMW-64 Installation Report, Revision 0, submitted to EPA.
- **30 March 2012 –** Annual Status Report for 2011, Revision 0, submitted to EPA.

D.2 ANTICIPATED SUBMITTAL DATES

- **6 April 2012 –** Notification letters for the Spring sampling event to be mailed to property owners.
- **10 April 2012 –** Winter Quarterly Sampling Report to be submitted to EPA.
- **5 July 2012 –** Notification letters for the summer quarterly Northern Plume sampling event to be mailed to property owners.
- **9 July 2012 –** Semiannual Self Monitoring Report **(**January through June 2012) to be submitted to the City.
- **13 August 2012 –** Spring 2012 Semiannual Groundwater Sampling Report to be submitted to EPA.
- **24 August 2012 –** QASP Addendum for the Fall 2012 Semiannual Sampling Event to be submitted to EPA.
- **28 September 2012 –** Summer Quarterly Sampling Report to be submitted to EPA.

E. EVENTS

E.1 FIELD EVENTS COMPLETED

- **Monthly –** O&M influent and effluent sampling.
- **4 through 18 October 2011 –** Fall 2011 semiannual groundwater sampling event.
- **19 and 20 December 2011 –** Direct push groundwater sampling for new Northern Plume monitoring well.
- **30 January through February 2012 –** Installation of new Northern Plume monitoring well AMW-64.
- **1 March 2012 –** Winter quarterly groundwater sampling event.

E.2 UPCOMING EVENTS

- **Monthly –** O&M influent and effluent sampling.
- **23 through 27 April 2012 –** Spring 2012 semiannual groundwater sampling event.
- **25 July 2012 –** Summer quarterly groundwater sampling event.

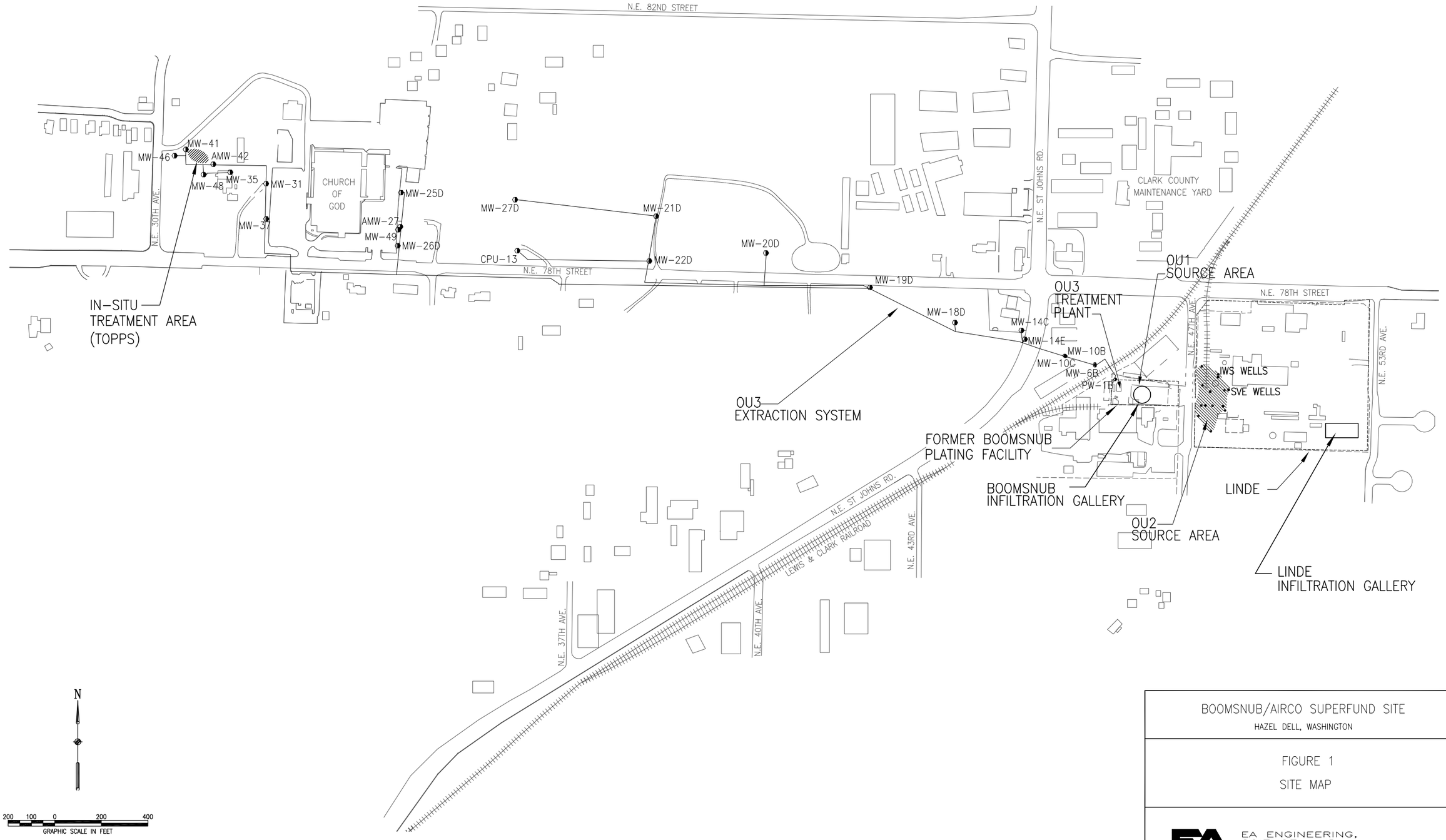
F. DATA QUALITY

The monthly OU-3 influent/effluent data for the reporting period were reviewed in accordance with the standards established in the Site-specific QASP.

With the exception of the October 2011 samples, the sample coolers and the samples contained within were received intact at the laboratory with the proper chemical preservative at less than 6 degrees Celsius. The October temperature blank and cooler blank were warm at 8.1 and 9.9 degrees Celsius, respectively. This is most likely due to the short travel time to the laboratory.

Methylene chloride was detected in the trip blanks and method blanks for October 2011 through March 2012 samples. Hexachlorobutadiene was detected in the trip blank and method blank in November 2011 and in the method blank in February 2012. These chemicals were not detected in the field samples and they are common laboratory contaminants.

Figures



BOOMSNUB/AIRCO SUPERFUND SITE

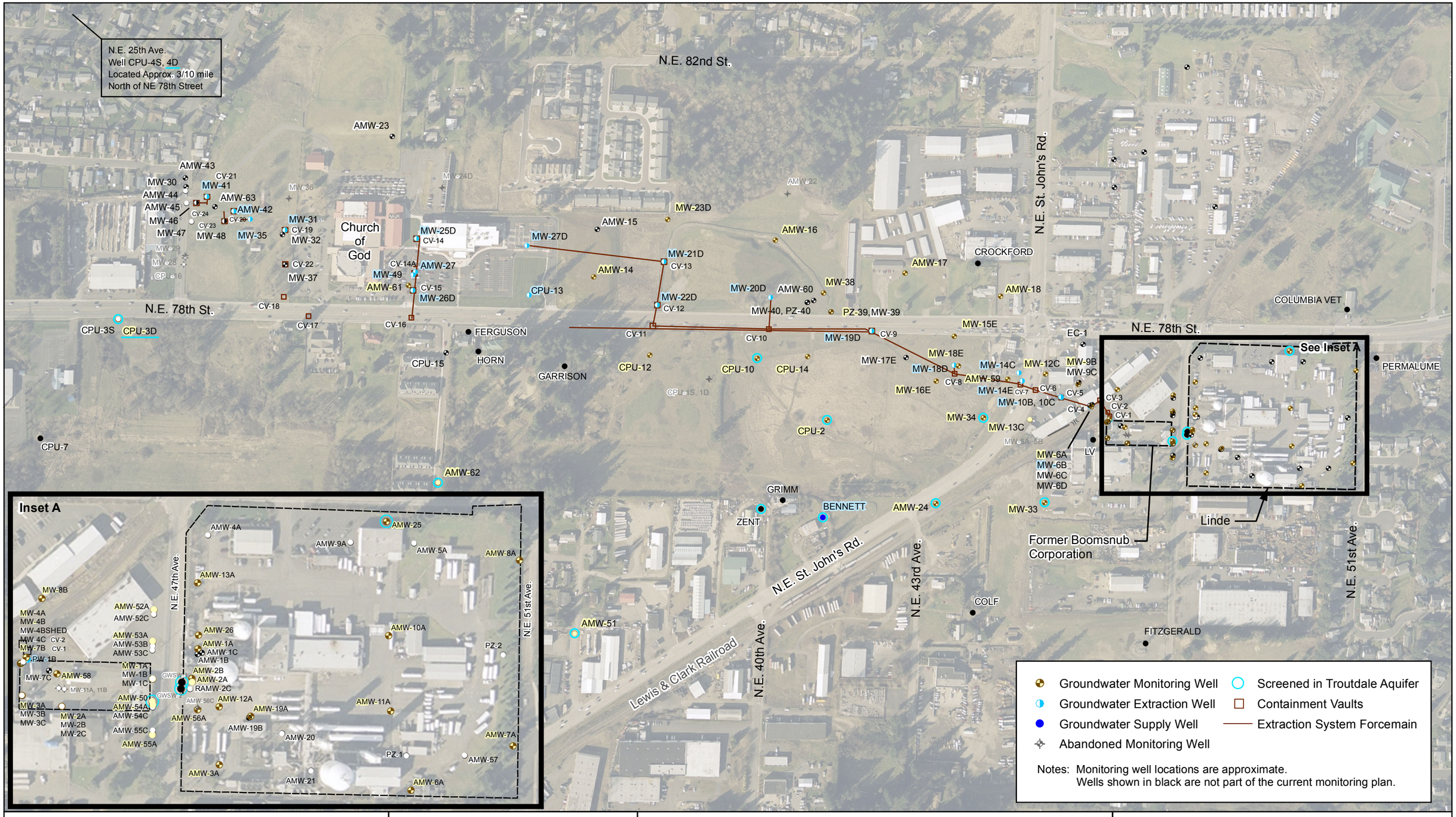
HAZEL DELL, WASHINGTON

FIGURE 1

SITE MAP

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

F:\Projects\14495.05 Linde GW Monitoring\FY 2012\0043 Reporting\EPA Progress Rpt\Oct 11 - March 12\Figures\Figure 1.dwg, 5/2/2012 3:35:24 PM, lwood



EA Engineering, Science, & Technology, Inc.
720 Sixth Street South, Suite 100
Kirkland, WA 98033
Phone: (425) 451-7400
Fax: (425) 451-7800

Feet
0 200 400 800

N

BOOMSNUB / AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

EA Project No. 14495.05
File Location: \\SEATTLE\Seattle\Projects\0_Linde GIS\Linde Reports\FALL2011\MXD\Annual_Report\Fig_2_Well_Network

FIGURE 2
MONITORING AND EXTRACTION WELL NETWORK

Appendix A

Daily Operation and Maintenance Summary

APPENDIX A
DAILY OPERATION AND MAINTENANCE SUMMARY

The Site System Operator performs routine tasks on the OU-2 TCE source area systems and OU-3 Site-wide groundwater treatment system. Routine and other Site activities are recorded in this section.

Synopsis of the Activities:

October 2011

October 3. Downloaded and tabulated data.

October 4. Gave tour of site and had project discussions with Linde. Assisted with the Fall groundwater sampling event. Supervised warehouse roof drain repairs.

October 5. Assisted with the Fall groundwater sampling event. Checked the status of well modifications at the Clark County Sports Field.

October 6. Performed routine maintenance on the OU-2 IWS system.

October 7. Collected monthly treatment system influent and effluent samples.

October 10. Assisted with the Fall groundwater sampling event.

October 11. Assisted with the Fall groundwater sampling event.

October 12. Conducted the bi-weekly system inspection and assisted with the Fall groundwater sampling event.

October 13. Measured and recorded water levels in wells.

October 14. Assisted with the Fall groundwater sampling event.

October 15. Downloaded and tabulated run-time data.

October 17. Assisted with the Fall groundwater sampling event. Checked the status of well modifications at the Clark County Sports Field. Showed EPA the proposed location for new Northern Plume well.

October 18. Assisted with the Fall groundwater sampling event.

October 19. Downloaded and tabulated run-time data. Pumped water out of the containment vaults.

October 20. Marked pipelines for the utility locate service. Cleaned the silt out of the sump pump in containment vault CV-13.

October 21. Inspected containment vaults.

October 25. Pumped water out of the containment vaults.

October 26. Installed new flushmount monitoring well manholes on wells AMW-16, MW-38, MW-39, MW-40 and AMW-60 at the Clark County sports field.

October 27. Checked the heat trace and pipe insulation around the air stripper pad and replaced the insulation where needed. Conducted the bi-weekly system inspection.

October 31. Recorded and tabulated monthly extraction well flow rates.

November 2011

November 1. Downloaded and tabulated run-time data.

November 3. Installed a flushmount manhole at well MW-23D as part of the Clark County sports field development.

November 4. Inspected the containment vaults.

November 7. Collected monthly treatment system influent and effluent samples.

November 10. Conducted the bi-weekly inspection. The system shut down due to a power outage and a fault on the air stripper sump variable frequency drive. The reset button was pushed to restart the system. The system was down for 2 hours and 10 minutes.

November 11. Conducted routine maintenance and the OU-2 system inspection.

November 15. Downloaded and tabulated run-time data. Installed a conduit and outlet in the IX building to power new components for communication with the SCADA unit.

November 18. The system was shut off to pump water out of containment vaults. The system was off for 33 minutes.

November 22. The system shut down 10 times due to flooding during a record precipitation event. Pumped water out of the containment vaults and controlled stormwater flow. The system was down for a total of 4 hours and 51 minutes.

November 23. Conducted the bi-weekly inspection. The system shut down 7 times due to flooding. The influent tank had issues pumping down so the influent canister filters were

replaced and the resin in the primary and secondary IX vessels was fluffed. Replaced a circuit breaker and re-started the Church wells. The system was down for a total of 3 hours.

November 28. Installed a DSL battery backup in the SCADA panel. The system shut down due to a high level fault in the influent tank. The well pump was turned off in well MW-6B to reduce influent flow so system would run. The system was down for 10 minutes.

November 29. Set up DSL and server in the SCADA panel. The system was shut off to troubleshoot the cause of an influent tank high level issue. The variable frequency drive output was adjusted to run the pump at a higher rate of speed to keep the system running. The system was down for 10 minutes.

November 30. Recorded and tabulated monthly extraction well flow rates.

December 2011

December 1. Downloaded and tabulated run-time data.

December 2. The system was shut off to pump water out of containment vaults. The system was down for 6 minutes.

December 5. Checked well conditions at the Clark County sports field.

December 6. Collected the monthly treatment system influent and effluent samples. Pumped water out of all containment vaults on the Church property. The system was shut off to remove the broken sump pump in containment vault CV-3. The system was off for 1 hour and 30 minutes.

December 7. Installed DSL and device server for remote SCADA access through the internet.

December 9. Conducted the bi-weekly system inspection.

December 12. Conducted routine maintenance and the OU-2 system inspection.
.
December 15. Downloaded and tabulated run-time data.

December 21. Conducted the bi-weekly system inspection. Installed a new sump pump in containment vault CV-3.

December 29. Recorded and tabulated the monthly extraction well flow rates. The system was shut off to pump water out of containment vaults. The system was down for 11 minutes.

January 2012

January 3. Downloaded and tabulated run-time data.

January 4. Collected the monthly treatment system influent and effluent samples.

January 10. Conducted the bi-weekly inspection.

January 12. Conducted routine maintenance and the OU-2 system inspection.

.

January 16. Downloaded and tabulated run-time data.

January 18. The system shut down due to flooding of the containment vaults. Shoveled snow away from the containment vaults. The system was down for 35 minutes. Noticed a crack in containment vault CV-18.

January 19. The system shut down due to flooding of the containment vaults. Pumped water out; the system was down for 45 minutes.

January 25. Conducted the bi-weekly inspection.

January 31. Recorded and tabulated the monthly extraction well flow rates. The system was shut off to pump water out of the containment vaults. The system was down for 16 minutes.

February 2012

February 1. Downloaded and tabulated run-time data.

February 8. Collected the treatment system influent and effluent samples. The system shut down due to high water in containment vaults CV-3 and CV-18. The system was down for 1 hour and 36 minutes.

February 10. Conducted the bi-weekly inspection.

February 14. Conducted routine maintenance and the OU-2 system inspection.

February 15. Downloaded and tabulated run-time data.

February 23. Conducted the bi-weekly inspection.

February 29. Recorded and tabulated the monthly extraction well flow rates.

March 2012

March 1. Downloaded and tabulated run-time data.

March 6. Collected treatment system influent and effluent samples.

March 9. Snowmelt and heavy precipitation filled the containment vaults with more water than average. The system was shut off to pump water out of containment vaults. The system was down for 40 minutes.

March 12. Conducted the bi-weekly inspection.

March 14. Conducted routine maintenance and the OU-2 system inspection.

March 15. Downloaded and tabulated run-time data.

March 21. Conducted the bi-weekly inspection.

March 30. Recorded and tabulated monthly extraction well flow rates. The system was shut off to pump water out of the containment vaults. The system was off for 34 minutes.

Appendix B

OU-2 Monthly Operating Field Forms

Name: Richard Read **Date:** 10/6/2011

In Well Stripping System						
Operating Parameters				**Individual Well Measurements**		
		System 1	**System 2**		**Flow**	**Depth to Water**
		(South Side)	(North Side)		(scfm)	(ft btc)
Total System Flow	scfm	off	210	**IWS-1**	off	23.97
Vacuum Blower Inlet Vacuum	in H_20	off	-28	**IWS-2**	off	24.51
Vacuum Blower Outlet Pressure	in H_20	off	20	**IWS-3**	39	24.50
Pressure Blower Outlet Temperature	deg F	off	158	**IWS-4**	39	23.97
Operating Hz	%	off	100	**IWS-5**	off	23.74
Secondary GAC Outlet Temperature	deg F	off	NA	**IWS-6**	39	23.98
				IWS-7	off	24.56
Comments on IWS System				**IWS-8**	40	24.18
				IWS-9	off	24.43

Name: Richard Read **Date:** 11/11/2011

In Well Stripping System						
Operating Parameters				**Individual Well Measurements**		
		System 1	**System 2**		**Flow**	**Depth to Water**
		(South Side)	(North Side)		(scfm)	(ft btc)
Total System Flow	scfm	off	210	**IWS-1**	off	23.09
Vacuum Blower Inlet Vacuum	in H_20	off	-28	**IWS-2**	off	23.59
Vacuum Blower Outlet Pressure	in H_20	off	20	**IWS-3**	39	23.59
Pressure Blower Outlet Temperature	deg F	off	155	**IWS-4**	39	22.93
Operating Hz	%	off	100	**IWS-5**	off	22.38
Secondary GAC Outlet Temperature	deg F	off	NA	**IWS-6**	39	23.23
				IWS-7	off	23.22
Comments on IWS System				**IWS-8**	40	23.39
The IWS system was down from 10/23/10 to 10/29/10 due to				**IWS-9**	off	23.12
broken drive belts on the blower.						

Name: Richard Read **Date:** 12/12/2011

In Well Stripping System						
Operating Parameters				**Individual Well Measurements**		
		System 1	**System 2**		**Flow**	**Depth to Water**
		(South Side)	(North Side)		(scfm)	(ft btc)
Total System Flow	scfm	off	210	**IWS-1**	off	23.05
Vacuum Blower Inlet Vacuum	in H_20	off	-28	**IWS-2**	off	23.55
Vacuum Blower Outlet Pressure	in H_20	off	20	**IWS-3**	40	23.56
Pressure Blower Outlet Temperature	deg F	off	154	**IWS-4**	40	23.04
Operating Hz	%	off	100	**IWS-5**	off	23.00
Secondary GAC Outlet Temperature	deg F	off	115	**IWS-6**	40	23.19
				IWS-7	off	23.18
Comments on IWS System				**IWS-8**	40	23.35
				IWS-9	off	23.08

Name: Richard Read **Date:** 1/12/2012

In Well Stripping System						
Operating Parameters				**Individual Well Measurements**		
		System 1	**System 2**		**Flow**	**Depth to Water**
		(South Side)	(North Side)		(scfm)	(ft btc)
Total System Flow	scfm	off	210	**IWS-1**	off	23.06
Vacuum Blower Inlet Vacuum	in H_20	off	-28	**IWS-2**	off	23.88
Vacuum Blower Outlet Pressure	in H_20	off	20	**IWS-3**	40	23.74
Pressure Blower Outlet Temperature	deg F	off	150	**IWS-4**	40	23.14
Operating Hz	%	off	100	**IWS-5**	off	22.99
Secondary GAC Outlet Temperature	deg F	off	120	**IWS-6**	40	23.32
				IWS-7	off	23.83
Comments on IWS System				**IWS-8**	40	23.56
				IWS-9	off	23.63

Name: Richard Read **Date:** 2/14/2012

In Well Stripping System						
Operating Parameters				**Individual Well Measurements**		
		System 1	**System 2**		**Flow**	**Depth to Water**
		(South Side)	(North Side)		(scfm)	(ft btc)
Total System Flow	scfm	off	200	**IWS-1**	off	23.54
Vacuum Blower Inlet Vacuum	in H_20	off	-30	**IWS-2**	off	24.36
Vacuum Blower Outlet Pressure	in H_20	off	26	**IWS-3**	40	24.22
Pressure Blower Outlet Temperature	deg F	off	152	**IWS-4**	40	23.62
Operating Hz	%	off	100	**IWS-5**	off	23.47
Secondary GAC Outlet Temperature	deg F	off	NA	**IWS-6**	40	23.80
				IWS-7	off	24.31
Comments on IWS System				**IWS-8**	off	24.04
				IWS-9	off	24.11

Name: Richard Read **Date:** 3/14/2012

In Well Stripping System						
Operating Parameters				**Individual Well Measurements**		
		System 1	**System 2**		**Flow**	**Depth to Water**
		(South Side)	(North Side)		(scfm)	(ft btc)
Total System Flow	scfm	off	200	**IWS-1**	off	22.73
Vacuum Blower Inlet Vacuum	in H_20	off	-30	**IWS-2**	off	23.55
Vacuum Blower Outlet Pressure	in H_20	off	26	**IWS-3**	38	23.41
Pressure Blower Outlet Temperature	deg F	off	152	**IWS-4**	38	22.81
Operating Hz	%	off	100	**IWS-5**	off	22.66
Secondary GAC Outlet Temperature	deg F	off	NA	**IWS-6**	38	22.99
				IWS-7	off	23.50
Comments on IWS System				**IWS-8**	off	23.23
Changed oil in Blower.				**IWS-9**	off	23.30

Appendix C

OU-3 Sitewide Groundwater Extraction System

Appendix C.1

OU-3 Bi-weekly System Monitoring Checklists

Name: Rick Read **Date:** 10/12/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.009	3	12%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.82
Pre-IX	5.86
IX Effluent	6.07
Final Discharge	8.12

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	35580270	8:04
IX Influent Flow Meter	156	87330106	8:02
AS Influent Flow Meter	155	62652808	8:01
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	52
Pre-Carbon Air Temperature (F^o)	72

Maintenance:

Replace Bag Filter?	Yes ☐	No ☒	Leaks/Notes?	
Drain Compressor?	Yes ☒	No ☐		
Replace Canister Filters?	Yes ☐	No ☒		
Lube Pump Motors?	Yes ☒	No ☐		
Inspect Infiltration Galleries?	Yes ☒	No ☐		

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	13
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes
INF-100711	CAS	10/7/11	8260b, T.Cr, pH
PIX-100711	CAS	10/7/11	T.Cr
EFF-100711	CAS	10/7/11	8260b, T.Cr, pH
EFFD-100711	CAS	10/7/11	8260b, T.Cr, pH
TB-100711	CAS	10/7/11	8260b

Comments:

Sampled primary IX Canister and labeled as PIX-100711.

Name: Rick Read **Date:** 10/27/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.009	3	12%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.00 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.83
Pre-IX	5.87
IX Effluent	6.07
Final Discharge	8.10

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	156	38951125	17:04
IX Influent Flow Meter	156	87670893	17:00
AS Influent Flow Meter	156	63393085	17:01
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	54
Pre-Carbon Air Temperature (F^o)	74

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☐	☒	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	13
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 11/10/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.010	3	13%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.98, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.86
Pre-IX	5.90
IX Effluent	6.07
Final Discharge	7.96

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	156		
Well Field Influent	157	42005495	13:43
IX Influent Flow Meter	157	87979245	13:40
AS Influent Flow Meter	157	64028775	13:41
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	55
Pre-Carbon Air Temperature (F^o)	75

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☐	☒	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	13
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes
INF-110711	CAS	11/7/11	8260b, T.Cr, pH
EFF-110711	CAS	11/7/11	8260b, T.Cr, pH
EFFD-110711	CAS	11/7/11	8260b, T.Cr, pH
TB-110711	CAS	11/7/11	8260b

Comments:

Name: Rick Read **Date:** 11/23/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.010	3	13%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.01, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.89
Pre-IX	6.01
IX Effluent	6.08
Final Discharge	7.89

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	157		
Well Field Influent	157	44707230	13:23
IX Influent Flow Meter	157	88254089	13:30
AS Influent Flow Meter	157	64643384	13:31
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	52
Pre-Carbon Air Temperature (F^o)	72

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☒	☐	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	10
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes

Comments:

Fluffed resin in Primar and Secondary IX vessels.

Name: Rick Read **Date:** 12/09/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.015	3	20%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.00, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.90
Pre-IX	6.02
IX Effluent	6.08
Final Discharge	7.87

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	157		
Well Field Influent	157	48152017	12:39
IX Influent Flow Meter	157	88599940	12:33
AS Influent Flow Meter	157	65263418	12:35
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	50
Pre-Carbon Air Temperature (F^o)	65

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☒	☐	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	10
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes
INF-120611	CAS	12/6/11	8260b,T.Cr, pH
EFF-120611	CAS	12/6/11	8260b,T.Cr, pH
EFFD-120611	CAS	12/6/11	8260b,T.Cr, pH
TB-120611	CAS	12/6/11	8260b

Comments:

Name: Rick Read **Date:** 12/21/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.015	3	20%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.89
Pre-IX	6.01
IX Effluent	6.06
Final Discharge	7.86

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	157		
Well Field Influent	157	505757830	10:09
IX Influent Flow Meter	157	88861015	10:13
AS Influent Flow Meter	157	65674820	10:14
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	45
Pre-Carbon Air Temperature (F^o)	65

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☒	☐	
Lube Pump Motors?	☒	☐	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	10
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 01/10/12

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.070		
Primary	0.020	3	29%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.90
Pre-IX	6.01
IX Effluent	6.07
Final Discharge	7.87

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	157		
Well Field Influent	157	55192790	16:26
IX Influent Flow Meter	157	89308710	16:24
AS Influent Flow Meter	157	66407200	16:23
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	55
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☒	☐	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☒	☐	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	1
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	7
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	6
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	16

Sampling:

Location	Lab	Date	Analytes
INF-010412	CAS	1/4/12	8260b, T.Cr, pH
EFF-010412	CAS	1/4/12	8260b, T.Cr, pH
EFFD-010412	CAS	1/4/12	8260b, T.Cr, pH
TB-010412	CAS	1/4/12	8260b

Comments:

Name: Rick Read **Date:** 01/25/12

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.070		
Primary	0.020	3	29%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.91
Pre-IX	6.02
IX Effluent	6.07
Final Discharge	7.87

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	157		
Well Field Influent	157	58466990	15:40
IX Influent Flow Meter	157	89638725	15:45
AS Influent Flow Meter	157	66930568	15:46
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	50
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☐	☒	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	1
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	7
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	6
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	16

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 02/10/12

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.060		
Primary	0.030	3	50%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.00 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.89
Pre-IX	6.01
IX Effluent	6.06
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	156		
Well Field Influent	156	61950130	12:28
IX Influent Flow Meter	156	89987208	12:26
AS Influent Flow Meter	156	67500700	12:27
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	52
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☒	☐	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☐	☒	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	1
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	6
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	6
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	16

Sampling:

Location	Lab	Date	Analytes
INF-020812	CAS	2/8/12	8260b, T.Cr, pH
EFF-020812	CAS	2/8/12	8260b, T.Cr, pH
EFFD-020812	CAS	2/8/12	8260b, T.Cr, pH
TB-020812	CAS	2/8/12	8260b

Comments:

Name: Rick Read **Date:** 02/23/12

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.060		
Primary	0.030	3	50%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.00 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.88
Pre-IX	6.01
IX Effluent	6.05
Final Discharge	7.86

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	156		
Well Field Influent	156	64845420	15:43
IX Influent Flow Meter	156	90278318	15:41
AS Influent Flow Meter	156	67969467	15:40
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	52
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☐	☒	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	1
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	6
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	6
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	16

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 03/12/12

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.060		
Primary	0.030	3	50%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 6.99, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.86
Pre-IX	6.01
IX Effluent	6.04
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	150		
Well Field Influent	152	68621857	8:10
IX Influent Flow Meter	150	90659774	8:15
AS Influent Flow Meter	150	68643134	8:16
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	50
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

			Leaks/Notes?
Replace Bag Filter?	Yes ☐	No ☒	
Drain Compressor?	Yes ☒	No ☐	
Replace Canister Filters?	Yes ☐	No ☒	
Lube Pump Motors?	Yes ☐	No ☒	
Inspect Infiltration Galleries?	Yes ☒	No ☐	

Inventory:

	Quantity
Gloves	1
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	6
Canister Filters	
10 Micron 29.25 inch	34
10 Micron 30 inch	6
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	16

Sampling:

Location	Lab	Date	Analytes
INF-030612	CAS	3/6/12	8260b, T.Cr, pH
EFF-030612	CAS	3/6/12	8260b, T.Cr, pH
EFFD-030612	CAS	3/6/12	8260b, T.Cr, pH
TB-030612	CAS	3/6/12	8260b

Comments:

Name: Rick Read **Date:** 03/22/12

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.060		
Primary	0.030	3	50%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.0, 4.01 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.86
Pre-IX	6.01
IX Effluent	6.04
Final Discharge	7.86

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	150		
Well Field Influent	147	70750560	12:12
IX Influent Flow Meter	147	90875003	12:14
AS Influent Flow Meter	147	69005475	12:15
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

Location:	(In. H2O)
Blower	31
Air Stripper	28

TCE Concentrations:

Location:	TCE (ppm)	
Air Stripper Effluent	1	
Post Primary	ND	
Final Discharge	ND	< 5?

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	50
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

	Yes	No	Leaks/Notes?
Replace Bag Filter?	☐	☒	
Drain Compressor?	☒	☐	
Replace Canister Filters?	☒	☐	
Lube Pump Motors?	☐	☒	
Inspect Infiltration Galleries?	☒	☐	

Inventory:

	Quantity
Gloves	1
Drums Empty 55-gal	9
Super sacks Spent Resin	0
Bag Filters	6
Canister Filters	
10 Micron 29.25 inch	10
10 Micron 30 inch	2
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	16

Sampling:

Location	Lab	Date	Analytes

Comments:

Appendix C.2

OU-3 System Operation Tables

APPENDIX C.2 - TABLE 1A
OU-3 OCTOBER 2011 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
10/01/11	223,675	24.00	100.00%
10/02/11	223,505	24.00	100.00%
10/03/11	223,503	24.00	100.00%
10/04/11	223,688	24.00	100.00%
10/05/11	223,740	24.00	100.00%
10/06/11	223,707	24.00	100.00%
10/07/11	223,689	24.00	100.00%
10/08/11	223,534	24.00	100.00%
10/09/11	223,586	24.00	100.00%
10/10/11	223,787	24.00	100.00%
10/11/11	223,701	24.00	100.00%
10/12/11	223,639	24.00	100.00%
10/13/11	223,679	24.00	100.00%
10/14/11	223,753	24.00	100.00%
10/15/11	223,521	24.00	100.00%
10/16/11	223,684	24.00	100.00%
10/17/11	223,761	24.00	100.00%
10/18/11	223,692	24.00	100.00%
10/19/11	223,706	24.00	100.00%
10/20/11	223,600	24.00	100.00%
10/21/11	223,553	24.00	100.00%
10/22/11	223,466	24.00	100.00%
10/23/11	223,468	24.00	100.00%
10/24/11	223,629	24.00	100.00%
10/25/11	223,693	24.00	100.00%
10/26/11	223,733	24.00	100.00%
10/27/11	223,663	24.00	100.00%
10/28/11	223,605	24.00	100.00%
10/29/11	223,488	24.00	100.00%
10/30/11	223,392	24.00	100.00%
10/31/11	223,419	24.00	100.00%
Subtotals	**6,932,254**	**744.00**	**100.00%**

Scheduled Downtime/Maintenance[3]	0.00	
Total Hours/Month	744	
Total Operating Hours/Availability %	**744.00**	**100.00%**
Daily Breakdown	**October 2011**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)	223,628	230,400
Maximum Daily Flow (gallons)	223,787	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	9268	
Average Daily Flow (hundreds of cubic feet)	299	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Planned shutdown periods for routine maintenance or monitoring activities - see monthly notes for details.

[4] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX C.2 - TABLE 1B
OU-3 NOVEMBER 2011 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
11/01/11	224,018	24.00	100.00%
11/02/11	224,565	24.00	100.00%
11/03/11	224,490	24.00	100.00%
11/04/11	224,477	24.00	100.00%
11/05/11	224,550	24.00	100.00%
11/06/11	233,863	24.00	100.00%[5]
11/07/11	224,344	24.00	100.00%
11/08/11	224,319	24.00	100.00%
11/09/11	224,230	24.00	100.00%
11/10/11	203,861	21.83	90.97%
11/11/11	224,853	24.00	100.00%
11/12/11	224,810	24.00	100.00%
11/13/11	224,756	24.00	100.00%
11/14/11	224,665	24.00	100.00%
11/15/11	224,693	24.00	100.00%
11/16/11	224,750	24.00	100.00%
11/17/11	224,847	24.00	100.00%
11/18/11	220,233	23.45	97.71%
11/19/11	224,331	24.00	100.00%
11/20/11	224,415	24.00	100.00%
11/21/11	224,402	24.00	100.00%
11/22/11	172,638	19.15	79.79%
11/23/11	148,018	21.00	87.50%
11/24/11	225,134	24.00	100.00%
11/25/11	224,524	24.00	100.00%
11/26/11	224,781	24.00	100.00%
11/27/11	224,682	24.00	100.00%
11/28/11	221,017	23.83	99.31%
11/29/11	222,194	23.97	99.86%
11/30/11	225,025	24.00	100.00%
Subtotals	**6,587,484**	**709.23**	**98.50%**

Scheduled Downtime/Maintenance[3]	0.58	
Total Hours/Month	720	
Total Operating Hours/Availability %	**709.81**	**98.59%**
Daily Breakdown	**November 2011**	**Vancouver Permit Limits**[4]
Average Daily Flow (gallons)	219,583	230,400
Maximum Daily Flow (gallons)	233,863	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	8807	
Average Daily Flow (hundreds of cubic feet)	294	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Planned shutdown periods for routine maintenance or monitoring activities - see monthly notes for details.

[4] Only applies if water is being discharged to the City of Vancouver sewer.

[5] Data reflects daylight savings time on November 6.

APPENDIX C.2 - TABLE 1C
OU-3 DECEMBER 2011 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
12/01/11	225,093	24.00	100.00%
12/02/11	223,989	23.90	99.58%
12/03/11	225,054	24.00	100.00%
12/04/11	225,014	24.00	100.00%
12/05/11	225,038	24.00	100.00%
12/06/11	209,760	22.50	93.75%
12/07/11	224,622	24.00	100.00%
12/08/11	224,648	24.00	100.00%
12/09/11	224,664	24.00	100.00%
12/10/11	224,866	24.00	100.00%
12/11/11	224,825	24.00	100.00%
12/12/11	224,876	24.00	100.00%
12/13/11	224,955	24.00	100.00%
12/14/11	224,784	24.00	100.00%
12/15/11	224,574	24.00	100.00%
12/16/11	224,512	24.00	100.00%
12/17/11	224,561	24.00	100.00%
12/18/11	224,409	24.00	100.00%
12/19/11	223,897	24.00	100.00%
12/20/11	223,972	24.00	100.00%
12/21/11	224,076	24.00	100.00%
12/22/11	224,373	24.00	100.00%
12/23/11	224,292	24.00	100.00%
12/24/11	224,208	24.00	100.00%
12/25/11	224,218	24.00	100.00%
12/26/11	224,208	24.00	100.00%
12/27/11	224,071	24.00	100.00%
12/28/11	223,889	24.00	100.00%
12/29/11	222,719	23.82	99.24%
12/30/11	224,184	24.00	100.00%
12/31/11	224,424	24.00	100.00%
Subtotals	**6,942,775**	**742.22**	**99.76%**
Scheduled Downtime/Maintenance[3]		1.78	
Total Hours/Month		744	
Total Operating Hours/Availability %		**744.00**	**100.00%**
Daily Breakdown		**December 2011**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		223,945	230,400
Maximum Daily Flow (gallons)		225,093	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		9282	
Average Daily Flow (hundreds of cubic feet)		299	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Planned shutdown periods for routine maintenance or monitoring activities - see monthly notes for details.

[4] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX C.2 - TABLE 1D
OU-3 JANUARY 2012 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
01/01/12	231,442	24.00	100.00%
01/02/12	231,439	24.00	100.00%
01/03/12	231,349	24.00	100.00%
01/04/12	215,141	22.92	95.49%
01/05/12	228,694	24.00	100.00%
01/06/12	231,277	24.00	100.00%
01/07/12	231,135	24.00	100.00%
01/08/12	231,277	24.00	100.00%
01/09/12	231,186	24.00	100.00%
01/10/12	231,147	24.00	100.00%
01/11/12	231,342	24.00	100.00%
01/12/12	231,153	24.00	100.00%
01/13/12	230,981	24.00	100.00%
01/14/12	217,069	22.52	93.82%
01/15/12	230,584	24.00	100.00%
01/16/12	230,616	24.00	100.00%
01/17/12	230,764	24.00	100.00%
01/18/12	230,983	24.00	100.00%
01/19/12	225,663	23.38	97.43%
01/20/12	231,304	24.00	100.00%
01/21/12	231,256	24.00	100.00%
01/22/12	231,282	24.00	100.00%
01/23/12	231,346	24.00	100.00%
01/24/12	231,288	24.00	100.00%
01/25/12	219,766	22.70	94.58%
01/26/12	231,821	24.00	100.00%
01/27/12	231,747	24.00	100.00%
01/28/12	231,660	24.00	100.00%
01/29/12	231,607	24.00	100.00%
01/30/12	231,685	24.00	100.00%
01/31/12	231,633	24.00	100.00%
Subtotals	**7,119,637**	**739.52**	**99.40%**
Scheduled Downtime/Maintenance[3]		0.62	
Total Hours/Month		744	
Total Operating Hours/Availability %		**740.14**	**99.48%**
Daily Breakdown		**January 2012**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		229,600	230,400
Maximum Daily Flow (gallons)		231,821	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		9518	
Average Daily Flow (hundreds of cubic feet)		307	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Planned shutdown periods for routine maintenance or monitoring activities - see monthly notes for details.

[4] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX C.2 - TABLE 1E
OU-3 FEBRUARY 2012 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
02/01/12	231,768	24.00	100.00%
02/02/12	231,832	24.00	100.00%
02/03/12	219,368	22.77	94.86%
02/04/12	231,892	24.00	100.00%
02/05/12	231,843	24.00	100.00%
02/06/12	231,546	24.00	100.00%
02/07/12	231,644	24.00	100.00%
02/08/12	231,700	24.00	100.00%
02/09/12	231,750	24.00	100.00%
02/10/12	231,842	24.00	100.00%
02/11/12	229,933	23.83	99.31%
02/12/12	213,078	21.13	88.06%
02/13/12	231,733	24.00	100.00%
02/14/12	231,681	24.00	100.00%
02/15/12	231,680	24.00	100.00%
02/16/12	228,202	23.62	98.40%
02/17/12	232,020	24.00	100.00%
02/18/12	232,058	24.00	100.00%
02/19/12	232,031	24.00	100.00%
02/20/12	232,026	24.00	100.00%
02/21/12	231,935	24.00	100.00%
02/22/12	231,942	24.00	100.00%
02/23/12	218,736	23.18	96.60%
02/24/12	224,073	24.00	100.00%
02/25/12	224,165	24.00	100.00%
02/26/12	219,927	22.85	95.21%
02/27/12	232,396	24.00	100.00%
02/28/12	232,385	24.00	100.00%
Subtotals	**6,415,188**	**665.38**	**99.02%**

Scheduled Downtime/Maintenance[3]	0.55	
Total Hours/Month	672	
Total Operating Hours/Availability %	**665.93**	**99.10%**
Daily Breakdown	**February 2012**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)	229,114	230,400
Maximum Daily Flow (gallons)	232,396	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	8576	
Average Daily Flow (hundreds of cubic feet)	306	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Planned shutdown periods for routine maintenance or monitoring activities - see monthly notes for details.

[4] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX C.2 - TABLE 1F
OU-3 MARCH 2012 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
03/01/12	224,145	24.00	100.00%
03/02/12	222,028	24.00	100.00%
03/03/12	212,702	24.00	100.00%
03/04/12	212,756	24.00	100.00%
03/05/12	212,837	24.00	100.00%
03/06/12	212,879	24.00	100.00%
03/07/12	213,077	24.00	100.00%
03/08/12	212,748	24.00	100.00%
03/09/12	207,242	23.33	97.22%
03/10/12	212,749	24.00	100.00%
03/11/12	203,965	23.00	95.83%
03/12/12	213,146	24.00	100.00%
03/13/12	213,224	24.00	100.00%
03/14/12	213,209	24.00	100.00%
03/15/12	213,263	24.00	100.00%
03/16/12	213,378	24.00	100.00%
03/17/12	213,399	24.00	100.00%
03/18/12	213,471	24.00	100.00%
03/19/12	213,495	24.00	100.00%
03/20/12	213,452	24.00	100.00%
03/21/12	213,616	24.00	100.00%
03/22/12	213,989	24.00	100.00%
03/23/12	213,623	24.00	100.00%
03/24/12	213,474	24.00	100.00%
03/25/12	213,472	24.00	100.00%
03/26/12	213,448	24.00	100.00%
03/27/12	213,468	24.00	100.00%
03/28/12	213,423	24.00	100.00%
03/29/12	213,487	24.00	100.00%
03/30/12	208,848	23.43	97.64%
03/31/12	213,796	24.00	100.00%
Subtotals	**6,611,808**	**741.77**	**99.70%**
Scheduled Downtime/Maintenance[3]		0.29	
Total Hours/Month		744	
Total Operating Hours/Availability %		**742.06**	**99.74%**
Daily Breakdown		**March 2012**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		213,267	230,400
Maximum Daily Flow (gallons)		224,145	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		8839	
Average Daily Flow (hundreds of cubic feet)		285	

Notes:

[1] gpd = gallons per day to the infiltration gallery.

[2] Based on minutes of operation as reported by data logger.

[3] Planned shutdown periods for routine maintenance or monitoring activities - see monthly notes for details.

[4] Only applies if water is being discharged to the City of Vancouver sewer.

APPENDIX C.2 - TABLE 2A

OU-3 EXTRACTION WELL PUMPING RATES FOR OCTOBER 31, 2011
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.4	8460010	11:40
MW-6B	7.5	920990	12:34
MW-10B	9.0	1542190	12:31
MW-10C	9.8	75210	12:32
CPU-13	12.1	84721	12:07
MW-14C	12.1	3980300	12:29
MW-14E	5.0	5794100	12:30
MW-18D	11.2	404250	12:25
MW-19D	10.6	137110	12:21
MW-20D	15.0	816100	11:49
MW-21D	9.5	725292	11:57
MW-22D	13.3	204551	12:00
MW-25D	6.4	9164620	12:17
MW-26D	8.6	6993330	12:11
MW-27D	off	off	
AMW-27	1.0	5609170	12:15
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.0	4367420	12:13
Total	153.5		

Notes:
Pumps in MW- 27D, 31, 37, 48 and AMW-42
were off during the reporting period.

APPENDIX C.2 - TABLE 2B

OU-3 EXTRACTION WELL PUMPING RATES FOR NOVEMBER 30, 2011
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.5	8855290	13:27
MW-6B	7.7	1226730	14:29
MW-10B	9.0	1899390	14:23
MW-10C	9.8	476370	14:24
CPU-13	12.0	153670	13:56
MW-14C	12.1	4483520	14:19
MW-14E	5.0	5992310	14:18
MW-18D	11.3	860360	14:14
MW-19D	10.4	572610	14:08
MW-20D	15.0	900731	13:33
MW-21D	11.2	789487	13:40
MW-22D	12.9	278875	13:46
MW-25D	6.4	9436260	14:04
MW-26D	8.7	7357060	14:00
MW-27D	off	off	
AMW-27	1.0	5632525	14:03
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.0	4906680	14:02
Total	155.0		

Notes:
Pumps in MW- 27D, 31, 37, 48 and AMW-42
were off during the reporting period.

APPENDIX C.2 - TABLE 2C

OU-3 EXTRACTION WELL PUMPING RATES FOR DECEMBER 29, 2011
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.5	9250710	11:12
MW-6B	7.7	1540490	12:12
MW-10B	10.0	2255830	12:08
MW-10C	8.7	876330	12:09
CPU-13	12.0	220640	11:39
MW-14C	12.0	4985490	12:05
MW-14E	5.0	6190570	12:06
MW-18D	11.0	1315420	12:02
MW-19D	10.4	1005640	11:57
MW-20D	15.0	982841	11:22
MW-21D	11.5	812155	11:31
MW-22D	13.0	350821	11:34
MW-25D	6.3	9597260	11:49
MW-26D	8.6	7711950	11:43
MW-27D	off	off	
AMW-27	1.0	5651850	11:47
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.0	5430480	11:45
Total	154.7		

Notes:
Pumps in MW- 27D, 31, 37, 48 and AMW-42
were off during the reporting period.

APPENDIX C.2 - TABLE 2D

OU-3 EXTRACTION WELL PUMPING RATES FOR JANUARY 31, 2012
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.5	9706170	15:13
MW-6B	7.7	1901700	15:25
MW-10B	8.8	2664670	15:22
MW-10C	9.8	1236110	15:21
CPU-13	12.3	297374	13:57
MW-14C	12.0	5561390	15:15
MW-14E	5.0	6419380	15:16
MW-18D	11.0	1837860	15:11
MW-19D	10.4	1496730	14:13
MW-20D	15.0	76746	13:29
MW-21D	10.5	923784	13:39
MW-22D	13.0	433253	13:36
MW-25D	6.4	9996740	14:07
MW-26D	8.8	8127050	14:01
MW-27D	off	off	
AMW-27	1.0	5675750	14:05
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.0	6029610	14:03
Total	154.2		

Notes:
Pumps in MW- 27D, 31, 37, 48 and AMW-42
were off during the reporting period.

APPENDIX C.2 - TABLE 2E

OU-3 EXTRACTION WELL PUMPING RATES FOR FEBRUARY 29, 2012
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.7	108660	14:38
MW-6B	7.7	2249110	15:45
MW-10B	9.0	3023480	15:41
MW-10C	10.0	1739210	15:43
CPU-13	9.1	364794	15:12
MW-14C	12.0	6066500	15:37
MW-14E	5.0	6619110	15:36
MW-18D	11.4	2296340	15:32
MW-19D	10.4	1923840	15:28
MW-20D	15.0	159096	15:56
MW-21D	11.2	986507	15:01
MW-22D	13.5	506029	15:05
MW-25D	6.4	263280	15:22
MW-26D	9.0	8483730	15:16
MW-27D	off	off	
AMW-27	1.0	5696805	15:20
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.0	6559560	15:18
Total	153.4		

Notes:
Pumps in MW- 27D, 31, 37, 48 and AMW-42
were off during the reporting period.

APPENDIX C.2 - TABLE 2F

OU-3 EXTRACTION WELL PUMPING RATES FOR MARCH 30, 2012
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.9	521840	8:59
MW-6B	7.8	2553370	10:20
MW-10B	9.0	3401930	10:15
MW-10C	10.0	2163320	10:16
CPU-13	12.3	434445	9:39
MW-14C	off	6104330	10:09
MW-14E	5.2	6836750	10:10
MW-18D	13.4	2773510	10:06
MW-19D	10.4	2365900	10:01
MW-20D	15.0	244408	9:23
MW-21D	11.5	51975	9:29
MW-22D	13.8	584066	9:33
MW-25D	9.0	559090	9:54
MW-26D	9.3	8883380	9:43
MW-27D	off	off	
AMW-27	1.0	5719290	9:52
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.3	7126340	9:45
Total	150.9		

Notes:
Pumps in MW-27, 31, 37, 48 and AMW-42
were off during the reporting period.
MW-14C pump motor failed.

APPENDIX C.2 - TABLE 3
OCTOBER 2011 THROUGH MARCH 2012

OU-3 MONTHLY SYSTEM SAMPLING ANALYTICAL RESULTS
BOOMSNUB/AIRCO SUPERFUND SITE

Location	Sample Number	Sampling Date	TCE (µg/L)	PCE (µg/L)	Total Chromium (µg/L)	pH
Permit #20009-07 Mod 1 Discharge Limits			**330**		**7,220**	**5.5 to 10**
Infiltration Gallery Discharge Limits			**1.9**		**19**	
October 2011						
Influent	INF-100711	10/7/2011	20	1.4	53.2	6.88
Effluent	EFF-100711	10/7/2011	0.41 J	0.5 U	2.6 J	8.01
Effluent Duplicate	EFFD-100711	10/7/2011	0.42 J	0.5 U	2 U	7.98
Trip Blank	TB-100711	10/7/2011	0.5 U	0.5 U	NA	NA
November 2011						
Influent	INF-110711	11/7/2011	17	1.1	49.9	6.95
Effluent	EFF-110711	11/7/2011	0.37 J	0.5 U	2.5 J	8.03
Effluent Duplicate	EFFD-110711	11/7/2011	0.38 J	0.5 U	2 U	8.09
Trip Blank	TB-110711	11/7/2011	0.5 U	0.5 U	NA	NA
Decenber 2011						
Influent	INF-120611	12/6/2011	16	1.2	52.1	6.91
Effluent	EFF-120611	12/6/2011	0.43 J	0.5 U	0.7 J	8.06
Effluent Duplicate	EFFD-120611	12/6/2011	0.38 J	0.5 U	1.0 J	8
Trip Blank	TB-120611	12/6/2011	0.5 U	0.5 U	NA	NA
January 2012						
Influent	INF-010412	1/4/2012	16	1.1	53.3	6.69
Effluent	EFF-010412	1/4/2012	0.38 J	0.5 U	2 U	7.93
Effluent Duplicate	EFFD-010412	1/4/2012	0.39 J	0.5 U	2 U	8.03
Trip Blank	TB-010412	1/4/2012	0.5 U	0.5 U	NA	NA
February 2012						
Influent	INF-020812	2/8/2012	17	1.2	54.3	6.9
Effluent	EFF-020812	2/8/2012	0.48 J	0.5 U	2.1	8.07
Effluent Duplicate	EFFD-020812	2/8/2012	0.44 J	0.5 U	2.2 J	8.06
Trip Blank	TB-020812	2/8/2012	0.5 U	0.5 U	NA	NA
March 2012						
Influent	INF-030612	3/6/2012	15	1.1	50.8	7.3
Effluent	EFF-030612	3/6/2012	0.33 J	0.5 U	0.6 U	8.16
Effluent Duplicate	EFFD-030612	3/6/2012	0.30 J	0.5 U	0.6 J	8.15
Trip Blank	TB-030612	3/6/2012	0.5 U	0.5 U	NA	NA

Notes:
J - result is an estimated concentration that is less then the Method Reporting Limit but is greater than or equal to the Method Detection Limit.
µg/L - micrograms per liter
NA - not analyzed
PCE - tetrachloroethene
TCE - trichloroethene
U - analyte not detected above specified reporting limit

Appendix C.3

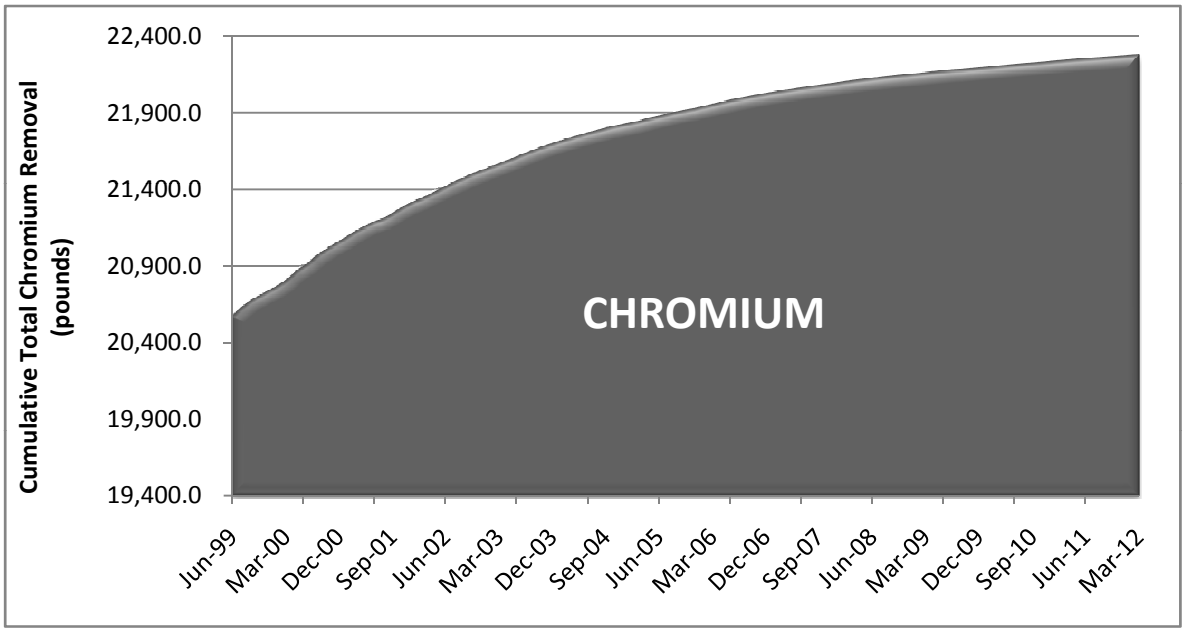
OU-3 Mass Removal Tables and Charts

APPENDIX C.3 - TABLE 1
OU-3 CHROMIUM AND TCE MASS REMOVAL ESTIMATION
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Monthly Flow (Gallons)	Influent Chromium (ug/L)	Influent TCE (ug/L)	Monthly Chromium Removal (lbs)	Monthly TCE Removal (lbs)	Cumulative Chromium Removed (lbs)	Cumulative TCE Removed (lbs)
1990 to 1995[1]						13,751.0	
1995 to May 1999[1]						20,538.0	
1990 to 1999[1]							1,645.7
Ave. Jun-Dec 1999	5,303,734	634.4	160.7	27.9	7.2	20,733.6	1,696.3
Ave. for 2000	5,429,513	593.4	197.5	27.0	8.9	21,057.0	1,803.6
Ave. for 2001	5,482,077	450.6	139.2	20.7	6.4	21,305.7	1,879.9
Ave. for 2002	5,587,227	379.0	102.1	17.7	4.8	21,518.0	1,937.3
Ave. for 2003	6,279,889	281.8	74.7	14.7	3.9	21,694.7	1,984.1
Ave. for 2004	6,463,796	194.1	59.8	10.5	3.2	21,820.2	2,022.8
Ave. for 2005	6,213,535	165.5	54.8	8.6	2.8	21,923.2	2,056.8
Ave. for 2006	6,409,175	153.8	55.8	8.2	3.0	22,022.0	2,092.2
Ave. for 2007	6,366,615	108.7	40.1	5.7	2.1	22,090.9	2,117.3
Ave. for 2008	6,547,878	84.2	26.3	4.6	1.4	22,146.3	2,134.6
Ave. for 2009	6,628,721	64.6	22.3	3.6	1.2	22,189.7	2,149.4
Ave. for 2010	6,835,587	60.5	20.8	3.5	1.2	22,231.1	2,163.6
Jan-11	7,119,637	64.9	21.0	3.9	1.2	22,235.0	2,164.8
Feb-11	6,415,188	57.9	20.0	3.1	1.1	22,238.1	2,165.9
Mar-11	6,941,436	61.7	20.0	3.6	1.2	22,241.6	2,167.1
Apr-11	6,743,201	57.3	20.0	3.2	1.1	22,244.9	2,168.2
May-11	6,591,577	54.8	17.0	3.0	0.9	22,247.9	2,169.1
Jun-11	6,276,833	51.0	17.0	2.7	0.9	22,250.6	2,170.0
Jul-11	5,510,495	48.1	14.0	2.2	0.6	22,252.8	2,170.7
Aug-11	6,391,648	49.3	14.0	2.6	0.7	22,255.4	2,171.4
Sep-11	6,575,576	47.2	14.0	2.6	0.8	22,258.0	2,172.2
Oct-11	6,932,254	53.2	20.0	3.1	1.2	22,261.1	2,173.3
Nov-11	6,587,484	49.9	17.0	2.7	0.9	22,263.8	2,174.3
Dec-11	6,942,775	52.1	16.0	3.0	0.9	22,266.8	2,175.2
Jan-12	6,951,522	53.3	16.0	3.1	0.9	22,269.9	2,176.1
Feb-12	6,499,220	54.3	17.0	2.9	0.9	22,272.9	2,177.1
Mar-12	6,611,808	50.8	15.0	2.8	0.8	22,275.7	2,177.9

Notes:
June 1999 through March 2002 data provided by URS
[1] - Provided by ICF Kaiser

FIGURE C.3.1. OU-3 CUMULATIVE TOTAL REMOVAL OVER TIME



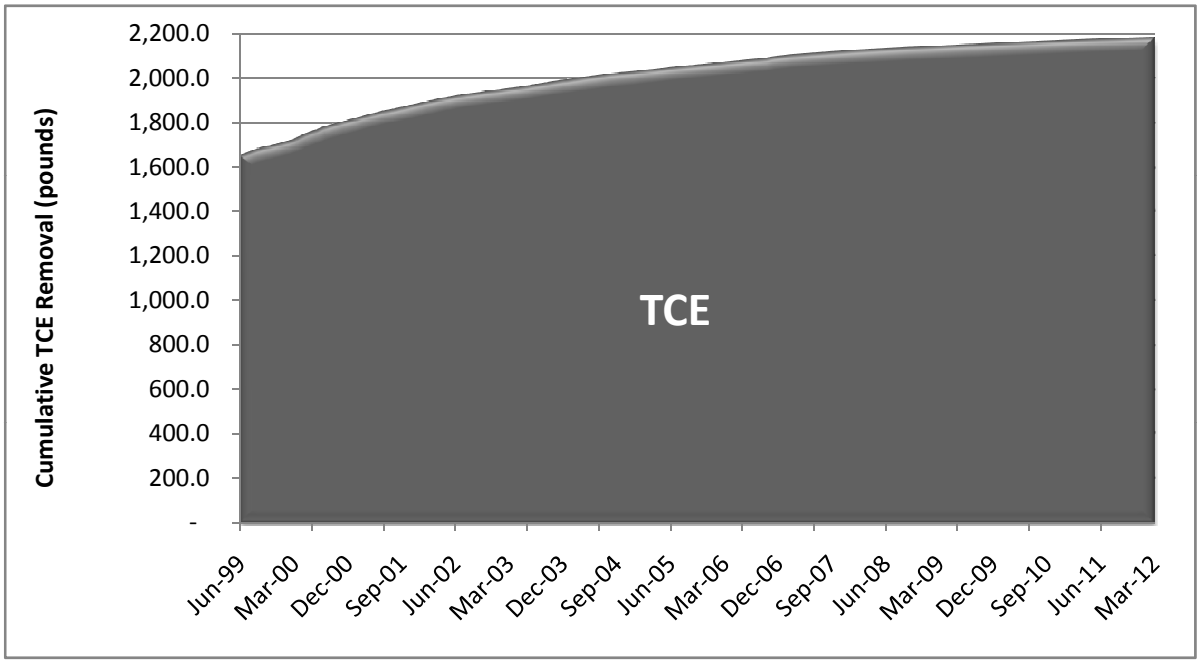
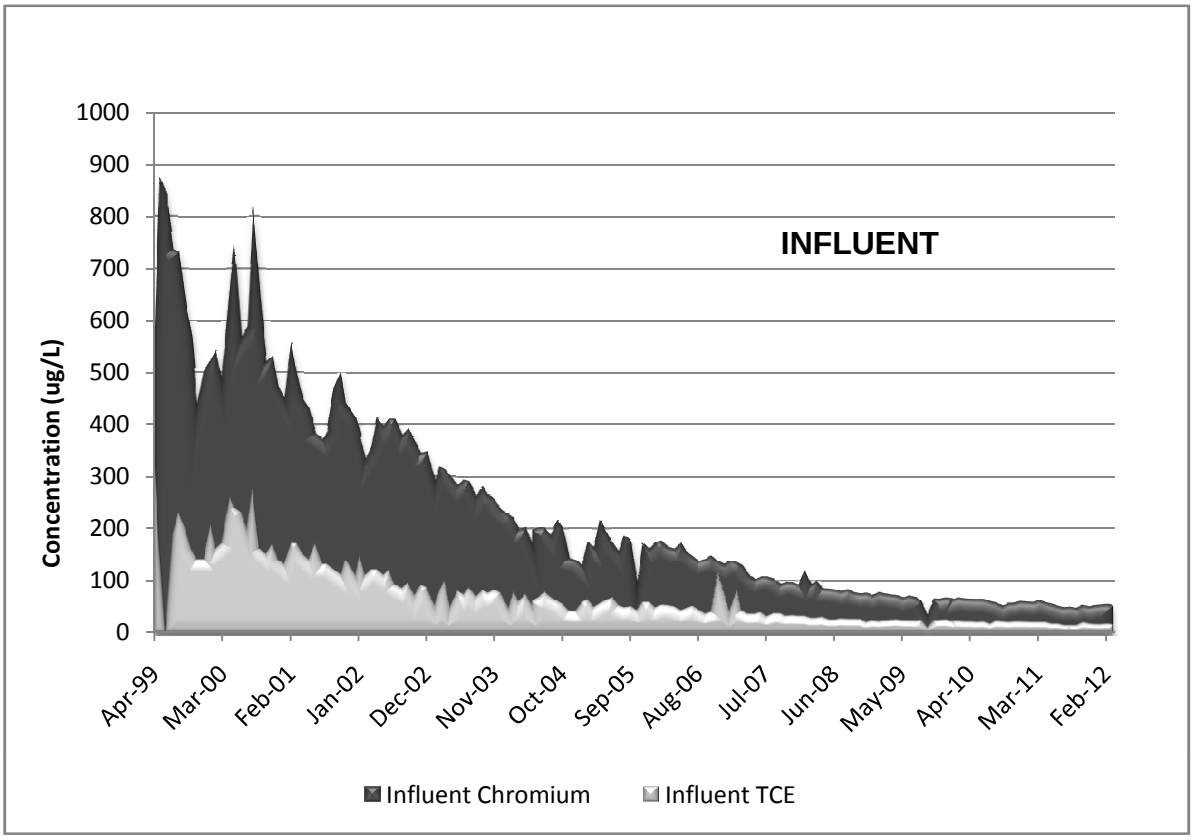


FIGURE C.3.2. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME



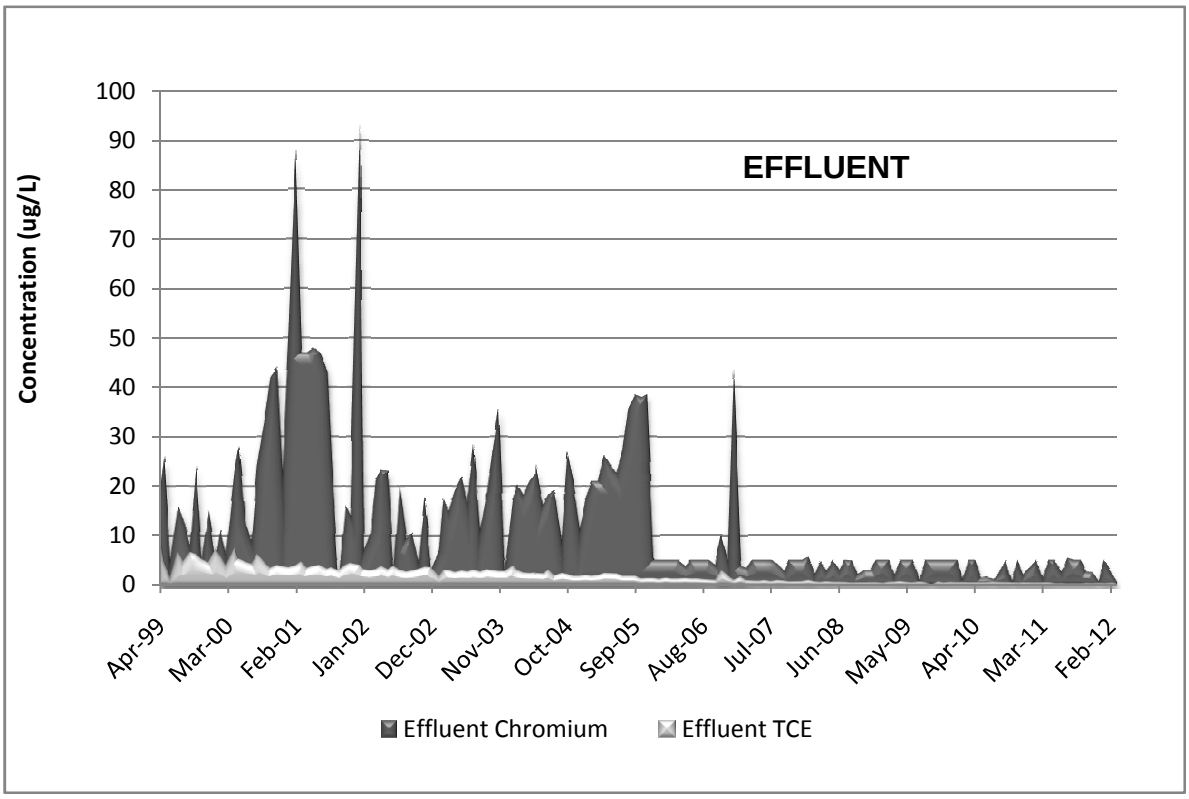
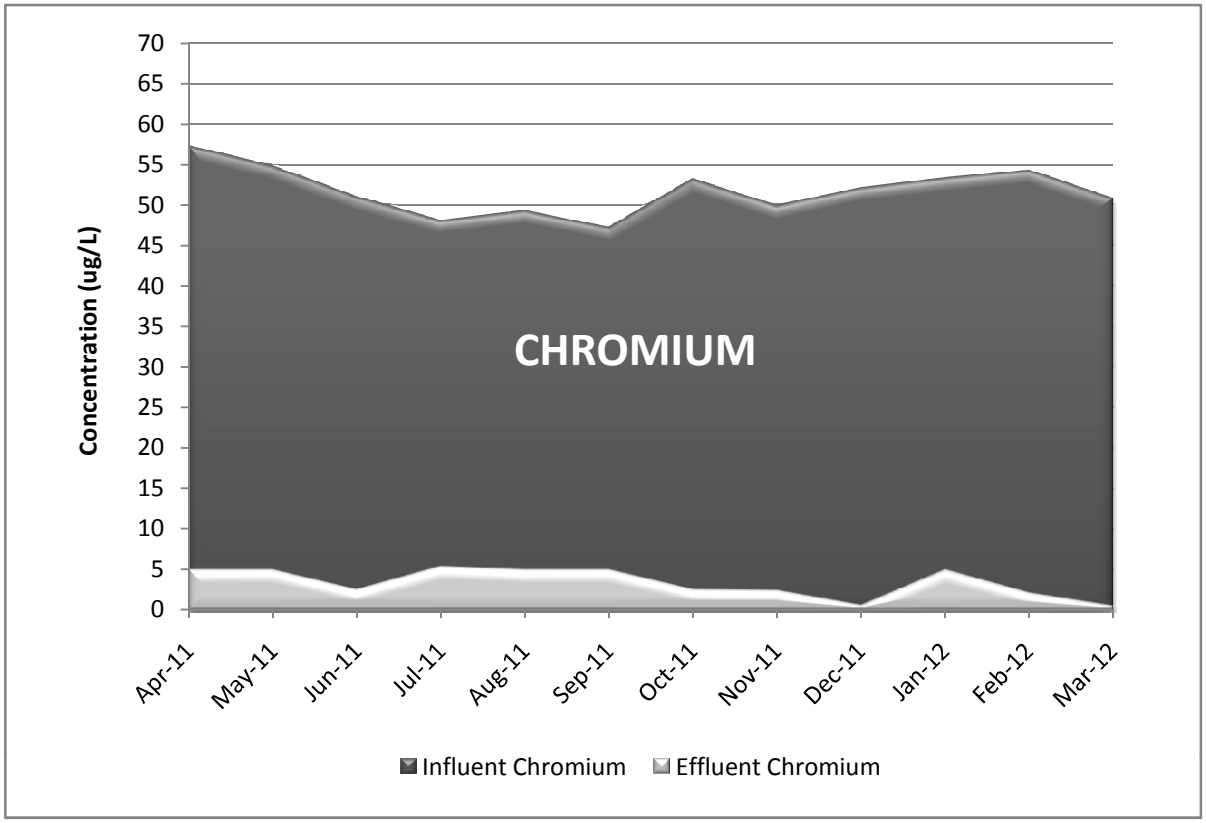


FIGURE C.3-3. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS OVER 1 YEAR



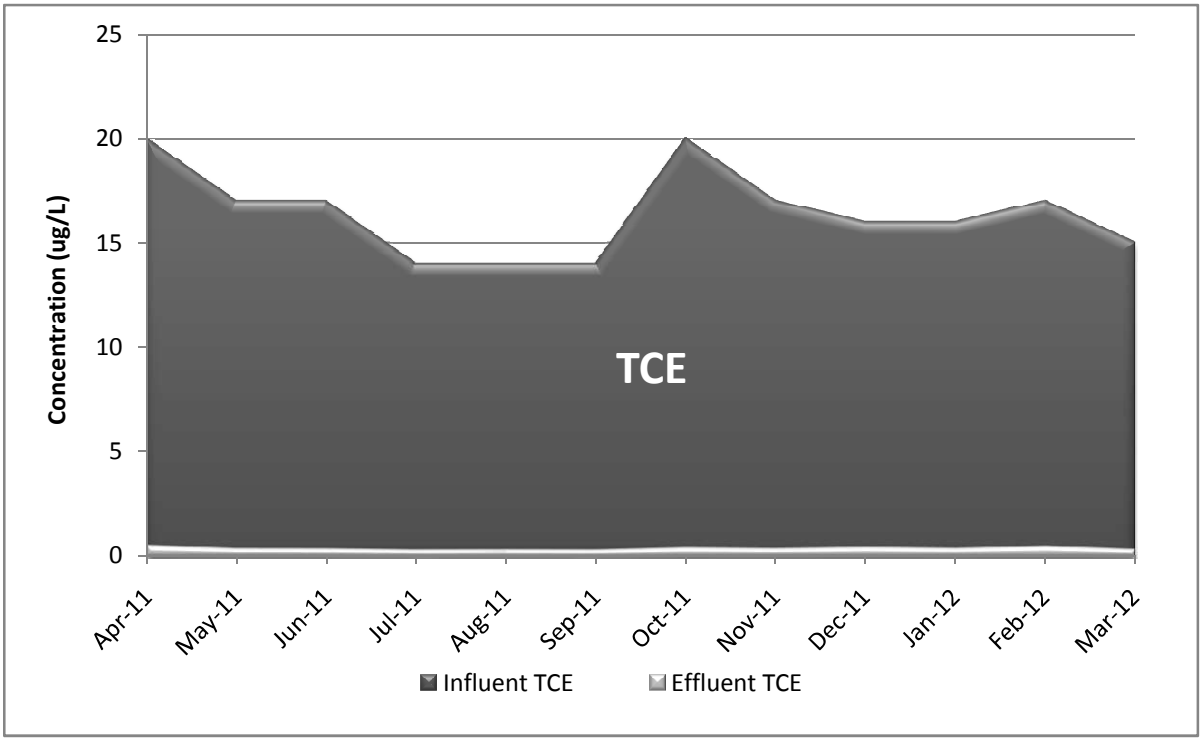
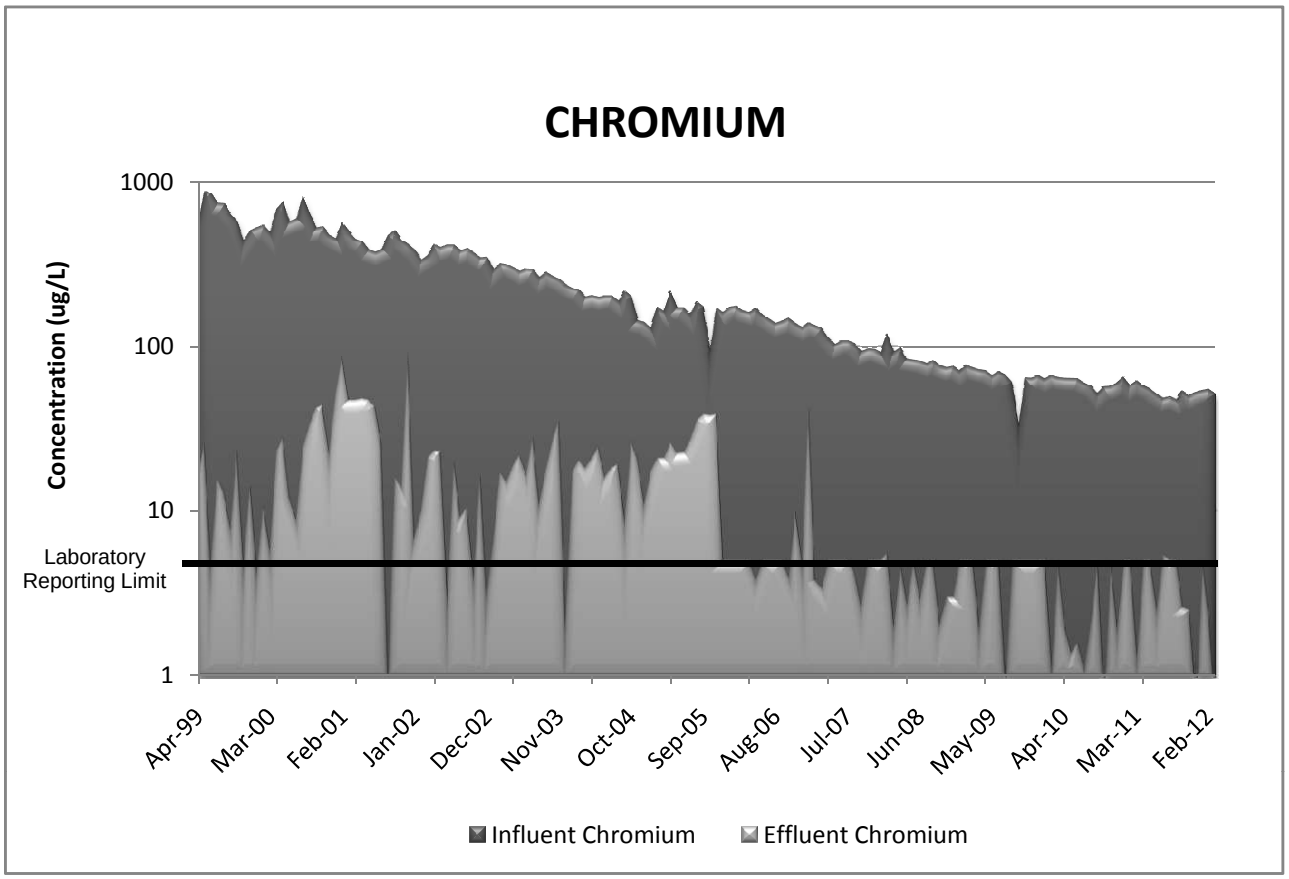
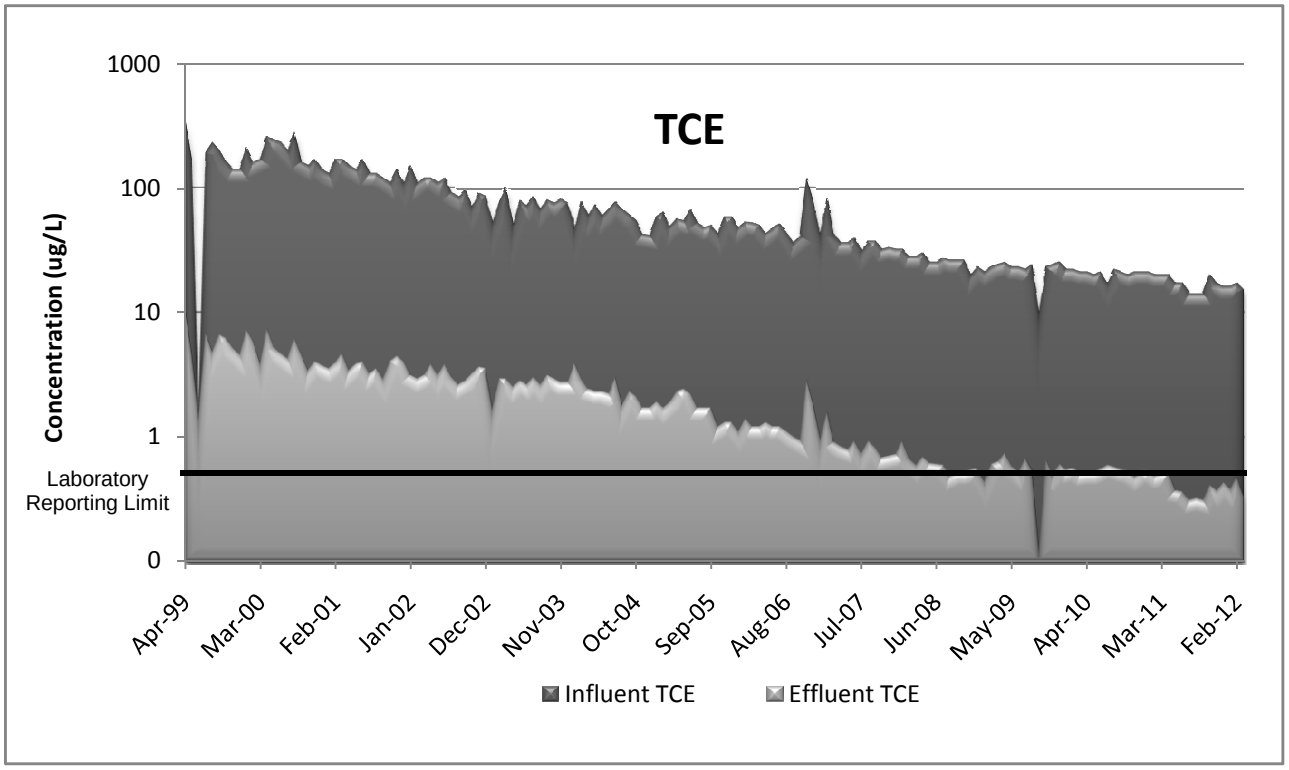


FIGURE C.3-4. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME - LOGARITHMIC SCALE





Appendix C.4

OU-3 Reports to the City of Vancouver
and
Supporting Flow Data

11 January 2012
14495.05 LN1243

Mr. Johnny Leuthold
Industrial Pretreatment Coordinator
City of Vancouver
Marine Park Engineering Office
P.O. Box 1995
Vancouver, Washington 98668-1995

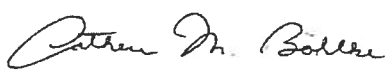
Subject: Semi-Annual Self-Monitoring Report – 31 December 2011
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Dear Mr. Leuthold:

Attached is the Semi-Annual Self-Monitoring Report for the Boomsnub/Airco Superfund Site prepared in accordance with the City of Vancouver Water Discharge Permit 2009-07. The time period covered includes July through December 2011. Flow data is being reported from the flow meter on the air stripper. During the reporting period all discharges were made to the infiltration gallery on Linde LLC property.

Effluent samples were collected by EA Engineering, Science, and Technology, Inc. on July 6, August 3, September 6, October 7, November 7, and December 6, 2011. Columbia Analytical Services, located in Kelso, Washington is our analytical laboratory. The analytical data for each monthly sampling event are included, along with the sample Chain-of-Custody forms and the case narrative.

Sincerely,



Catherine Bohlke
Project Coordinator

cc: Dave Grupp

Enclosures: City of Vancouver Quarterly Self-Monitoring Report
Laboratory Analytical Results, Chain of Custody and Case Narrative

Boomsnub Airco Superfund Site **(Permit No. 2009-07 Mod1)**

Semi-Annual Self-Monitoring Report

Report Due Date (circle one): June 30, ***December 31***

Lab Contracted for Analysis: Columbia Analytical Services, Inc.

Attach: Chain of Custody, Laboratory Results, Lab Report Narrative

Parameter**	Result	Permit Limit	Sample Type*	Sample Date/Collected by:
Month 1 – July				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0054	7.22 mg/L	G	July 6, 2011/EA
Trichloroethene – mg/L	0.00031 J	0.33 mg/L	G	July 6, 2011/EA
pH (high/low) – SU	8.24/8.21	10.0/5.5 SU	G	July 6, 2011/EA
Month 2 – August				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.002 U	7.22 mg/L	G	August 3, 2011/EA
Trichloroethene – mg/L	0.00032 J	0.33 mg/L	G	August 3, 2011/EA
pH (high/low) – SU	8.41/8.07	10.0/5.5 SU	G	August 3, 2011/EA
Month 3 – September				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.002 U	7.22 mg/L	G	September 6, 2011/EA
Trichloroethene – mg/L	0.00031 J	0.33 mg/L	G	September 6, 2011/EA
pH (high/low) - SU	8.23/8.15	10.0/5.5 SU	G	September 6, 2011/EA
Month 4 – October				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0026 J	7.22 mg/L	G	October 7, 2011/EA
Trichloroethene – mg/L	0.00042 J	0.33 mg/L	G	October 7, 2011/EA
pH (high/low) - SU	8.01/7.98	10.0/5.5 SU	G	October 7, 2011/EA
Month 5 – November				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.0025 J	7.22 mg/L	G	November 7, 2011/EA
Trichloroethene – mg/L	0.00038 J	0.33 mg/L	G	November 7, 2011/EA
pH (high/low) - SU	8.09/8.03	10.0/5.5 SU	G	November 7, 2011/EA
Month 6 – December				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome – mg/L	0.001 J	7.22 mg/L	G	December 6, 2011/EA
Trichloroethene – mg/L	0.00043 J	0.33 mg/L	G	December 6, 2011/EA
pH (high/low) - SU	8.06/8.00	10.0/5.5 SU	G	December 6, 2011/EA

Parameter	Value – mg/L	Limit	No. Samples
Semi Annual Average - Chrome	0.0022	0.572 mg/L	12

* Sample Type: *Cont*-Continuous; *G* – Grab; *Comp* - Composite

** If more than one sample analyzed, report the highest concentration for the month.

General Certification Statement: "*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*"

Signature | Head of WJ Site Operations *Title* | 1/6/12 *Date*

October 7, 2011
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1109635
Project:	Boomsnub/14495.2011.0040.03	**Date Received:**	10/7/11
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Four water samples and one trip blank were received for analysis at Columbia Analytical Services on 10/7/11. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260

No anomalies associated with the analysis of these samples were observed.

Approved by _____ **Date** 10/28/11

Columbia Analytical Services™ — CHAIN OF CUSTODY

SR#: K1109635

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	14495.2011.0040-03
PROJECT MANAGER	J. J Frain
COMPANY ADDRESS	EA Engineering
	720 Sixth Street South suite 100
CITY/STATE/ZIP	Kirkland, Wa 98033
E MAIL ADDRESS	jfrain@eaest.com
PHONE #	(425) 451-7400
FAX #	(425) 451-7800
SAMPLER'S SIGNATURE	Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐ 8021 ☐ BTEX ☐	Hydro-carbons (see below) Gas ☐ Diesel ☐ Oil ☐	Fuel Fingerprint (FIQ) 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, 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
INF-100711	10/7/11	7:45		H_2O	5		X								X		X	
~~PIX-100711~~		7:50			1										X			
EFF-100711		7:55			5		X								X		X	
EFFD-100711		8:00			5		X								X		X	
TB-100711		NA	46316		2		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:

TURNAROUND REQUIREMENTS

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

10/25/11 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:

VOCs - 8260b
Total Metals - Cr
pH

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard Read	Signature:	Signature:	Signature:
Date/Time: 10/7/11 8:10	Date/Time: 10/7/11 1015	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name:	Printed Name:	Printed Name:
Firm: EA	Firm: EAS	Firm:	Firm:

RCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1109635
Project:	Boomsnub/14495.2011.0040.03	**Date Collected:**	10/ 7/11
Sample Matrix:	Water	**Date Received:**	10/ 7/11
		Units:	pH Units
Analysis Method:	SM 4500-H+ B	**Basis:**	NA

pH

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
INF-100711	K1109635-001	6.88		-		1	NA	10/7/11 13:11	H
EFF-100711	K1109635-003	8.01		-		1	NA	10/7/11 13:12	H
EFFD-100711	K1109635-004	7.98		-		1	NA	10/7/11 13:14	H

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1109635
Project No.:	14495.2011.0040.03	**Date Collected:**	10/07/11
Project Name:	Boomsnub	**Date Received:**	10/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-100711 **Lab Code:** K1109635-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/18/11	10/20/11	53.2		

% Solids: 0.0

Comments:

METALS

- I -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1109635
Project No.:	14495.2011.0040.03	**Date Collected:**	10/07/11
Project Name:	Boomsnub	**Date Received:**	10/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-100711 **Lab Code:** K1109635-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/18/11	10/20/11	2.6	J	

% Solids: 0.0

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1109635
Project No.:	14495.2011.0040.03	**Date Collected:**	10/07/11
Project Name:	Boomsnub	**Date Received:**	10/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-100711 **Lab Code:** K1109635-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/18/11	10/20/11	2.0	U	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1109635
Project:	Boomsnub/14495.2011.0040.03	**Date Collected:**	10/07/2011
Sample Matrix:	Water	**Date Received:**	10/07/2011

Volatile Organic Compounds

Sample Name:	INF-100711	**Units:**	ug/L
Lab Code:	K1109635-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Trichlorofluoromethane	**0.56**		0.50	0.12	1	10/13/11	10/13/11	KWG1110359	
1,1-Dichloroethene	**0.83**		0.50	0.074	1	10/13/11	10/13/11	KWG1110359	
Methylene Chloride	ND	U	2.0	0.10	1	10/13/11	10/13/11	KWG1110359	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	10/13/11	10/13/11	KWG1110359	
cis-1,2-Dichloroethene	**0.27**	J	0.50	0.067	1	10/13/11	10/13/11	KWG1110359	
1,1,1-Trichloroethane (TCA)	**0.13**	J	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/11	10/13/11	KWG1110359	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/11	10/13/11	KWG1110359	
Trichloroethene (TCE)	**20**		0.50	0.10	1	10/13/11	10/13/11	KWG1110359	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/11	10/13/11	KWG1110359	
Tetrachloroethene (PCE)	**1.4**		0.50	0.099	1	10/13/11	10/13/11	KWG1110359	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/11	10/13/11	KWG1110359	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/11	10/13/11	KWG1110359	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/11	10/13/11	KWG1110359	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/11	10/13/11	KWG1110359	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	119	73-122	10/13/11	Acceptable
Toluene-d8	116	65-144	10/13/11	Acceptable
4-Bromofluorobenzene	108	68-117	10/13/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1109635
Project:	Boomsnub/14495.2011.0040.03	**Date Collected:**	10/07/2011
Sample Matrix:	Water	**Date Received:**	10/07/2011

Volatile Organic Compounds

Sample Name:	EFF-100711	**Units:**	ug/L
Lab Code:	K1109635-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/13/11	10/13/11	KWG1110359	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/13/11	10/13/11	KWG1110359	
Methylene Chloride	ND	U	2.0	0.10	1	10/13/11	10/13/11	KWG1110359	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	10/13/11	10/13/11	KWG1110359	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/13/11	10/13/11	KWG1110359	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/11	10/13/11	KWG1110359	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/11	10/13/11	KWG1110359	
Trichloroethene (TCE)	**0.41**	J	0.50	0.10	1	10/13/11	10/13/11	KWG1110359	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/11	10/13/11	KWG1110359	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/13/11	10/13/11	KWG1110359	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/11	10/13/11	KWG1110359	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/11	10/13/11	KWG1110359	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/11	10/13/11	KWG1110359	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/11	10/13/11	KWG1110359	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	115	73-122	10/13/11	Acceptable
Toluene-d8	116	65-144	10/13/11	Acceptable
4-Bromofluorobenzene	107	68-117	10/13/11	Acceptable

Comments

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1109635
Project:	Boomsnub/14495.2011.0040.03	**Date Collected:**	10/07/2011
Sample Matrix:	Water	**Date Received:**	10/07/2011

Volatile Organic Compounds

Sample Name:	EFFD-100711	**Units:**	ug/L
Lab Code:	K1109635-004	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/13/11	10/13/11	KWG1110359	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/13/11	10/13/11	KWG1110359	
Methylene Chloride	ND	U	2.0	0.10	1	10/13/11	10/13/11	KWG1110359	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	10/13/11	10/13/11	KWG1110359	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/13/11	10/13/11	KWG1110359	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/11	10/13/11	KWG1110359	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/11	10/13/11	KWG1110359	
Trichloroethene (TCE)	**0.42**	J	0.50	0.10	1	10/13/11	10/13/11	KWG1110359	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/11	10/13/11	KWG1110359	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/13/11	10/13/11	KWG1110359	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/11	10/13/11	KWG1110359	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/11	10/13/11	KWG1110359	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/11	10/13/11	KWG1110359	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/11	10/13/11	KWG1110359	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	112	73-122	10/13/11	Acceptable
Toluene-d8	114	65-144	10/13/11	Acceptable
4-Bromofluorobenzene	110	68-117	10/13/11	Acceptable

Comments

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1109635
Project:	Boomsnub/14495.2011.0040.03	**Date Collected:**	10/07/2011
Sample Matrix:	Water	**Date Received:**	10/07/2011

Volatile Organic Compounds

Sample Name:	TB-100711	**Units:**	ug/L
Lab Code:	K1109635-005	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/13/11	10/13/11	KWG1110359	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/13/11	10/13/11	KWG1110359	
Methylene Chloride	**0.32**	J	2.0	0.10	1	10/13/11	10/13/11	KWG1110359	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	10/13/11	10/13/11	KWG1110359	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/13/11	10/13/11	KWG1110359	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/13/11	10/13/11	KWG1110359	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/11	10/13/11	KWG1110359	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/11	10/13/11	KWG1110359	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	10/13/11	10/13/11	KWG1110359	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/11	10/13/11	KWG1110359	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/13/11	10/13/11	KWG1110359	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/11	10/13/11	KWG1110359	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/11	10/13/11	KWG1110359	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/11	10/13/11	KWG1110359	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/11	10/13/11	KWG1110359	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	112	73-122	10/13/11	Acceptable
Toluene-d8	115	65-144	10/13/11	Acceptable
4-Bromofluorobenzene	109	68-117	10/13/11	Acceptable

Comments:

November 7, 2011
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1110851
Project:	Boomsnub/14495.05.2011.0040-03	**Date Received:**	11/07/11
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Four water samples were received for analysis at Columbia Analytical Services on 11/07/11. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260

No anomalies associated with the analysis of these samples were observed.

Approved by _____ **Date** 11/28/11

CHAIN OF CUSTODY

Columbia Analytical Services™

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

SR#: K1110561

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.05.2011.0040-03
PROJECT MANAGER: Jil Frain
COMPANY/ADDRESS: EA Engineering
720 Sixth St. South, Suite 100
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: jfrain@eaest.com
PHONE #: (425) 451-7400 FAX #: (425) 451-7800
SAMPLER'S SIGNATURE: Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐ 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 ☐	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
INF-110711	11/7/11	7:50		H_2O	5		X						X		X					
EFF-110711	11/7/11	7:55		↓	5		X						X		X					
EFFD-110711	11/7/11	8:00		↓	5		X						X		X					
TB-110711	11/7/11	NA	46375	↓	2		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:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
11/22/11 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:
VOCs - 8260b
Total Metals - Cr
pH

☐ 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: 11/7/11 8:15	Date/Time: 11/7/11 1125	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: [illegible]	Printed Name:	Printed Name:
Firm: EA	Firm: [illegible]	Firm:	Firm:

RCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1110851
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	11/ 7/11
Sample Matrix:	Water	**Date Received:**	11/ 7/11
		Units:	pH Units
Analysis Method:	SM 4500-H+ B	**Basis:**	NA

pH

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
INF-110711	K1110851-001	6.95		-		1	NA	11/7/11 15:33	H
EFF-110711	K1110851-002	8.03		-		1	NA	11/7/11 15:34	H
EFFD-110711	K1110851-003	8.09		-		1	NA	11/7/11 15:34	H

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1110851
Project No.:	14495.05.2011.0040-03	**Date Collected:**	11/07/11
Project Name:	Boomsnub	**Date Received:**	11/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-110711 **Lab Code:** K1110851-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/09/11	11/17/11	49.9		

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1110851
Project No.:	14495.05.2011.0040-03	**Date Collected:**	11/07/11
Project Name:	Boomsnub	**Date Received:**	11/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-110711 **Lab Code:** K1110851-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/09/11	11/17/11	2.5	J	

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1110851
Project No.:	14495.05.2011.0040-03	**Date Collected:**	11/07/11
Project Name:	Boomsnub	**Date Received:**	11/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-110711 **Lab Code:** K1110851-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/09/11	11/17/11	2.0	U	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1110851
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	11/07/2011
Sample Matrix:	Water	**Date Received:**	11/07/2011

Volatile Organic Compounds

Sample Name:	INF-110711	**Units:**	ug/L
Lab Code:	K1110851-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Trichlorofluoromethane	**0.37**	J	0.50	0.12	1	11/17/11	11/17/11	KWG1111698	
1,1-Dichloroethene	**0.73**		0.50	0.074	1	11/17/11	11/17/11	KWG1111698	
Methylene Chloride	ND	U	2.0	0.10	1	11/17/11	11/17/11	KWG1111698	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	11/17/11	11/17/11	KWG1111698	
cis-1,2-Dichloroethene	**0.31**	J	0.50	0.067	1	11/17/11	11/17/11	KWG1111698	
1,1,1-Trichloroethane (TCA)	**0.11**	J	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/17/11	11/17/11	KWG1111698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/17/11	11/17/11	KWG1111698	
Trichloroethene (TCE)	**17**		0.50	0.10	1	11/17/11	11/17/11	KWG1111698	
Bromodichloromethane	ND	U	0.50	0.091	1	11/17/11	11/17/11	KWG1111698	
Tetrachloroethene (PCE)	**1.1**		0.50	0.099	1	11/17/11	11/17/11	KWG1111698	
Dibromochloromethane	ND	U	0.50	0.14	1	11/17/11	11/17/11	KWG1111698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/17/11	11/17/11	KWG1111698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/17/11	11/17/11	KWG1111698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/17/11	11/17/11	KWG1111698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	79	73-122	11/17/11	Acceptable
Toluene-d8	86	65-144	11/17/11	Acceptable
4-Bromofluorobenzene	79	68-117	11/17/11	Acceptable

Comments

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1110851
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	11/07/2011
Sample Matrix:	Water	**Date Received:**	11/07/2011

Volatile Organic Compounds

Sample Name:	EFF-110711	**Units:**	ug/L
Lab Code:	K1110851-002	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/17/11	11/17/11	KWG1111698	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/17/11	11/17/11	KWG1111698	
Methylene Chloride	ND	U	2.0	0.10	1	11/17/11	11/17/11	KWG1111698	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	11/17/11	11/17/11	KWG1111698	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/17/11	11/17/11	KWG1111698	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/17/11	11/17/11	KWG1111698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/17/11	11/17/11	KWG1111698	
Trichloroethene (TCE)	**0.37**	J	0.50	0.10	1	11/17/11	11/17/11	KWG1111698	
Bromodichloromethane	ND	U	0.50	0.091	1	11/17/11	11/17/11	KWG1111698	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/17/11	11/17/11	KWG1111698	
Dibromochloromethane	ND	U	0.50	0.14	1	11/17/11	11/17/11	KWG1111698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/17/11	11/17/11	KWG1111698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/17/11	11/17/11	KWG1111698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/17/11	11/17/11	KWG1111698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	81	73-122	11/17/11	Acceptable
Toluene-d8	87	65-144	11/17/11	Acceptable
4-Bromofluorobenzene	80	68-117	11/17/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1110851
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	11/07/2011
Sample Matrix:	Water	**Date Received:**	11/07/2011

Volatile Organic Compounds

Sample Name:	EFFD-110711	**Units:**	ug/L
Lab Code:	K1110851-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/17/11	11/17/11	KWG1111698	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/17/11	11/17/11	KWG1111698	
Methylene Chloride	ND	U	2.0	0.10	1	11/17/11	11/17/11	KWG1111698	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	11/17/11	11/17/11	KWG1111698	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/17/11	11/17/11	KWG1111698	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/17/11	11/17/11	KWG1111698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/17/11	11/17/11	KWG1111698	
Trichloroethene (TCE)	**0.38**	J	0.50	0.10	1	11/17/11	11/17/11	KWG1111698	
Bromodichloromethane	ND	U	0.50	0.091	1	11/17/11	11/17/11	KWG1111698	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/17/11	11/17/11	KWG1111698	
Dibromochloromethane	ND	U	0.50	0.14	1	11/17/11	11/17/11	KWG1111698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/17/11	11/17/11	KWG1111698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/17/11	11/17/11	KWG1111698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/17/11	11/17/11	KWG1111698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	79	73-122	11/17/11	Acceptable
Toluene-d8	87	65-144	11/17/11	Acceptable
4-Bromofluorobenzene	78	68-117	11/17/11	Acceptable

Comments

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1110851
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	11/07/2011
Sample Matrix:	Water	**Date Received:**	11/07/2011

Volatile Organic Compounds

Sample Name:	TB-110711 #46375	**Units:**	ug/L
Lab Code:	K1110851-004	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/17/11	11/17/11	KWG1111698	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/17/11	11/17/11	KWG1111698	
Methylene Chloride	**0.10**	J	2.0	0.10	1	11/17/11	11/17/11	KWG1111698	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	11/17/11	11/17/11	KWG1111698	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/17/11	11/17/11	KWG1111698	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/17/11	11/17/11	KWG1111698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/17/11	11/17/11	KWG1111698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/17/11	11/17/11	KWG1111698	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	11/17/11	11/17/11	KWG1111698	
Bromodichloromethane	ND	U	0.50	0.091	1	11/17/11	11/17/11	KWG1111698	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/17/11	11/17/11	KWG1111698	
Dibromochloromethane	ND	U	0.50	0.14	1	11/17/11	11/17/11	KWG1111698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/17/11	11/17/11	KWG1111698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/17/11	11/17/11	KWG1111698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/17/11	11/17/11	KWG1111698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	78	73-122	11/17/11	Acceptable
Toluene-d8	87	65-144	11/17/11	Acceptable
4-Bromofluorobenzene	79	68-117	11/17/11	Acceptable

Comments:

December 6, 2011
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1111825
Project:	Boomsnub/14495.05.2011.0040-03	**Date Received:**	12/06/11
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Three water samples and one trip blank were received for analysis at Columbia Analytical Services on 12/06/11. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260

Duplicate Lab Control Sample Exceptions:
The spike recovery of Methylene Chloride for Duplicate Laboratory Control Sample (DLCS) KWG1112453-4 was outside the upper control criterion. The DLCS is used to evaluate batch precision, which was acceptable. The recovery in the Laboratory Control Sample (LCS) was acceptable indicating the batch was in control. The data was flagged to indicate the problem.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____ Date 1/3/12

Columbia Analytical Services™

CHAIN OF CUSTODY

SR#: K111825

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: 14495.05.2011.0640-03
PROJECT MANAGER: J. Frain
COMPANY ADDRESS: EA Engineering
720 Sixth Street South, Suite 100
CITY/STATE/ZIP: Kirkland, WA 98033
E MAIL ADDRESS: jfrain@eaest.com
PHONE #: 425-451-7400 FAX #: 425-451-7800
SAMPLER'S SIGNATURE: Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC MS 625 ☐ 8270 ☐	Volatile Organics 624 ☐ 8270LL ☐	Hydrocarbons (*See below) Gas ☐	BTEX 8021 ☐	Diesel ☐ Oil ☐	Fuel Fingerprint (FID) NW-HCID Screen ☐	Oil & Grease/TRPH 1664 SGT ☐ 1664 HEM ☐	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, 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
INF-120611	12/6/11	7:55		H_2O	5		X									X		X					
EFF-120611		8:00			5		X									X		X					
EFFD-120611		8:05			5		X									X		X					
TB-120611	↓	NA		↓	2		X																

8

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: _____

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:
VOCs - 8260b
Total Metals - Cr
pH

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Richard Read 12/6/11 8:30			Dwight 12/6/11 1315
Signature / Date/Time	Signature / Date/Time	Signature / Date/Time	Signature / Date/Time
RICK READ / EA			Dwight / EA
Printed Name / Firm	Printed Name / Firm	Printed Name / Firm	Printed Name / Firm

RCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1111825
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	12/ 6/11
Sample Matrix:	Water	**Date Received:**	12/ 6/11
		Units:	pH Units
Analysis Method:	SM 4500-H+ B	**Basis:**	NA

pH

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
INF-120611	K1111825-001	6.91		-		1	NA	12/6/11 15:15	H
EFF-120611	K1111825-002	8.06		-		1	NA	12/6/11 15:16	H
EFFD-120611	K1111825-003	8.00		-		1	NA	12/6/11 15:16	H

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1111825
Project No.:	14495.05.2011.0040-03	**Date Collected:**	12/06/11
Project Name:	Boomsnub	**Date Received:**	12/06/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-120611 **Lab Code:** K1111825-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	12/21/11	12/22/11	52.1		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1111825
Project No.:	14495.05.2011.0040-03	**Date Collected:**	12/06/11
Project Name:	Boomsnub	**Date Received:**	12/06/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-120611 **Lab Code:** K1111825-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	12/21/11	12/22/11	0.7	J	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1111825
Project No.:	14495.05.2011.0040-03	**Date Collected:**	12/06/11
Project Name:	Boomsnub	**Date Received:**	12/06/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-120611 **Lab Code:** K1111825-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	12/21/11	12/22/11	1.0	J	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1111825
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	12/06/2011
Sample Matrix:	Water	**Date Received:**	12/06/2011

Volatile Organic Compounds

Sample Name:	INF-120611	**Units:**	ug/L
Lab Code:	K1111825-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Trichlorofluoromethane	**0.37**	J	0.50	0.12	1	12/08/11	12/08/11	KWG1112453	
1,1-Dichloroethene	**0.80**		0.50	0.074	1	12/08/11	12/08/11	KWG1112453	
Methylene Chloride	ND	U	2.0	0.10	1	12/08/11	12/08/11	KWG1112453	*
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	12/08/11	12/08/11	KWG1112453	
cis-1,2-Dichloroethene	**0.28**	J	0.50	0.067	1	12/08/11	12/08/11	KWG1112453	
1,1,1-Trichloroethane (TCA)	**0.10**	J	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/08/11	12/08/11	KWG1112453	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/08/11	12/08/11	KWG1112453	
Trichloroethene (TCE)	**16**		0.50	0.10	1	12/08/11	12/08/11	KWG1112453	
Bromodichloromethane	ND	U	0.50	0.091	1	12/08/11	12/08/11	KWG1112453	
Tetrachloroethene (PCE)	**1.2**		0.50	0.099	1	12/08/11	12/08/11	KWG1112453	
Dibromochloromethane	ND	U	0.50	0.14	1	12/08/11	12/08/11	KWG1112453	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/08/11	12/08/11	KWG1112453	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/08/11	12/08/11	KWG1112453	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/08/11	12/08/11	KWG1112453	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	78	73-122	12/08/11	Acceptable
Toluene-d8	86	65-144	12/08/11	Acceptable
4-Bromofluorobenzene	82	68-117	12/08/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1111825
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	12/06/2011
Sample Matrix:	Water	**Date Received:**	12/06/2011

Volatile Organic Compounds

Sample Name:	EFF-120611	**Units:**	ug/L
Lab Code:	K1111825-002	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/08/11	12/08/11	KWG1112453	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/08/11	12/08/11	KWG1112453	
Methylene Chloride	ND	U	2.0	0.10	1	12/08/11	12/08/11	KWG1112453	*
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	12/08/11	12/08/11	KWG1112453	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/08/11	12/08/11	KWG1112453	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/08/11	12/08/11	KWG1112453	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/08/11	12/08/11	KWG1112453	
Trichloroethene (TCE)	**0.43**	J	0.50	0.10	1	12/08/11	12/08/11	KWG1112453	
Bromodichloromethane	ND	U	0.50	0.091	1	12/08/11	12/08/11	KWG1112453	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/08/11	12/08/11	KWG1112453	
Dibromochloromethane	ND	U	0.50	0.14	1	12/08/11	12/08/11	KWG1112453	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/08/11	12/08/11	KWG1112453	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/08/11	12/08/11	KWG1112453	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/08/11	12/08/11	KWG1112453	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	82	73-122	12/08/11	Acceptable
Toluene-d8	86	65-144	12/08/11	Acceptable
4-Bromofluorobenzene	87	68-117	12/08/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1111825
Project:	Boomsnub/14495.05.2011.0040-03	**Date Collected:**	12/06/2011
Sample Matrix:	Water	**Date Received:**	12/06/2011

Volatile Organic Compounds

Sample Name:	EFFD-120611	**Units:**	ug/L
Lab Code:	K1111825-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/08/11	12/08/11	KWG1112453	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/08/11	12/08/11	KWG1112453	
Methylene Chloride	ND	U	2.0	0.10	1	12/08/11	12/08/11	KWG1112453	*
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	12/08/11	12/08/11	KWG1112453	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/08/11	12/08/11	KWG1112453	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/08/11	12/08/11	KWG1112453	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/08/11	12/08/11	KWG1112453	
Trichloroethene (TCE)	**0.38**	J	0.50	0.10	1	12/08/11	12/08/11	KWG1112453	
Bromodichloromethane	ND	U	0.50	0.091	1	12/08/11	12/08/11	KWG1112453	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/08/11	12/08/11	KWG1112453	
Dibromochloromethane	ND	U	0.50	0.14	1	12/08/11	12/08/11	KWG1112453	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/08/11	12/08/11	KWG1112453	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/08/11	12/08/11	KWG1112453	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/08/11	12/08/11	KWG1112453	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	81	73-122	12/08/11	Acceptable
Toluene-d8	90	65-144	12/08/11	Acceptable
4-Bromofluorobenzene	80	68-117	12/08/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2011.0040-03
Sample Matrix: Water

Service Request: K1111825
Date Collected: 12/06/2011
Date Received: 12/06/2011

Volatile Organic Compounds

Sample Name: TB-1020611
Lab Code: K1111825-004

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/08/11	12/08/11	KWG1112453	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/08/11	12/08/11	KWG1112453	
Methylene Chloride	**0.13**	J	2.0	0.10	1	12/08/11	12/08/11	KWG1112453	*
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	12/08/11	12/08/11	KWG1112453	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/08/11	12/08/11	KWG1112453	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/08/11	12/08/11	KWG1112453	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/08/11	12/08/11	KWG1112453	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/08/11	12/08/11	KWG1112453	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	12/08/11	12/08/11	KWG1112453	
Bromodichloromethane	ND	U	0.50	0.091	1	12/08/11	12/08/11	KWG1112453	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/08/11	12/08/11	KWG1112453	
Dibromochloromethane	ND	U	0.50	0.14	1	12/08/11	12/08/11	KWG1112453	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/08/11	12/08/11	KWG1112453	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/08/11	12/08/11	KWG1112453	
Hexachlorobutadiene	**0.12**	J	2.0	0.11	1	12/08/11	12/08/11	KWG1112453	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	78	73-122	12/08/11	Acceptable
Toluene-d8	87	65-144	12/08/11	Acceptable
4-Bromofluorobenzene	80	68-117	12/08/11	Acceptable

Comments:

January 4, 2012
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	K1200059	**Service Request No.:**	K1200059
Project:	EA Engineering, Science and Technology	**Date Received:**	01/04/12
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Water samples were received for analysis at Columbia Analytical Services on 01/04/12. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260

Calibration Verification Exceptions:
The following analytes were flagged as outside the lower control criterion for Continuing Calibration Verification (CCV) J:\MS04\0106F003.D: 1,1-Dichloroethene. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The CAS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____ **Date** 1/20/12

CHAIN OF CUSTODY

SR#: K1200059

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: 14495.05.2012.0040-03
PROJECT MANAGER: Jil Frain
COMPANY/ADDRESS: EA Engineering
720 Sixth Street South, Suit 100
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: jfrain@eaest.com
PHONE #: 425 451-7400 FAX #: 425 451-7800
SAMPLER'S SIGNATURE: Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐	Volatile Organics 624 ☐ 8260 ☒ 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 ☐	Hex-Chrom ☐ (pH) Cond., Cl, SO_4, 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
INF-010412	1/4/12	8:10		H_2O	5		X								X		X				
EFF-010412	1/4/12	8:15			5		X								X		X				
EFFD-010412	1/4/12	8:20			5		X								X		X				
TB-010412	1/4/12	NA	46834	↓	2		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:

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:

VOCs - 8260b
Total Metals - Cr
pH

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard Read	Signature:	Signature:	Signature:
Date/Time: 1/4/12 8:45	Date/Time: 1/4/12 1415	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: Les Kennedy	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

RCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1200059
Project:	Boomsnub/14495.05.2012.0040-03	**Date Collected:**	1/ 4/12
Sample Matrix:	Water	**Date Received:**	1/ 4/12
		Units:	pH Units
Analysis Method:	SM 4500-H+ B	**Basis:**	NA

pH

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
INF-010412	K1200059-001	6.69		-		1	NA	1/4/12 16:06	H
EFF-010412	K1200059-002	7.93		-		1	NA	1/4/12 16:07	H
EFFD-010412	K1200059-003	8.03		-		1	NA	1/4/12 16:09	H

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1200059
Project No.:	14495.05.2012.0040-03	**Date Collected:**	01/04/12
Project Name:	Boomsnub	**Date Received:**	01/04/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-010412 **Lab Code:** K1200059-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	01/09/12	01/11/12	53.3		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1200059
Project No.:	14495.05.2012.0040-03	**Date Collected:**	01/04/12
Project Name:	Boomsnub	**Date Received:**	01/04/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-010412 **Lab Code:** K1200059-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	01/09/12	01/11/12	2.0	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1200059
Project No.:	14495.05.2012.0040-03	**Date Collected:**	01/04/12
Project Name:	Boomsnub	**Date Received:**	01/04/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-010412 **Lab Code:** K1200059-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	01/09/12	01/11/12	2.0	U	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1200059
Project:	Boomsnub/14495.05.2012.0040-03	**Date Collected:**	01/04/2012
Sample Matrix:	Water	**Date Received:**	01/04/2012

Volatile Organic Compounds

Sample Name:	INF-010412	**Units:**	ug/L
Lab Code:	K1200059-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Trichlorofluoromethane	**0.31**	J	0.50	0.12	1	01/06/12	01/06/12	KWG1200273	
1,1-Dichloroethene	**0.74**		0.50	0.074	1	01/06/12	01/06/12	KWG1200273	*
Methylene Chloride	ND	U	2.0	0.10	1	01/06/12	01/06/12	KWG1200273	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	01/06/12	01/06/12	KWG1200273	
cis-1,2-Dichloroethene	**0.29**	J	0.50	0.067	1	01/06/12	01/06/12	KWG1200273	
1,1,1-Trichloroethane (TCA)	**0.12**	J	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/06/12	01/06/12	KWG1200273	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/06/12	01/06/12	KWG1200273	
Trichloroethene (TCE)	**16**		0.50	0.10	1	01/06/12	01/06/12	KWG1200273	
Bromodichloromethane	ND	U	0.50	0.091	1	01/06/12	01/06/12	KWG1200273	
Tetrachloroethene (PCE)	**1.1**		0.50	0.099	1	01/06/12	01/06/12	KWG1200273	
Dibromochloromethane	ND	U	0.50	0.14	1	01/06/12	01/06/12	KWG1200273	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/06/12	01/06/12	KWG1200273	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/06/12	01/06/12	KWG1200273	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/06/12	01/06/12	KWG1200273	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	85	73-122	01/06/12	Acceptable
Toluene-d8	92	65-144	01/06/12	Acceptable
4-Bromofluorobenzene	87	68-117	01/06/12	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1200059
Project:	Boomsnub/14495.05.2012.0040-03	**Date Collected:**	01/04/2012
Sample Matrix:	Water	**Date Received:**	01/04/2012

Volatile Organic Compounds

Sample Name:	EFF-010412	**Units:**	ug/L
Lab Code:	K1200059-002	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/06/12	01/06/12	KWG1200273	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/06/12	01/06/12	KWG1200273	*
Methylene Chloride	ND	U	2.0	0.10	1	01/06/12	01/06/12	KWG1200273	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	01/06/12	01/06/12	KWG1200273	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/06/12	01/06/12	KWG1200273	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/06/12	01/06/12	KWG1200273	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/06/12	01/06/12	KWG1200273	
Trichloroethene (TCE)	**0.38**	J	0.50	0.10	1	01/06/12	01/06/12	KWG1200273	
Bromodichloromethane	ND	U	0.50	0.091	1	01/06/12	01/06/12	KWG1200273	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/06/12	01/06/12	KWG1200273	
Dibromochloromethane	ND	U	0.50	0.14	1	01/06/12	01/06/12	KWG1200273	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/06/12	01/06/12	KWG1200273	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/06/12	01/06/12	KWG1200273	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/06/12	01/06/12	KWG1200273	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	85	73-122	01/06/12	Acceptable
Toluene-d8	95	65-144	01/06/12	Acceptable
4-Bromofluorobenzene	87	68-117	01/06/12	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012.0040-03
Sample Matrix: Water

Service Request: K1200059
Date Collected: 01/04/2012
Date Received: 01/04/2012

Volatile Organic Compounds

Sample Name: EFFD-010412
Lab Code: K1200059-003

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/06/12	01/06/12	KWG1200273	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/06/12	01/06/12	KWG1200273	*
Methylene Chloride	ND	U	2.0	0.10	1	01/06/12	01/06/12	KWG1200273	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	01/06/12	01/06/12	KWG1200273	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/06/12	01/06/12	KWG1200273	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/06/12	01/06/12	KWG1200273	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/06/12	01/06/12	KWG1200273	
Trichloroethene (TCE)	**0.39**	J	0.50	0.10	1	01/06/12	01/06/12	KWG1200273	
Bromodichloromethane	ND	U	0.50	0.091	1	01/06/12	01/06/12	KWG1200273	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/06/12	01/06/12	KWG1200273	
Dibromochloromethane	ND	U	0.50	0.14	1	01/06/12	01/06/12	KWG1200273	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/06/12	01/06/12	KWG1200273	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/06/12	01/06/12	KWG1200273	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/06/12	01/06/12	KWG1200273	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	87	73-122	01/06/12	Acceptable
Toluene-d8	99	65-144	01/06/12	Acceptable
4-Bromofluorobenzene	86	68-117	01/06/12	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1200059
Project:	Boomsnub/14495.05.2012.0040-03	**Date Collected:**	01/04/2012
Sample Matrix:	Water	**Date Received:**	01/04/2012

Volatile Organic Compounds

Sample Name:	TB-010412	**Units:**	ug/L
Lab Code:	K1200059-004	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/06/12	01/06/12	KWG1200273	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/06/12	01/06/12	KWG1200273	*
Methylene Chloride	**0.15**	J	2.0	0.10	1	01/06/12	01/06/12	KWG1200273	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	01/06/12	01/06/12	KWG1200273	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/06/12	01/06/12	KWG1200273	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/06/12	01/06/12	KWG1200273	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/06/12	01/06/12	KWG1200273	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/06/12	01/06/12	KWG1200273	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	01/06/12	01/06/12	KWG1200273	
Bromodichloromethane	ND	U	0.50	0.091	1	01/06/12	01/06/12	KWG1200273	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/06/12	01/06/12	KWG1200273	
Dibromochloromethane	ND	U	0.50	0.14	1	01/06/12	01/06/12	KWG1200273	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/06/12	01/06/12	KWG1200273	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/06/12	01/06/12	KWG1200273	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/06/12	01/06/12	KWG1200273	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	83	73-122	01/06/12	Acceptable
Toluene-d8	97	65-144	01/06/12	Acceptable
4-Bromofluorobenzene	88	68-117	01/06/12	Acceptable

Comments:

February 2, 2012
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1201192
Project:	Boomsnub	**Date Received:**	02/08/12
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Water samples were received for analysis at Columbia Analytical Services on 02/08/12. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry

No anomalies associated with the analysis of these samples were observed.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260

Calibration Verification Exceptions:
The following analyte was flagged as outside the upper control criterion for Continuing Calibration Verification (CCV) J:\MS18\0221F015.D: Trichlorofluoromethane. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The CAS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____ **Date** 2/24/12

CHAIN OF CUSTODY

SR#: K1201192

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: 14495.05.2012.0040-03
PROJECT MANAGER: J.I Frain
COMPANY/ADDRESS: EA Engineering
720 Sixth Street South, Suite 100
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: Jfrain@eaest.com
PHONE #: (425) 451-7400 FAX #: (425) 451-7800
SAMPLER'S SIGNATURE: Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐	Volatile Organics 624☐ 8260 X 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/Dissolved) (See list below)	Cyanide☐	(pH) Hex-Chrom☐ 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
INF-020812	2/8/12	9:30		H_2O	5		X							X		X			
EFF-020812		9:35			5		X							X		X			
EFFD-020812		9:40			5		X							X		X			
TB-020812		NA	46993		2		X												

8

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:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
X Standard (10-15 working days)
___ Provide FAX Results
2/24/12 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:
VOCs - 8260b
Total Metals - Cr
pH

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard Read	Signature:	Signature:	Signature:
Date/Time: 2/8/12 9:50	Date/Time:	Date/Time:	Date/Time: 2/8/12 14:30
Printed Name: RICK READ	Printed Name:	Printed Name:	Printed Name:
Firm: EA	Firm:	Firm:	Firm: CLS

RCOC #1 03/10

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1201192
Project:	Boomsnub/14495.05.2012.0040-03	**Date Collected:**	02/8/12
Sample Matrix:	Water	**Date Received:**	02/8/12
Analysis Method:	SM 4500-H+ B	**Units:**	pH Units
		Basis:	NA

pH

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
INF-020812	K1201192-001	6.90	-	-	1	02/08/12 20:18	H
EFF-020812	K1201192-002	8.07	-	-	1	02/08/12 20:19	H
EFFD-020812	K1201192-003	8.06	-	-	1	02/08/12 20:20	H

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1201192
Project No.:	14495.05.2012.0040-03	**Date Collected:**	02/08/12
Project Name:	Boomsnub	**Date Received:**	02/08/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-020812 **Lab Code:** K1201192-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	02/13/12	02/16/12	54.3		

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1201192
Project No.:	14495.05.2012.0040-03	**Date Collected:**	02/08/12
Project Name:	Boomsnub	**Date Received:**	02/08/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-020812 **Lab Code:** K1201192-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	02/13/12	02/16/12	2.1	J	

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1201192
Project No.:	14495.05.2012.0040-03	**Date Collected:**	02/08/12
Project Name:	Boomsnub	**Date Received:**	02/08/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-020812 **Lab Code:** K1201192-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	02/13/12	02/16/12	2.2	J	

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.
Now part of the ALS Group
Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1201192
Project:	Boomsnub/14495.05.2012.0040-03	**Date Collected:**	02/08/2012
Sample Matrix:	Water	**Date Received:**	02/08/2012

Volatile Organic Compounds

Sample Name:	INF-020812	**Units:**	ug/L
Lab Code:	K1201192-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Trichlorofluoromethane	**0.41**	J	0.50	0.12	1	02/21/12	02/21/12	KWG1201792	*
1,1-Dichloroethene	**0.75**		0.50	0.074	1	02/21/12	02/21/12	KWG1201792	
Methylene Chloride	ND	U	2.0	0.10	1	02/21/12	02/21/12	KWG1201792	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/21/12	02/21/12	KWG1201792	
cis-1,2-Dichloroethene	**0.35**	J	0.50	0.067	1	02/21/12	02/21/12	KWG1201792	
1,1,1-Trichloroethane (TCA)	**0.090**	J	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/21/12	02/21/12	KWG1201792	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/21/12	02/21/12	KWG1201792	
Trichloroethene (TCE)	**17**		0.50	0.10	1	02/21/12	02/21/12	KWG1201792	
Bromodichloromethane	ND	U	0.50	0.091	1	02/21/12	02/21/12	KWG1201792	
Tetrachloroethene (PCE)	**1.2**		0.50	0.099	1	02/21/12	02/21/12	KWG1201792	
Dibromochloromethane	ND	U	0.50	0.14	1	02/21/12	02/21/12	KWG1201792	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/21/12	02/21/12	KWG1201792	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/21/12	02/21/12	KWG1201792	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/21/12	02/21/12	KWG1201792	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	90	73-122	02/21/12	Acceptable
Toluene-d8	94	65-144	02/21/12	Acceptable
4-Bromofluorobenzene	80	68-117	02/21/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012.0040-03
Sample Matrix: Water

Service Request: K1201192
Date Collected: 02/08/2012
Date Received: 02/08/2012

Volatile Organic Compounds

Sample Name: EFF-020812
Lab Code: K1201192-002

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/21/12	02/21/12	KWG1201792	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/21/12	02/21/12	KWG1201792	
Methylene Chloride	ND	U	2.0	0.10	1	02/21/12	02/21/12	KWG1201792	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/21/12	02/21/12	KWG1201792	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/21/12	02/21/12	KWG1201792	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/21/12	02/21/12	KWG1201792	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/21/12	02/21/12	KWG1201792	
Trichloroethene (TCE)	**0.48**	J	0.50	0.10	1	02/21/12	02/21/12	KWG1201792	
Bromodichloromethane	ND	U	0.50	0.091	1	02/21/12	02/21/12	KWG1201792	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/21/12	02/21/12	KWG1201792	
Dibromochloromethane	ND	U	0.50	0.14	1	02/21/12	02/21/12	KWG1201792	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/21/12	02/21/12	KWG1201792	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/21/12	02/21/12	KWG1201792	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/21/12	02/21/12	KWG1201792	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	91	73-122	02/21/12	Acceptable
Toluene-d8	93	65-144	02/21/12	Acceptable
4-Bromofluorobenzene	81	68-117	02/21/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012.0040-03
Sample Matrix: Water

Service Request: K1201192
Date Collected: 02/08/2012
Date Received: 02/08/2012

Volatile Organic Compounds

Sample Name: EFFD-020812
Lab Code: K1201192-003

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/21/12	02/21/12	KWG1201792	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/21/12	02/21/12	KWG1201792	
Methylene Chloride	ND	U	2.0	0.10	1	02/21/12	02/21/12	KWG1201792	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/21/12	02/21/12	KWG1201792	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/21/12	02/21/12	KWG1201792	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/21/12	02/21/12	KWG1201792	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/21/12	02/21/12	KWG1201792	
Trichloroethene (TCE)	**0.44**	J	0.50	0.10	1	02/21/12	02/21/12	KWG1201792	
Bromodichloromethane	ND	U	0.50	0.091	1	02/21/12	02/21/12	KWG1201792	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/21/12	02/21/12	KWG1201792	
Dibromochloromethane	ND	U	0.50	0.14	1	02/21/12	02/21/12	KWG1201792	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/21/12	02/21/12	KWG1201792	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/21/12	02/21/12	KWG1201792	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/21/12	02/21/12	KWG1201792	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	88	73-122	02/21/12	Acceptable
Toluene-d8	94	65-144	02/21/12	Acceptable
4-Bromofluorobenzene	80	68-117	02/21/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012.0040-03
Sample Matrix: Water

Service Request: K1201192
Date Collected: 02/08/2012
Date Received: 02/08/2012

Volatile Organic Compounds

Sample Name: TB-020812
Lab Code: K1201192-004

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/21/12	02/21/12	KWG1201792	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/21/12	02/21/12	KWG1201792	
Methylene Chloride	**0.29**	J	2.0	0.10	1	02/21/12	02/21/12	KWG1201792	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/21/12	02/21/12	KWG1201792	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/21/12	02/21/12	KWG1201792	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/21/12	02/21/12	KWG1201792	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/21/12	02/21/12	KWG1201792	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/21/12	02/21/12	KWG1201792	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	02/21/12	02/21/12	KWG1201792	
Bromodichloromethane	ND	U	0.50	0.091	1	02/21/12	02/21/12	KWG1201792	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/21/12	02/21/12	KWG1201792	
Dibromochloromethane	ND	U	0.50	0.14	1	02/21/12	02/21/12	KWG1201792	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/21/12	02/21/12	KWG1201792	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/21/12	02/21/12	KWG1201792	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/21/12	02/21/12	KWG1201792	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	88	73-122	02/21/12	Acceptable
Toluene-d8	95	65-144	02/21/12	Acceptable
4-Bromofluorobenzene	80	68-117	02/21/12	Acceptable

Comments:

March 6, 2012
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering Science and Technology	**Service Request No.:**	K1202027
Project:	Boomsnub	**Date Received:**	03/06/12
Sample Matrix:	Water		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Water samples were received for analysis at Columbia Analytical Services on 03/06/12. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Volatile Organic Compounds by EPA Method 8260

No anomalies associated with the analysis of these samples were observed.

Approved by _____ **Date** 03/20/12

CHAIN OF CUSTODY

SR#: K1202027

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	14445.05.2012.0040-03
PROJECT MANAGER	J. I Frain
COMPANY ADDRESS	EA Engineering
	720 Sixth St. South, Suite 100
CITY/STATE/ZIP	Kirkland, Wa. 98033
E MAIL ADDRESS	jfrain@eaest.com
PHONE #	(425) 451-7400
FAX #	(425) 451-7500
SAMPLER'S SIGNATURE	Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 ☐ 8021 ☐ BTEX ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐ ☐ Fuel Fingerprint ☐ 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 ☐	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
INF-030612	3/6/12	8:05		H_2O	5		X							X		X			
EFF-030612		8:10			5		X							X		X			
EFFD-030612		8:15			5		X							X		X			
TB-030612		NA	47045		2		X												

8

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: _____

TURNAROUND REQUIREMENTS

____ 24 hr. ____ 48 hr.
____ 5 Day
X Standard (10-15 working days)
____ Provide FAX Results
3/23/12 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:

VOCs - 8260b
Total Metals - Cr
pH

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard Read	Signature:	Signature:	Signature:
Date/Time: 3/6/12 8:30	Date/Time: 3-6-12 1300	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: Brian Rabin	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

RCOC #1 03/10

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1202027
Project No.:	14495.05.2012,0040-03	**Date Collected:**	03/06/12
Project Name:	Boomsnub	**Date Received:**	03/06/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-030612 **Lab Code:** K1202027-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	03/07/12	03/12/12	50.8		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1202027
Project No.:	14495.05.2012,0040-03	**Date Collected:**	03/06/12
Project Name:	Boomsnub	**Date Received:**	03/06/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-030612 **Lab Code:** K1202027-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	03/07/12	03/12/12	0.6	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1202027
Project No.:	14495.05.2012,0040-03	**Date Collected:**	03/06/12
Project Name:	Boomsnub	**Date Received:**	03/06/12
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-030612 **Lab Code:** K1202027-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	03/07/12	03/12/12	0.6	J	

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012,0040-03
Sample Matrix: Water

Service Request: K1202027
Date Collected: 03/06/2012
Date Received: 03/06/2012

Volatile Organic Compounds

Sample Name: INF-030612
Lab Code: K1202027-001

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/10/12	03/10/12	KWG1202481	
Trichlorofluoromethane	**0.32**	J	0.50	0.12	1	03/10/12	03/10/12	KWG1202481	
1,1-Dichloroethene	**0.63**		0.50	0.080	1	03/10/12	03/10/12	KWG1202481	
Methylene Chloride	ND	U	2.0	0.10	1	03/10/12	03/10/12	KWG1202481	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/10/12	03/10/12	KWG1202481	
cis-1,2-Dichloroethene	**0.33**	J	0.50	0.067	1	03/10/12	03/10/12	KWG1202481	
1,1,1-Trichloroethane (TCA)	**0.12**	J	0.50	0.075	1	03/10/12	03/10/12	KWG1202481	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/12	03/10/12	KWG1202481	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/12	03/10/12	KWG1202481	
Trichloroethene (TCE)	**15**		0.50	0.10	1	03/10/12	03/10/12	KWG1202481	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/12	03/10/12	KWG1202481	
Tetrachloroethene (PCE)	**1.1**		0.50	0.099	1	03/10/12	03/10/12	KWG1202481	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/12	03/10/12	KWG1202481	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/12	03/10/12	KWG1202481	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/12	03/10/12	KWG1202481	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/10/12	03/10/12	KWG1202481	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	96	73-122	03/10/12	Acceptable
Toluene-d8	109	65-144	03/10/12	Acceptable
4-Bromofluorobenzene	102	68-117	03/10/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012,0040-03
Sample Matrix: Water

Service Request: K1202027
Date Collected: 03/06/2012
Date Received: 03/06/2012

Volatile Organic Compounds

Sample Name: EFF-030612
Lab Code: K1202027-002

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/10/12	03/10/12	KWG1202481	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/10/12	03/10/12	KWG1202481	
1,1-Dichloroethene	ND	U	0.50	0.080	1	03/10/12	03/10/12	KWG1202481	
Methylene Chloride	ND	U	2.0	0.10	1	03/10/12	03/10/12	KWG1202481	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/10/12	03/10/12	KWG1202481	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/10/12	03/10/12	KWG1202481	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/10/12	03/10/12	KWG1202481	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/12	03/10/12	KWG1202481	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/12	03/10/12	KWG1202481	
Trichloroethene (TCE)	**0.33**	J	0.50	0.10	1	03/10/12	03/10/12	KWG1202481	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/12	03/10/12	KWG1202481	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/10/12	03/10/12	KWG1202481	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/12	03/10/12	KWG1202481	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/12	03/10/12	KWG1202481	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/12	03/10/12	KWG1202481	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/10/12	03/10/12	KWG1202481	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	97	73-122	03/10/12	Acceptable
Toluene-d8	109	65-144	03/10/12	Acceptable
4-Bromofluorobenzene	100	68-117	03/10/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012,0040-03
Sample Matrix: Water

Service Request: K1202027
Date Collected: 03/06/2012
Date Received: 03/06/2012

Volatile Organic Compounds

Sample Name: EFFD-030612
Lab Code: K1202027-003

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/10/12	03/10/12	KWG1202481	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/10/12	03/10/12	KWG1202481	
1,1-Dichloroethene	ND	U	0.50	0.080	1	03/10/12	03/10/12	KWG1202481	
Methylene Chloride	ND	U	2.0	0.10	1	03/10/12	03/10/12	KWG1202481	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/10/12	03/10/12	KWG1202481	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/10/12	03/10/12	KWG1202481	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/10/12	03/10/12	KWG1202481	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/12	03/10/12	KWG1202481	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/12	03/10/12	KWG1202481	
Trichloroethene (TCE)	**0.30**	J	0.50	0.10	1	03/10/12	03/10/12	KWG1202481	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/12	03/10/12	KWG1202481	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/10/12	03/10/12	KWG1202481	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/12	03/10/12	KWG1202481	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/12	03/10/12	KWG1202481	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/12	03/10/12	KWG1202481	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/10/12	03/10/12	KWG1202481	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	98	73-122	03/10/12	Acceptable
Toluene-d8	109	65-144	03/10/12	Acceptable
4-Bromofluorobenzene	101	68-117	03/10/12	Acceptable

Comments

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.05.2012,0040-03
Sample Matrix: Water

Service Request: K1202027
Date Collected: 03/06/2012
Date Received: 03/06/2012

Volatile Organic Compounds

Sample Name: TB-030612
Lab Code: K1202027-004

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA

Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	03/09/12	03/09/12	KWG1202481	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/09/12	03/09/12	KWG1202481	
1,1-Dichloroethene	ND	U	0.50	0.080	1	03/09/12	03/09/12	KWG1202481	
Methylene Chloride	**0.17**	J	2.0	0.10	1	03/09/12	03/09/12	KWG1202481	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	03/09/12	03/09/12	KWG1202481	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/09/12	03/09/12	KWG1202481	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/09/12	03/09/12	KWG1202481	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/09/12	03/09/12	KWG1202481	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/09/12	03/09/12	KWG1202481	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	03/09/12	03/09/12	KWG1202481	
Bromodichloromethane	ND	U	0.50	0.091	1	03/09/12	03/09/12	KWG1202481	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/09/12	03/09/12	KWG1202481	
Dibromochloromethane	ND	U	0.50	0.14	1	03/09/12	03/09/12	KWG1202481	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/09/12	03/09/12	KWG1202481	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/09/12	03/09/12	KWG1202481	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/09/12	03/09/12	KWG1202481	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	99	73-122	03/09/12	Acceptable
Toluene-d8	111	65-144	03/09/12	Acceptable
4-Bromofluorobenzene	102	68-117	03/09/12	Acceptable

Comments