Progress Report
October 2010 — March 2011
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Prepared for

Linde LLC
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LIST OF ACRONYMS

CAS	Columbia Analytical Services
City	City of Vancouver
EA	EA Engineering, Science, and Technology, Inc.
EPA	United States Environmental Protection Agency
GAC	Granular Activated Carbon
IWS	In-Well Stripping
lb	Pound(s)
Linde	Linde LLC
MDL	Method Detection Limit
MRL	Method Reporting Limit
O&M	Operation and Maintenance
OU	Operable Unit
QASP	Quality Assurance and Sampling Plan
Site	Boomsnub/Airco Superfund Site
TCE	Trichloroethene
VOC	Volatile Organic Compounds

PROGRESS REPORT

Site Name: Boomsnub/Airco Superfund Site, Hazel Dell, Washington (Site)
Prepared By: EA Engineering, Science, and Technology, Inc. (EA)
Date: 20 May 2011
Reporting Period: October 2010 through March 2011.

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 identifies Operable Unit (OU)-2 and OU-3, along with 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 Volatile Organic Compound (VOC) 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 in-well stripping (IWS) system availability over this reporting period was as follows:

Total hours available from 1 October 2010 to 31 March 2011: 4,367.
Total hours of IWS system downtime: 225 (The system blowers were turned off to repair broken belts on two separate occasions)
Total operating hours: 4,142.
System availability: ~ 95 percent.

A.1.2 OU-3 Sitewide Groundwater Extraction and Treatment System

Copies of the completed Boomsnub 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 2010 through March 2011.
- Tables 2A through 2F present the pumping rates for each of the active extraction wells during this period.
- Table 3 presents 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 sanitary sewer during the reporting period. The treatment system operated for 4,314 hours, more than 98 percent of the reporting period, exceeding the requirements of the Consent Decree.

From 1 October 2010 to 31 March 2011, 41,463,215 gallons of groundwater were treated, removing 7.1 pounds (lb) of trichloroethene (TCE) and 20.6 lb of total chromium from the groundwater. Appendix C.3 provides mass removal tables and figures.

Monthly flow reports for billing purposes were sent to the City of Vancouver (City) and copies are included in Appendix C.4. Also included in Appendix C.4 is a copy of the Semiannual Self Monitoring Report delivered to the City for July through December 2010. Monthly influent and effluent sampling data is 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 2010) submitted with the Semiannual Self Monitoring Report is included in the previous Progress Report. Monthly influent and effluent sampling data for the Progress Report reporting period, 1 October through 31 March 2011, is 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 Down Time	Type	Reason
October 2010			
7 October	37 minutes	Unscheduled	High level fault
13 October	3 hours, 59 minutes	Unscheduled	Clogged filters
18 October	8 minutes	Maintenance	Change filters
24 October	56 minutes	Unscheduled	High level fault
29 October	32 minutes	Maintenance	Pump water out of vaults
Total October Downtime: Unscheduled; 5 hours, 32 minutes. Maintenance; 40 minutes.			
November 2010			
12 November	16 minutes	Maintenance	Pump water out of vaults
19 November	44 minutes	Maintenance	Pump vaults/change filters
24 November	9 minutes	Maintenance	Pump water out of vaults
Total November Downtime: Maintenance; 1 hour, 9 minutes.			

Date	System Down Time	Type	Reason
December 2010			
9 December	1 hour, 23 minutes	Unscheduled	High level fault
12 December	9 minutes	Maintenance	Pump water out of vaults
20 December	6 hours, 18 minutes	Unscheduled	High level fault
28 December	7 minutes	Maintenance	Pump water out of vaults
30 December	19 minutes	Maintenance	Pump water out of vaults
Total December Downtime: Unscheduled; 7 hours, 41 minutes. Maintenance; 35 minutes.			
January 2011			
4 January 2011	1 hour, 5 minutes	Unscheduled	High level fault
14 January 2011	1 hour, 29 minutes	Unscheduled	High level fault
19 January 2011	37 minutes	Maintenance	Pump water out of vaults
25 January 2011	1 hour, 18 minutes	Unscheduled	High level fault
3 February 2011	1 hour, 14 minutes	Unscheduled	High level fault
Total January Downtime: Unscheduled; 5 hours, 6 minutes. Maintenance; 37 minutes.			
February 2011			
11 February 2011	10 minutes	Maintenance	Pump water out vaults
12 February 2011	2 hours, 52 minutes	Unscheduled	High level fault
16 February 2011	23 minutes	Maintenance	Pump water/check vaults
23 February 2011	49 minutes	Unscheduled	High level fault
26 February 2011	9 minutes	Unscheduled	High level fault
Total February Downtime: Unscheduled; 3 hour, 50 minutes. Maintenance; 33 minutes.			
March 2011			
4 March 2011	16 minutes	Maintenance	Pump water out vaults
10 March 2011	1 minute	Maintenance	Test the ion exchange (IX) influent tank high level float switch
Total March Downtime: Maintenance; 33 minutes. There were 21 unscheduled system shut-downs totaling 30 hours and 24 minutes (See Table 1F in Appendix C.2 for dates). The system shut down multiple times due to record rainfall and an extraordinarily high water table contributing to flooding in the deeper containment vaults CV-3 and CV-9. Vault high level faults in CV-9 were occurring almost daily due to water seeping between vault extensions and failing grout near pipe entrances.			

A.2 SYSTEM MODIFICATIONS AND RECOMMENDATIONS

OU-2

Partial IWS System Shutdown - EA continues to pulse-pump the IWS system (alternating operating wells) in an attempt to increase TCE removal rates. Alternating the IWS wells causes the circulation patterns in the groundwater to change. This may allow the groundwater to circulate in any remaining areas of higher TCE concentrations. Changes to the IWS operations

are made as needed. The IWS wells that were operating during this reporting period are as follows: IWS-3, IWS-4, IWS-6 and IWS-8.

OU-3

Clark County is about to begin development of several sports fields and related structures on parcel no. 144505-000. On March 8, 2011 EA decommissioned two unused wells on the Clark County parcel (AMW-22 and SW-1). EA will modify the remaining monitoring wells on the sports field property, as necessary, to accommodate changes in the land elevation. In addition, several other Site monitoring wells which are no longer used were decommissioned on March 8, 2011, including wells CPU-16, MW-28, MW-29 and MW-36 located in the original toe-of-plume area. All wells were decommissioned with EPA approval.

EA is evaluating options for decreasing or eliminating pumping in the current toe-of-plume area. Additionally, the need to change pumping rates in extraction wells located near the Northern Plume is being evaluated.

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, August 2004). VOC analyses were conducted using EPA Method 8260B, total chromium analyses using EPA Method 200.7, and pH analyses using EPA Method 150.1. Samples were sent to Columbia Analytical Services (CAS) Kelso for these analyses.

Effluent samples were collected by EA on 6 October 2010, 3 November 2010, 2 December 2010, 5 January 2011, 3 February 2011, and 7 March 2011. Based on the analytical results for these samples, effluent water quality met both the City discharge permit limits and the Site-specific 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. It also presents the discharge permit limits and the infiltration gallery discharge limits. A summary of the estimated mass removed, by month, is presented in Appendix C.3.

A.4 MEETINGS

- **25 January –** Attendees: Claire Hong and Bernie Zavala (EPA); Jil Frain and Cathy Bohlke (EA). Purpose: To discuss extraction system pumping rates and proposed changes, groundwater monitoring changes, report formats, and easement agreement status.

- **23 March –** Attendees: Claire Hong and Bernie Zavala (EPA); Jil Frain and Cathy Bohlke (EA). Purpose: To discuss issues and concerns related to the offsite TCE contaminant plume, referred to as the Northern plume.

- **30 March –** Attendees: Claire Hong, Bernie Zavala and Jennifer Byrne (EPA); Jil Frain and Cathy Bohlke (EA); Brian Thiesse (Linde); Pete Haller and Claudia Powers (Ater Wynne LLC). Purpose: To discuss Northern Plume issues and concerns, as well as proposed joint (EPA/EA) investigation activities in the Northern Plume area.

A.5 MISCELLANEOUS

EA continues to pursue easement agreements and restrictive covenants with neighboring property owners.

B. ANTICIPATED PROBLEM AREAS AND RECOMMENDED SOLUTIONS

The proximity and extent of the Northern Plume are currently not known. The potential for this offsite VOC plume to impact Site remediation activities is also not known. Additional investigation of the Northern Plume is needed and will likely include cooperative efforts between EPA and Linde.

C. PROBLEMS RESOLVED

Due to a high water table containment vault CV-9 was constantly flooding, and shutting off the system frequently. To resolve the issue a new sump pump was installed to pump excess stormwater out of the vault and through the treatment system. The new pump works without shutting down the treatment system.

D. DELIVERABLES

D.1 DELIVERABLES SUBMITTED

- **6 October –** July monthly Flow Report submitted to the City.
- **7 October –** QASP Addendum, Revision 1 for the Fall 2010 Semiannual Sampling Event submitted to EPA.
- **7 October –** Proposal for use of HydraSleeve™ passive groundwater samplers, Revision 1, submitted to EPA.
- **5 November –** October monthly Flow Report submitted to the City.
- **18 November–** Easement Agreement and Restrictive Covenants — Status Update letter, submitted to EPA.
- **19 November–** Progress Report, April through September 2010, submitted to EPA.
- **7 December –** November monthly Flow Report submitted to the City.

- **5 January –** December 2010 Semiannual Self Monitoring Report (July – December 2010) submitted to the City.
- **7 January –** December monthly Flow Report submitted to the City.
- **8 February –** Results of Well MW-25D and MW-27D Quarterly Sampling submitted to EPA.
- **8 February –** January monthly Flow Report submitted to the City.
- **11 February –** QASP Addendum for the Spring 2011 Semiannual Sampling Event submitted to EPA.
- **11 February –** Fall 2010 Semiannual Groundwater Sampling Report submitted to EPA.
- **15 February –** Well Modification Work Plan submitted to EPA.
- **21 February –** Resin Dangerous Waste Report submitted to Ecology.
- **23 February –** Carbon Dangerous Waste Report submitted to Ecology.
- **4 March –** February monthly Flow Report submitted to the City.
- **31 March –** 2010 Annual Status Report submitted to EPA.

D.2 ANTICIPATED SUBMITTAL DATES

- Monthly Flow Reports are due to City on the 10th of every month.
- **18 April –** Northern Plume Work Plan to be submitted to EPA.
- **10 July –** Quarterly (January – June 2011) Self Monitoring Report to be submitted to the City.
- **10 August –** Fall 2011 QASP Addendum to be submitted to EPA.
- **26 August –** Northern Plume Draft Summary Report to be submitted to EPA.
- **19 August –** Spring 2011 Semiannual Groundwater Sampling Report to be submitted to EPA.
- **23 September –** Preliminary Draft Closeout Report to be submitted to EPA.

E. EVENTS

E.1 FIELD EVENTS COMPLETED

- **Monthly –** O&M influent and effluent sampling.
- **11 through 20 October –** Fall 2010 semiannual groundwater sampling event.

E.2 UPCOMING EVENTS

- **Monthly –** O&M influent and effluent sampling.
- **18 through 22 April 2011 –** Spring 2011 semiannual groundwater sampling event.
- **9 through 20 May –** Northern Plume Groundwater Sampling event.

F. DATA QUALITY

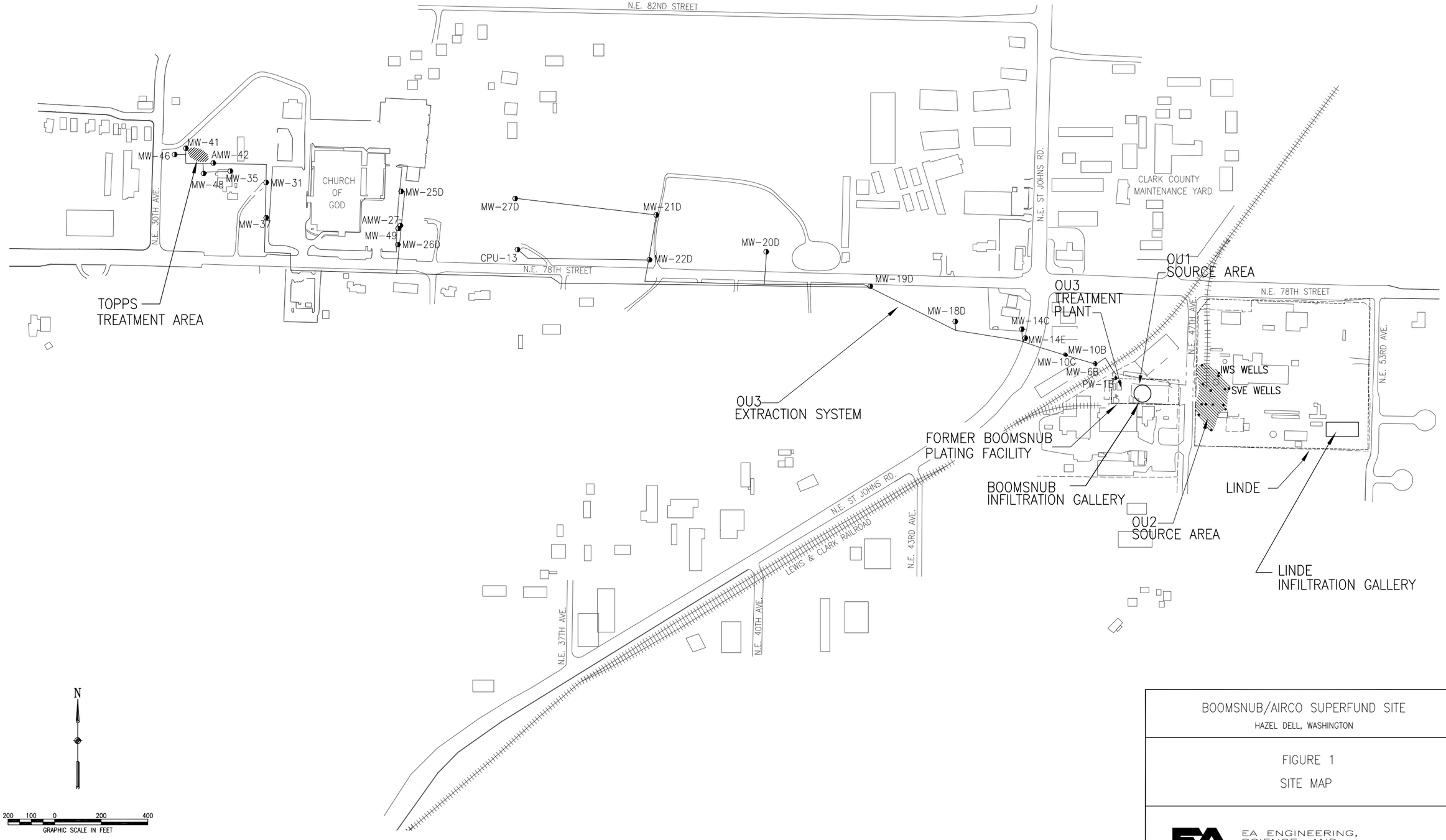
The monthly OU-3 influent/effluent data for the reporting period were reviewed in accordance with the standards established in the 2004 EA QASP.

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. No qualification of sample data is necessary on the basis of sample receipt or chain of custody.

The February data show the matrix spike/duplicate matrix spike recovery for TCE outside the control limit of 10 percent recovery. This is not expected to affect the data since the analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

There were no data quality control issues during the reporting period that would be expected to affect the data.

Figures



BOOMSNUB/AIRCO SUPERFUND SITE

HAZEL DELL, WASHINGTON

FIGURE 1

SITE MAP

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

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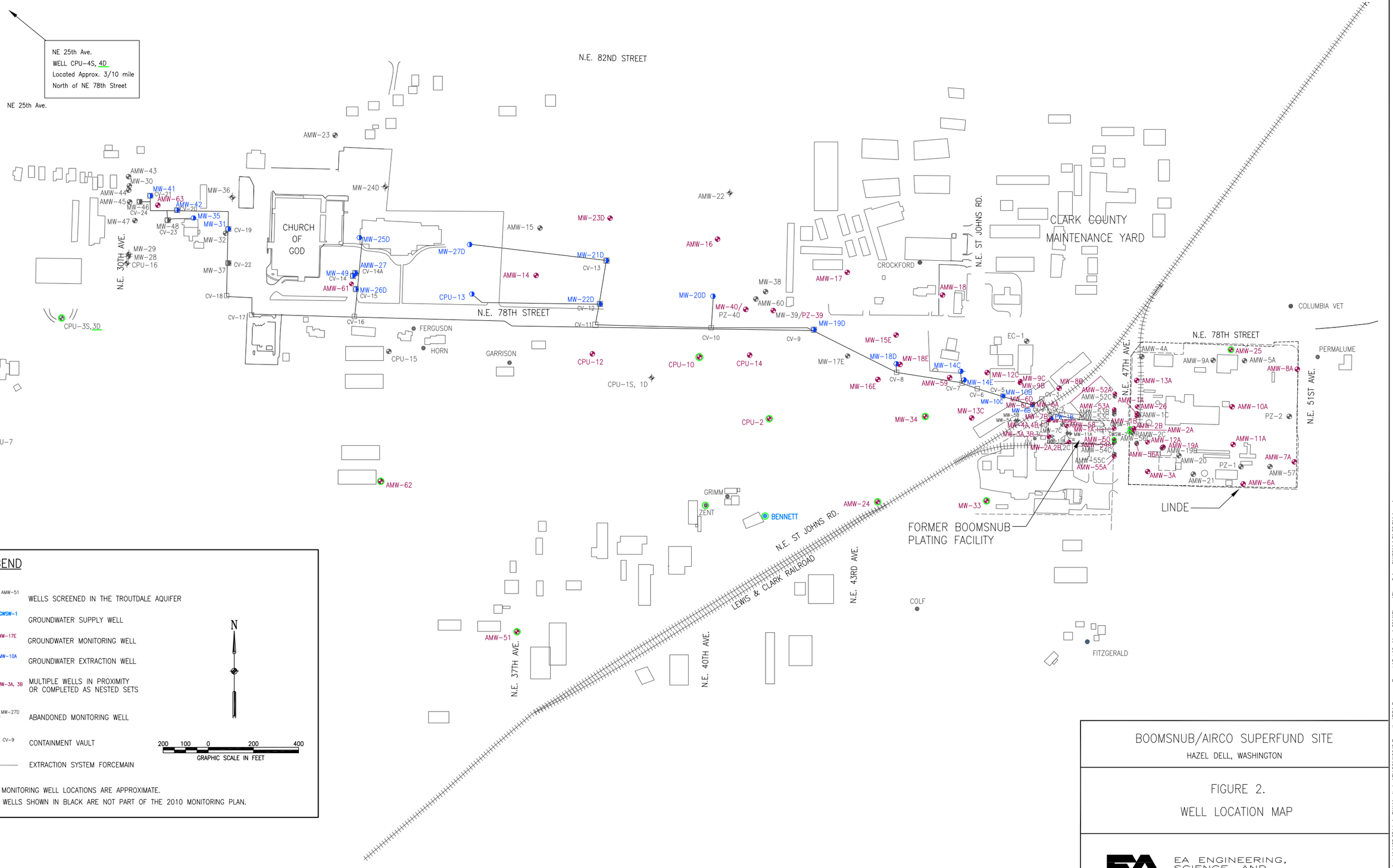


LEGEND

- WELLS SCREENED IN THE TROUTDALE AQUIFER
- GROUNDWATER SUPPLY WELL
- GROUNDWATER MONITORING WELL
- GROUNDWATER EXTRACTION WELL
- MULTIPLE WELLS IN PROXIMITY OR COMPLETED AS NESTED SETS
- ABANDONED MONITORING WELL
- CONTAINMENT VAULT
- EXTRACTION SYSTEM FORCEMAIN

NOTES: MONITORING WELL LOCATIONS ARE APPROXIMATE.
WELLS SHOWN IN BLACK ARE NOT PART OF THE 2010 MONITORING PLAN.

BOOMSNUB/AIRCO SUPERFUND SITE

HAZEL DELL, WASHINGTON

FIGURE 2.

WELL LOCATION MAP

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

F:\Projects\14495.05 Linde GW Monitoring\FY 2013\0043 Reporting\EPA Progress Reports\Oct 10 - March 2011\Figures\Figure 2.dwg, 5/4/2011 1:51:50 PM, lwood

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 VOC source area systems and OU-3 sitewide groundwater treatment system. Routine and other site activities are recorded in this section.

Synopsis of the Activities:

October 2010

October 1. Downloaded and tabulated data.

October 4. Installed Hydra-Sleeve samplers in wells AMW-14, CPU-14, MW-2A, MW-4B, MW-18E and MW-35.

October 6. Collected the monthly treatment system influent and effluent samples.

October 7. The system shut down due to a high water level in containment vault CV-3 caused by heavy precipitation. The system was down for 37 minutes.

October 11. Collected groundwater samples for the Fall 2010 Sampling event.

October 13. The system shut down due to clogged filters on the air stripper pad sump discharge. Very heavy rainfall filled the containment vaults faster than the sump pump could pump against the filters. Pumped water out of containment vaults. The system was down for 3 hours and 59 minutes. Conducted the bi-weekly system inspection.

October 18. Downloaded and tabulated run-time data and inspected the extraction well network. The system was turned off to change filters in the small influent filter canister on the OU2 in-well stripping system. The system was down for 8 minutes.

October 22. Measured and recorded water levels for the Fall 2010 Sampling event.

October 22. Conducted a flow optimization study. Turned off the Church of God extraction wells and turned on others within the extraction system to test flow optimization within the plume.

October 24. The system shut down due to a high level fault in containment vault CV-18. The system was down for 56 minutes.

October 28. Conducted the bi-weekly system inspection.

October 29. Recorded and tabulated monthly extraction well flow rates. The system was turned off to pump water out of containment vaults. The system was down for 32 minutes.

November 2010

November 1. Downloaded and tabulated data.

November 3. Collected the treatment system influent and effluent samples.

November 12. Conducted the bi-weekly system inspection. The system was shut off to pump water out of containment vaults. The system was down for 16 minutes.

November 15. Performed routine maintenance on the OU-2 in-well stripping system. Downloaded and tabulated run-time data and inspected the extraction well network.

November 19. Inspected the extraction well network and pumped water out of containment vaults. The system was turned off to change filters in both of the influent filter canisters and to pump water out of containment vaults. The system was down for 44 minutes.

November 20. Disconnected the GAC vessels at Linde and installed a stack on the IWS trailer.

November 24. Inspected the extraction well network. The system was shut off to pump water out of containment vaults. The system was down for 9 minutes.

November 29. Recorded and tabulated monthly extraction well flow rates. Pumped water out of containment vaults.

November 30. Conducted the bi-weekly system inspection.

December 2010

December 1. Downloaded and tabulated data. Changed out carbon in the two radial units on the air stripper discharge. Emptied carbon from the IWS and SVE GAC vessels.

December 2. Collected the treatment system influent and effluent samples.

December 9. The system shut down due to a high water level fault in containment vaults CV-3 and CV-9. The system was down for 1 hour and 23 minutes.

December 10. Performed routine maintenance on the OU2- in-well stripping system and inspected the extraction well network.

December 12. The system was turned off to pump water out of vaults. The system was down for 9 minutes.

December 13. Conducted the bi-weekly system inspection. Downloaded Run-time data.

December 20. The groundwater treatment system shut down due to high level fault in containment vault CV-3. Direct Electrical Contractors responded for EA and restored the system operation. The system was down for 6 hours and 18 minutes.

December 27. Downloaded and tabulated run-time data and inspected the extraction well network.

December 28. The system was turned off to pump water out of containment vault CV-3. The system was down for 7 minutes. Conducted the bi-weekly system inspection.

December 29. Pumped water out of containment vaults.

December 30. The system was turned off to pump water out of vaults. The system was down for 19 minutes. Recorded and tabulated monthly extraction well flow rates.

January 2011

January 3. Downloaded and tabulated data.

January 4. **T**he system shut down due to a vault high level fault in containment vault CV-9. The system was down for 1 hour and 5 minutes.

January 5. Collected treatment system influent and effluent samples.

January 12. Performed routine maintenance on the OU-2 in-well stripping system and inspected the extraction well network.

January 13. Loaded the Veolia Environmental Services truck with spent Carbon from the GAC units that were emptied in December. Seven totes and 5 drums were hauled off-site.

January 14. The system shut down due to a vault high level fault in containment vault CV-3. The system was down for 1 hour and 29 minutes.

January 17. Conducted the bi-weekly system inspection. Downloaded Run-time data.

January 19. The system was turned off to pump water out of vaults. The system was down for 37 minutes.

January 25. The system shut down due to a vault high level fault in containment vault CV-24. The system was down 1 hour and 18 minutes.

January 26. Conducted the bi-weekly system inspection. Pumped water out of the vaults on the Holtgrieve property and disposed of it in the treatment system.

January 28. Recorded and tabulated monthly extraction well flow rates.

February 2011

February 1. Downloaded and tabulated data. The City of Vancouver had their Annual Inspection.

February 3. Collected treatment system influent and effluent samples. The system shut down due to a high water level fault in containment vault CV-9. The system was down for 1 hour and 14 minutes.

February 9. Conducted the bi-weekly system inspection.

February 11. The system was turned off to pump water out of containment vault CV-9. The system was down for 10 minutes.

February 12. The system shut down due to a vault high level fault in containment vaults CV-3 and CV-9. All vaults containing sump pumps were pumped. The system was down for 2 hours and 52 minutes.

February 16. The system was turned off to pump water out of containment vault CV-9 and to check CV-3 and CV-18. The system was down for 23 minutes.

February 17. Performed routine maintenance on the OU-2 in-well stripping system and inspected the extraction well network. Downloaded Run-time data.

February 22. Conducted the bi-weekly system inspection.

February 23. Pumped water out of the containment vaults on the Church of God property. The system shut down due to a vault high level fault in containment vault CV-9. The system was down for 49 minutes.

February 26. The system shut down due to a vault high level fault in containment vault CV-9. The system was down for 1 hour and 9 minutes.

February 28. Recorded and tabulated monthly extraction well flow rates.

March 2011

In March there were 19 system shut-downs and two system maintenance shut. The system shut down multiple times in the month of March due to record rainfall and an extraordinarily high water table contributing to flooding in the deeper containment vaults CV-3 and CV-9. Vault high level faults in CV-9 were occurring almost daily due to water seeping between vault extensions and failing grout near pipe entrances. The system was down for 29 hours and 24 minutes (accumulated total for the month) due to these circumstances.

March 1. Downloaded and tabulated data.

March 4. The system was turned off to pump water out of containment vaults CV-3 and CV-9. The system was down for 16 minutes.

March 7. Collected the treatment system influent and effluent samples.

March 8. Provided oversight for the decommissioning of monitoring wells AMW-22, SW-1, MW-28, MW-29, CPU-16 and MW-36.

March 10. The system was turned off to test the IX influent tank high level float switch. The system was off for 1 minute. Conducted the bi-weekly system inspection.

March 14. Downloaded and tabulated Run-time data. Adjusted system clocks in SCADA program and data logger.

March 16. Pumped water out of all containment vaults.

March 23. Conducted the bi-weekly system inspection.

March 24. Pumped water out of all containment vaults.

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

March 31. Performed routine maintenance on the OU-2 IWS system and inspected the extraction well network.

Appendix B

OU-2 Monthly Operating Field Forms

Name: Richard Read **Date:** 10/18/2010

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	cfm	off	210
Vacuum Blower Inlet Vacuum	in H_20	off	-28
Vacuum Blower Outlet Pressure	in H_20	off	20
Pressure Blower Outlet Temperature	deg F	off	158
Operating Hz	%	off	100
Secondary GAC Outlet Temperature	deg F	off	118

Individual Well Measurements

	Flow (cfm)	Depth to Water (ft btc)
IWS-1	off	25.70
IWS-2	off	26.24
IWS-3	40	26.23
IWS-4	40	25.70
IWS-5	off	25.47
IWS-6	40	25.71
IWS-7	off	26.29
IWS-8	40	25.91
IWS-9	off	26.16

Comments on IWS System

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?	
IWS System (Effluent of primary GAC)			If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples collected this month? **Yes** ☐ **No** ☒

Sample Location	ID	Type	Container?	PID Reading (if collected)	units

Name: Richard Read **Date:** 11/15/2010

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	cfm	off	210
Vacuum Blower Inlet Vacuum	in H_20	off	-28
Vacuum Blower Outlet Pressure	in H_20	off	20
Pressure Blower Outlet Temperature	deg F	off	156
Operating Hz	%	off	100
Secondary GAC Outlet Temperature	deg F	off	118

Individual Well Measurements

	Flow (cfm)	Depth to Water (ft btc)
IWS-1	off	25.10
IWS-2	off	25.64
IWS-3	40	25.63
IWS-4	40	25.10
IWS-5	off	24.87
IWS-6	40	25.11
IWS-7	off	25.69
IWS-8	40	25.31
IWS-9	off	25.56

Comments on IWS System

The IWS system was down from 10/23/10 to 10/29/10 due to broken drive belts on the blower.

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?	
IWS System (Effluent of primary GAC)		2	If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples collected this month? **Yes** ☐ **No** ☒

Sample Location	ID	Type	Container?	PID Reading units (if collected)

Name: Richard Read **Date:** 12/10/2010

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	cfm	off	210
Vacuum Blower Inlet Vacuum	in H_20	off	-28
Vacuum Blower Outlet Pressure	in H_20	off	20
Pressure Blower Outlet Temperature	deg F	off	154
Operating Hz	%	off	100
Secondary GAC Outlet Temperature	deg F	off	115

Individual Well Measurements

	Flow (cfm)	Depth to Water (ft btc)
IWS-1	off	24.62
IWS-2	off	25.60
IWS-3	40	25.44
IWS-4	40	25.01
IWS-5	off	24.60
IWS-6	40	25.20
IWS-7	off	25.74
IWS-8	40	25.42
IWS-9	off	25.41

Comments on IWS System

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?	
IWS System (Effluent of primary GAC)			If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples collected this month? **Yes** ☐ **No** ☒

Sample Location	ID	Type	Container?	PID Reading units (if collected)

Name: **Richard Read** **Date:** 1/12/2011

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	cfm	off	210
Vacuum Blower Inlet Vacuum	in H_20	off	-28
Vacuum Blower Outlet Pressure	in H_20	off	20
Pressure Blower Outlet Temperature	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Outlet Temperature	deg F	off	120

Individual Well Measurements

	Flow (cfm)	Depth to Water (ft btc)
IWS-1	off	24.67
IWS-2	off	25.21
IWS-3	40	25.20
IWS-4	40	24.67
IWS-5	off	24.44
IWS-6	40	24.68
IWS-7	off	25.26
IWS-8	40	24.88
IWS-9	off	25.13

Comments on IWS System

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?	
IWS System (Effluent of primary GAC)			If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples collected this month? **Yes** ☐ **No** ☒

Sample Location	ID	Type	Container?	PID Reading units (if collected)

Name: Richard Read **Date:** 2/17/2011

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	cfm	off	210
Vacuum Blower Inlet Vacuum	in H_20	off	-28
Vacuum Blower Outlet Pressure	in H_20	off	20
Pressure Blower Outlet Temperature	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Outlet Temperature	deg F	off	120

Individual Well Measurements

	Flow (cfm)	Depth to Water (ft btc)
IWS-1	off	23.97
IWS-2	off	24.51
IWS-3	40	24.50
IWS-4	40	23.97
IWS-5	off	23.74
IWS-6	40	23.98
IWS-7	off	24.56
IWS-8	40	24.18
IWS-9	off	24.43

Comments on IWS System

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?	
IWS System (Effluent of primary GAC)			If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples collected this month? **Yes** ☐ **No** ☒

Sample Location	ID	Type	Container?	PID Reading (if collected)	units

Name: Richard Read **Date:** 3/31/2011

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	cfm	off	210
Vacuum Blower Inlet Vacuum	in H_20	off	-28
Vacuum Blower Outlet Pressure	in H_20	off	20
Pressure Blower Outlet Temperature	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Outlet Temperature	deg F	off	120

Individual Well Measurements

	Flow (cfm)	Depth to Water (ft btc)
IWS-1	off	21.52
IWS-2	off	22.06
IWS-3	38	22.05
IWS-4	38	21.52
IWS-5	off	21.29
IWS-6	38	21.53
IWS-7	off	22.11
IWS-8	38	21.73
IWS-9	off	21.98

Comments on IWS System

Changed oil in Blower.

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?	
IWS System (Effluent of primary GAC)		>2	If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples collected this month? **Yes** ☐ **No** ☒

Sample Location	ID	Type	Container?	PID Reading (if collected)	units

Appendix C

OU-3 Sitewide Groundwater Extraction System

Appendix C.1

OU-3 Bi-weekly System Monitoring Checklists

Name: Rick Read **Date:** 10/13/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.020	3	27%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.01, 4.02 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	5.87
Pre-IX	5.96
IX Effluent	6.04
Final Discharge	7.83

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	158		
Well Field Influent	158	57866402	12:07
IX Influent Flow Meter	158	79471863	12:13
AS Influent Flow Meter	158	48739093	12:14
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)	58
Pre-Carbon Air Temperature (F^o)	78

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	9
Canister Filters	
10 Micron 29.25 inch	26
10 Micron 30 inch	19
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes
INF-100610	CAS	10/6/10	8260b, T.Cr, pH
EFF-100610	CAS	10/6/10	8260b, T.Cr, pH
EFFD-100610	CAS	10/6/10	8260b, T.Cr, pH
TB-100610	CAS	10/6/10	8260b

Comments:

Name: Rick Read **Date:** 10/28/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.020	3	27%
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	5.95
IX Effluent	6.04
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	158		
Well Field Influent	158	61201085	14:23
IX Influent Flow Meter	158	79808726	14:21
AS Influent Flow Meter	158	49141142	14:20
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)	60
Pre-Carbon Air Temperature (F^o)	80

Maintenance:

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

Leaks/Notes?

Inventory:

	Quantity
Gloves	2
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	26
10 Micron 30 inch	19
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes

Comments:

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

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.020	3	27%
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	5.87
Pre-IX	5.96
IX Effluent	6.05
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	161		
Well Field Influent	161	64580225	14:26
IX Influent Flow Meter	162	80149308	14:27
AS Influent Flow Meter	161	49521345	14:26
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)	53
Pre-Carbon Air Temperature (F^o)	73

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	26
10 Micron 30 inch	15
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes
INF-110310	CAS	11/3/10	8260b, T. Cr, pH
EFF-110310	CAS	11/3/10	8260b, T. Cr, pH
EFFD-110310	CAS	11/3/10	8260b, T. Cr, pH
TB-110310	CAS	11/3/10	8260b

Comments:

Name: Rick Read **Date:** 11/30/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.025	3	33%
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	5.94
IX Effluent	6.03
Final Discharge	7.82

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	160		
Well Field Influent	160	68724100	17:11
IX Influent Flow Meter	160	80564200	17:09
AS Influent Flow Meter	160	50126843	17:07
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:

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	26
10 Micron 30 inch	15
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 12/13/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.025	3	33%
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	5.87
Pre-IX	6.01
IX Effluent	6.03
Final Discharge	7.83

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	160		
Well Field Influent	160	71544180	5:36
IX Influent Flow Meter	161	80847831	5:34
AS Influent Flow Meter	162	50665276	5:35
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)	55
Pre-Carbon Air Temperature (F^o)	75

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	26
10 Micron 30 inch	15
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes
INF-120210	CAS	12/2/10	8260b, T.Cr, pH
EFF-120210	CAS	12/2/10	8260b, T.Cr, pH
EFFD-120210	CAS	12/2/10	8260b, T.Cr, pH
TB-120210	CAS	12/2/10	8260b

Comments:

Name: Rick Read **Date:** 12/28/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.025	3	33%
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	6.03
Final Discharge	7.82

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	160		
Well Field Influent	159	71544180	16:12
IX Influent Flow Meter	161	80847831	16:02
AS Influent Flow Meter	161	50665276	16:08
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)	48
Pre-Carbon Air Temperature (F^o)	68

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	26
10 Micron 30 inch	15
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 01/17/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.025	3	33%
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	6.00
IX Effluent	6.03
Final Discharge	7.81

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	1158		
Well Field Influent	158	79365410	7:38
IX Influent Flow Meter	159	81630748	7:43
AS Influent Flow Meter	159	52257218	7:42
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	26
10 Micron 30 inch	15
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes
INF-010511	CAS	1/5/11	8260b, T. Cr, pH
EFF-010511	CAS	1/5/11	8260b, T. Cr, pH
EFFD-010511	CAS	1/5/11	8260b, T. Cr, pH
TB-010511	CAS	1/5/11	8260b

Comments:

Name: Rick Read **Date:** 01/26/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.025	3	33%
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	5.88
Pre-IX	6.01
IX Effluent	6.03
Final Discharge	7.83

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	158		
Well Field Influent	159	81463549	15:06
IX Influent Flow Meter	159	81840434	15:04
AS Influent Flow Meter	159	52653716	15:05
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:

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	26
10 Micron 30 inch	15
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 02/09/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.030	3	40%
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	5.89
Pre-IX	6.01
IX Effluent	6.03
Final Discharge	7.86

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	158		
Well Field Influent	159	84648050	16:47
IX Influent Flow Meter	159	82157117	16:45
AS Influent Flow Meter	159	53310961	16:46
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)	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	52
10 Micron 30 inch	35
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes
INF-020311	CAS	2/3/11	8260b, T.Cr, pH
EFF-020311	CAS	2/3/11	8260b, T.Cr, pH
EFFD-020311	CAS	2/3/11	8260b, T.Cr, pH
TB-020311	CAS	2/3/11	8260b

Comments:

Name: Rick Read **Date:** 02/22/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.075		
Primary	0.035	3	47%
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	6.02
IX Effluent	6.03
Final Discharge	7.89

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	158		
Well Field Influent	159	87575160	17:13
IX Influent Flow Meter	159	82448398	17:11
AS Influent Flow Meter	159	54026960	17:10
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:

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	52
10 Micron 30 inch	31
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:** 03/10/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.070		
Primary	0.035	3	50%
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	5.86
Pre-IX	6.00
IX Effluent	6.03
Final Discharge	7.89

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	158		
Well Field Influent	159	91132500	16:27
IX Influent Flow Meter	159	82803462	16:24
AS Influent Flow Meter	159	54701798	16:25
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	2
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	8
Canister Filters	
10 Micron 29.25 inch	52
10 Micron 30 inch	31
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes
INF-030711	CAS	3/7/11	8260b, T.Cr, pH
EFF-030711	CAS	3/7/11	8260b, T.Cr, pH
EFFD-030711	CAS	3/7/11	8260b, T.Cr, pH
TB-030711	CAS	3/7/11	8260b

Comments:

Name: Rick Read **Date:** 03/23/11

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.070		
Primary	0.035	3	50%
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	5.86
Pre-IX	6.00
IX Effluent	6.02
Final Discharge	7.88

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	160		
Well Field Influent	161	93827185	16:57
IX Influent Flow Meter	162	83093040	16:54
AS Influent Flow Meter	162	5522208	16:55
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	52
10 Micron 30 inch	31
20 Micron 29.25 inch	20
30 Micron 30 inch	
75 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes
INF-030711			
EFF-030711			
EFFD-030711			
TB-030711			

Comments:

Appendix C.2

OU-3 System Operation Tables

APPENDIX C.2 - TABLE 1A
OU-3 OCTOBER 2010 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
10/01/10	226,597	24.00	100.00%
10/02/10	226,692	24.00	100.00%
10/03/10	226,686	24.00	100.00%
10/04/10	226,733	24.00	100.00%
10/05/10	226,613	24.00	100.00%
10/06/10	226,581	24.00	100.00%
10/07/10	219,255	23.38	97.43%
10/08/10	226,361	24.00	100.00%
10/09/10	226,491	24.00	100.00%
10/10/10	226,226	24.00	100.00%
10/11/10	226,990	24.00	100.00%
10/12/10	226,853	24.00	100.00%
10/13/10	188,894	20.02	83.40%
10/14/10	226,950	24.00	100.00%
10/15/10	226,904	24.00	100.00%
10/16/10	226,752	24.00	100.00%
10/17/10	226,709	24.00	100.00%
10/18/10	226,623	23.87	99.44%
10/19/10	226,883	24.00	100.00%
10/20/10	226,829	24.00	100.00%
10/21/10	221,536	24.00	100.00%
10/22/10	226,168	24.00	100.00%
10/23/10	226,109	24.00	100.00%
10/24/10	216,963	23.07	96.11%
10/25/10	227,756	24.00	100.00%
10/26/10	227,617	24.00	100.00%
10/27/10	227,349	24.00	100.00%
10/28/10	227,315	24.00	100.00%
10/29/10	225,892	23.47	97.78%
10/30/10	234,124	24.00	100.00%
10/31/10	234,072	24.00	100.00%
Subtotals	**6,983,523**	**737.80**	**99.17%**
Scheduled Downtime/Maintenance[3]		0.66	
Total Hours/Month		744	
Total Operating Hours/Availability %		**738.46**	**99.26%**
Daily Breakdown		**October 2010**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		224,982	230,400
Maximum Daily Flow (gallons)		234,124	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		9336	
Average Daily Flow (hundreds of cubic feet)		301	

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 2010 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
11/01/10	234,038	24.00	100.00%
11/02/10	234,064	24.00	100.00%
11/03/10	233,813	24.00	100.00%
11/04/10	229,659	24.00	100.00%
11/05/10	226,707	24.00	100.00%
11/06/10	226,791	24.00	100.00%
11/07/10	227,122	24.00	100.00%[5]
11/08/10	227,204	24.00	100.00%
11/09/10	227,377	24.00	100.00%
11/10/10	227,508	24.00	100.00%
11/11/10	227,453	24.00	100.00%
11/12/10	227,526	23.73	98.89%
11/13/10	234,609	24.00	100.00%
11/14/10	234,825	24.00	100.00%
11/15/10	234,188	24.00	100.00%
11/16/10	234,044	24.00	100.00%
11/17/10	234,270	24.00	100.00%
11/18/10	234,660	24.00	100.00%
11/19/10	227,734	23.27	96.94%
11/20/10	233,523	24.00	100.00%
11/21/10	234,624	24.00	100.00%
11/22/10	235,069	24.00	100.00%
11/23/10	235,137	24.00	100.00%
11/24/10	233,099	23.85	99.38%
11/25/10	233,945	24.00	100.00%
11/26/10	234,958	24.00	100.00%
11/27/10	234,907	24.00	100.00%
11/28/10	234,888	24.00	100.00%
11/29/10	233,333	24.00	100.00%
11/30/10	231,404	24.00	100.00%
Subtotals	**6,958,479**	**718.85**	**99.84%**

Scheduled Downtime/Maintenance[3]	1.15	
Total Hours/Month	720	
Total Operating Hours/Availability %	**720.00**	**100.00%**
Daily Breakdown	**November 2010**	**Vancouver Permit Limits**[4]
Average Daily Flow (gallons)	231,949	230,400
Maximum Daily Flow (gallons)	235,137	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	9303	
Average Daily Flow (hundreds of cubic feet)	310	

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 7.

APPENDIX C.2 - TABLE 1C
OU-3 DECEMBER 2010 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
12/01/10	231,447	24.00	100.00%
12/02/10	231,358	24.00	100.00%
12/03/10	231,336	24.00	100.00%
12/04/10	231,416	24.00	100.00%
12/05/10	231,382	24.00	100.00%
12/06/10	231,352	24.00	100.00%
12/07/10	231,301	24.00	100.00%
12/08/10	231,432	24.00	100.00%
12/09/10	218,720	22.62	94.24%
12/10/10	229,622	24.00	100.00%
12/11/10	230,546	24.00	100.00%
12/12/10	228,670	23.85	99.38%
12/13/10	229,023	24.00	100.00%
12/14/10	229,229	24.00	100.00%
12/15/10	229,379	24.00	100.00%
12/16/10	229,872	24.00	100.00%
12/17/10	230,859	24.00	100.00%
12/18/10	230,830	24.00	100.00%
12/19/10	230,862	24.00	100.00%
12/20/10	170,634	17.70	73.75%
12/21/10	230,989	24.00	100.00%
12/22/10	230,876	24.00	100.00%
12/23/10	230,887	24.00	100.00%
12/24/10	225,970	24.00	100.00%
12/25/10	223,593	24.00	100.00%
12/26/10	223,515	24.00	100.00%
12/27/10	223,443	24.00	100.00%
12/28/10	225,069	23.88	99.51%
12/29/10	231,149	24.00	100.00%
12/30/10	228,799	23.68	98.68%
12/31/10	231,392	24.00	100.00%
Subtotals	**7,044,952**	**735.73**	**98.89%**

Scheduled Downtime/Maintenance[3]	0.59	
Total Hours/Month	744	
Total Operating Hours/Availability %	**736.32**	**98.97%**
Daily Breakdown	**December 2010**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)	227,119	230,400
Maximum Daily Flow (gallons)	231,447	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	9418	
Average Daily Flow (hundreds of cubic feet)	304	

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 2011 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
01/01/11	231,442	24.00	100.00%
01/02/11	231,439	24.00	100.00%
01/03/11	231,349	24.00	100.00%
01/04/11	215,141	22.92	95.49%
01/05/11	228,694	24.00	100.00%
01/06/11	231,277	24.00	100.00%
01/07/11	231,135	24.00	100.00%
01/08/11	231,277	24.00	100.00%
01/09/11	231,186	24.00	100.00%
01/10/11	231,147	24.00	100.00%
01/11/11	231,342	24.00	100.00%
01/12/11	231,153	24.00	100.00%
01/13/11	230,981	24.00	100.00%
01/14/11	217,069	22.52	93.82%
01/15/11	230,584	24.00	100.00%
01/16/11	230,616	24.00	100.00%
01/17/11	230,764	24.00	100.00%
01/18/11	230,983	24.00	100.00%
01/19/11	225,663	23.38	97.43%
01/20/11	231,304	24.00	100.00%
01/21/11	231,256	24.00	100.00%
01/22/11	231,282	24.00	100.00%
01/23/11	231,346	24.00	100.00%
01/24/11	231,288	24.00	100.00%
01/25/11	219,766	22.70	94.58%
01/26/11	231,821	24.00	100.00%
01/27/11	231,747	24.00	100.00%
01/28/11	231,660	24.00	100.00%
01/29/11	231,607	24.00	100.00%
01/30/11	231,685	24.00	100.00%
01/31/11	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 2011**	**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 2011 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
02/01/11	231,768	24.00	100.00%
02/02/11	231,832	24.00	100.00%
02/03/11	219,368	22.77	94.86%
02/04/11	231,892	24.00	100.00%
02/05/11	231,843	24.00	100.00%
02/06/11	231,546	24.00	100.00%
02/07/11	231,644	24.00	100.00%
02/08/11	231,700	24.00	100.00%
02/09/11	231,750	24.00	100.00%
02/10/11	231,842	24.00	100.00%
02/11/11	229,933	23.83	99.31%
02/12/11	213,078	21.13	88.06%
02/13/11	231,733	24.00	100.00%
02/14/11	231,681	24.00	100.00%
02/15/11	231,680	24.00	100.00%
02/16/11	228,202	23.62	98.40%
02/17/11	232,020	24.00	100.00%
02/18/11	232,058	24.00	100.00%
02/19/11	232,031	24.00	100.00%
02/20/11	232,026	24.00	100.00%
02/21/11	231,935	24.00	100.00%
02/22/11	231,942	24.00	100.00%
02/23/11	218,736	23.18	96.60%
02/24/11	224,073	24.00	100.00%
02/25/11	224,165	24.00	100.00%
02/26/11	219,927	22.85	95.21%
02/27/11	232,396	24.00	100.00%
02/28/11	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 2011**	**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 2011 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
03/01/11	228,913	23.62	98.40%
03/02/11	222,255	22.90	95.42%
03/03/11	223,900	23.17	96.53%
03/04/11	229,957	23.73	98.89%
03/05/11	232,478	24.00	100.00%
03/06/11	232,570	24.00	100.00%
03/07/11	232,616	24.00	100.00%
03/08/11	218,570	22.57	94.03%
03/09/11	232,434	24.00	100.00%
03/10/11	231,543	23.98	99.93%
03/11/11	232,715	23.58	98.26%
03/12/11	232,521	24.00	100.00%
03/13/11	221,354	22.42	97.46%
03/14/11	232,687	23.00	95.83%
03/15/11	225,297	23.23	96.81%
03/16/11	212,086	21.88	91.18%
03/17/11	224,905	23.27	96.94%
03/18/11	219,832	22.68	94.51%
03/19/11	224,133	23.08	96.18%
03/20/11	220,803	22.73	94.72%
03/21/11	229,012	23.57	98.19%
03/22/11	231,844	23.85	99.38%
03/23/11	231,010	23.77	99.03%
03/24/11	233,048	24.00	100.00%
03/25/11	233,048	24.00	100.00%
03/26/11	182,036	18.77	78.19%
03/27/11	233,085	24.00	100.00%
03/28/11	205,722	21.17	88.19%
03/29/11	228,394	23.50	97.92%
03/30/11	170,730	17.00	70.83%
03/31/11	231,936	23.85	99.38%
Subtotals	**6,941,436**	**713.32**	**95.88%**
Scheduled Downtime/Maintenance[3]		0.29	
Total Hours/Month		744	
Total Operating Hours/Availability %		**713.61**	**95.91%**
Daily Breakdown		**March 2011**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		223,650	230,400
Maximum Daily Flow (gallons)		233,085	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		9280	
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 2A

OU-3 EXTRACTION WELL PUMPING RATES FOR OCTOBER 2010
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	10.0	4089640	13:17
MW-6B	7.5	7035530	14:12
MW-10B	8.8	7021330	14:08
MW-10C	9.0	5063180	14:09
CPU-13	13.0	203457	13:42
MW-14C	12.0	7656820	14:02
MW-14E	5.4	3271550	14:03
MW-18D	12.4	4455480	13:59
MW-19D	11.3	5202720	13:53
MW-20D	15.6	94135	13:24
MW-21D	9.9	152631	13:32
MW-22D	11.4	302020	13:36
MW-25D	11.0	4343830	13:49
MW-26D	12.5	1516553	14:15
MW-27D	off		
AMW-27	1.0	6367475	13:47
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	12.8	6726080	13:46
Total	163.6		

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 2010
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	7.0	4533730	13:43
MW-6B	7.3	7363510	14:38
MW-10B	8.5	7397060	14:36
MW-10C	9.0	5479390	14:35
CPU-13	13.1	281455	14:05
MW-14C	12.0	8191490	14:31
MW-14E	5.4	3497470	14:32
MW-18D	12.4	5012850	14:27
MW-19D	11.3	5572420	14:23
MW-20D	15.0	183941	13:49
MW-21D	9.3	208505	13:56
MW-22D	11.2	370220	13:59
MW-25D	11.0	4840130	14:17
MW-26D	11.0	1959840	14:10
MW-27D	off		
AMW-27	1.0	5384900	14:15
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	13.0	7886110	14:13
Total	157.5		

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 2010
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	6.4	4827420	14:38
MW-6B	7.0	7688660	15:33
MW-10B	8.5	7773460	15:30
MW-10C	8.9	5895980	15:31
CPU-13	13.0	358689	15:05
MW-14C	12.0	8722720	15:27
MW-14E	5.4	3719770	15:28
MW-18D	12.5	5566480	15:22
MW-19D	11.3	6000080	15:17
MW-20D	15.1	272925	14:50
MW-21D	9.3	264002	14:57
MW-22D	11.5	438804	15:00
MW-25D	11.0	5331170	15:13
MW-26D	11.0	2382750	15:08
MW-27D	off		
AMW-27	1.0	5401540	15:36
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	13.0	8470580	15:10
Total	156.9		

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 2011
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	6.5	5093800	11:31
MW-6B	7.2	7975970	12:26
MW-10B	8.5	8126880	12:24
MW-10C	9.2	628720	12:23
CPU-13	13.1	430642	11:55
MW-14C	12.2	9218600	12:17
MW-14E	5.2	3924230	12:19
MW-18D	12.5	6082970	12:14
MW-19D	11.3	6463390	12:10
MW-20D	15.1	355838	11:41
MW-21D	9.5	315686	11:48
MW-22D	11.6	502366	11:51
MW-25D	11.0	5787710	12:05
MW-26D	11.0	2832610	11:59
MW-27D	off		
AMW-27	1.0	5416834	12:03
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	13.3	9011970	12:00
Total	158.2		

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 2011
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	6.5	5380680	15:50
MW-6B	7.2	8293490	16:45
MW-10B	8.5	8501730	16:43
MW-10C	9.2	1034440	16:42
CPU-13	13.1	565448	16:14
MW-14C	12.2	9756620	16:36
MW-14E	5.2	4153550	16:38
MW-18D	12.5	6634220	16:33
MW-19D	11.3	6961720	16:29
MW-20D	15.1	492435	16:00
MW-21D	9.5	413899	16:07
MW-22D	11.6	637917	16:10
MW-25D	11.0	6272810	16:24
MW-26D	11.0	3317710	16:18
MW-27D	off		
AMW-27	1.0	5460934	16:22
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	13.3	9598500	16:19
Total	158.2		

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 2011
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	6.5	5650120	15:44
MW-6B	7.6	8576170	16:40
MW-10B	9.0	8865180	16:38
MW-10C	9.7	7105960	16:37
CPU-13	13.1	580637	16:08
MW-14C	12.0	252170	16:32
MW-14E	5.0	4348660	16:33
MW-18D	12.4	76140200	16:28
MW-19D	11.1	7418460	16:22
MW-20D	15.1	528648	15:52
MW-21D	9.7	424069	15;58
MW-22D	11.9	636608	16:02
MW-25D	11.0	6740490	16:17
MW-26D	11.6	3767340	16:11
MW-27D	off	off	
AMW-27	1.0	5449220	16:15
MW-31	off	off	
MW-37	off	off	
AMW-42	off	off	
MW-48	off	off	
MW-49	13.6	145890	16:13
Total	160.3		

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

APPENDIX C.2 - TABLE 3
OCTOBER 2010 THROUGH MARCH 2011
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
Discharge Permit #20009-07 Discharge Limits			**330**		**1,700**	**5.5 to 9.0**
Infiltration Gallery Discharge Limits			**1.9**		**19**	
October 2010						
Influent	INF-100610	10/6/2010	20	1.5	56.1	6.88
Effluent	EFF-100610	10/6/2010	0.53	0.5 U	0.7 J	8.03
Effluent Duplicate	EFFD-100610	10/6/2010	0.46 J	0.5 U	0.6 J	8.03
Trip Blank	TB-100610	10/6/2010	0.5 U	0.5 U	NA	NA
November 2010						
Influent	INF-110310	11/3/2010	21	1.3	56.6	6.91
Effluent	EFF-110310	11/3/2010	0.48 J	0.5 U	2 U	8.08
Effluent Duplicate	EFFD-110310	11/3/2010	0.46 J	0.5 U	2 U	8.09
Trip Blank	TB-110310	11/3/2010	0.5 U	0.5 U	NA	NA
December 2010						
Influent	INF-12/2/2010	12/2/2010	21	1.3	59.7	6.84
Effluent	EFF-12/2/2010	12/2/2010	0.53	0.5 U	2 J	8.07
Effluent Duplicate	EFFD-12/2/2010	12/2/2010	0.53	0.5 U	2 U	8.12
Trip Blank	TB-12/2/2010	12/2/2010	0.5 U	0.5 U	NA	NA
January 2011						
Influent	INF-01/5/2011	1/5/2011	21	1.4	64.9	6.59
Effluent	EFF-01/5/2011	1/5/2011	0.53	0.5 U	0.7 J	7.95
Effluent Duplicate	EFFD-01/5/2011	1/5/2011	0.54	0.5 U	0.6 U	7.95
Trip Blank	TB-01/5/2011	1/5/2011	0.5 U	0.5 U	NA	NA
February 2011						
Influent	INF-02/3/2011	2/3/2011	20	1.4	57.9	6.83
Effluent	EFF-02/3/2011	2/3/2011	0.49 J	0.5 U	2 U	7.95
Effluent Duplicate	EFFD-02/3/2011	2/3/2011	0.45 J	0.5 U	2 U	8.06
Trip Blank	TB-02/3/2011	2/3/2011	0.5 U	0.5 U	NA	NA
March 2011						
Influent	INF-030711	3/7/2011	20	1.3	61.7	6.93
Effluent	EFF-030711	3/7/2011	0.51	0.5 U	1 J	7.97
Effluent Duplicate	EFFD-030711	3/7/2011	0.47 J	0.5 U	1.4 J	8.05
Trip Blank	TB-030711	3/7/2011	0.5 U	0.5 U	NA	NA

D - associated value is derived from analysis of a diluted sample
B/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

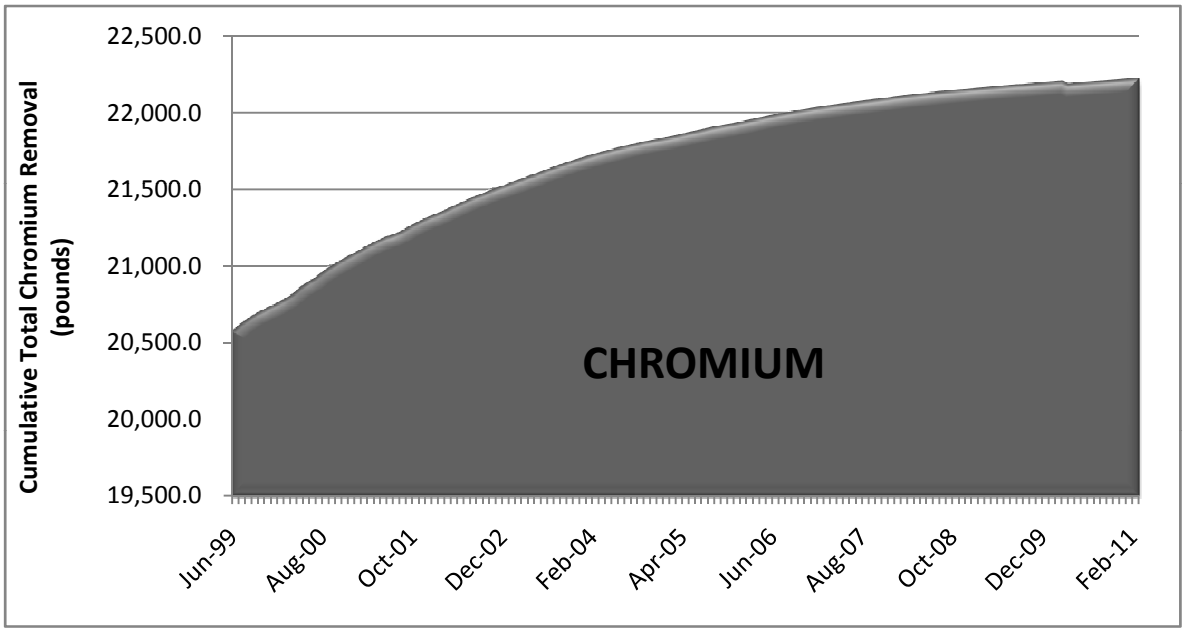
OU-3 Mass Removal Tables and Charts

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]						6,787.0	
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
Jan-09	6,549,104	76.3	21.0	4.2	1.1	22,150.5	2,135.7
Feb-09	6,161,087	73.4	23.0	3.8	1.2	22,154.2	2,136.9
Mar-09	6,827,012	71.6	24.0	4.1	1.4	22,158.3	2,138.3
Apr-09	6,587,133	70.7	25.0	3.9	1.4	22,162.2	2,139.7
May-09	6,808,120	66.3	23.0	3.8	1.3	22,166.0	2,141.0
Jun-09	6,624,855	69.9	23.0	3.9	1.3	22,169.9	2,142.3
Jul-09	6,898,307	66.7	22.0	3.8	1.3	22,173.7	2,143.5
Aug-09	6,753,887	60.2	24.0	3.4	1.4	22,177.1	2,144.9
Sep-09	6,231,056	33.8	10.0	1.8	0.5	22,178.9	2,145.4
Oct-09	6,921,469	64.2	23.0	3.7	1.3	22,182.6	2,146.7
Nov-09	6,593,625	63.7	24.0	3.5	1.3	22,186.1	2,148.0
Dec-09	6,588,997	66.2	25.0	3.6	1.4	22,189.7	2,149.4
Jan-10	6,659,770	63.1	22.0	3.5	1.2	22,193.2	2,150.6
Feb-10	6,316,735	66.4	22.0	3.5	1.2	22,196.7	2,151.8
Mar-10	6,979,482	64.4	21.0	3.8	1.2	22,200.5	2,153.0
Apr-10	6,771,580	64.4	21.0	3.6	1.2	22,182.5	2,146.6
May-10	7,011,044	63.5	20.0	3.7	1.2	22,186.2	2,147.8
Jun-10	6,706,252	63.4	21.0	3.6	1.2	22,189.8	2,148.9
Jul-10	6,982,435	59.7	17.0	3.5	1.0	22,193.2	2,149.9
Aug-10	6,976,736	57.1	22.0	3.3	1.3	22,196.6	2,151.2
Sep-10	6,636,056	51.4	21.0	2.8	1.2	22,199.4	2,152.4
Oct-10	6,983,523	56.1	20.0	3.3	1.2	22,202.7	2,153.5
Nov-10	6,958,479	56.6	21.0	3.3	1.2	22,206.0	2,154.8
Dec-10	7,044,952	59.7	21.0	3.5	1.2	22,209.5	2,156.0
Jan-11	7,119,637	64.9	21.0	3.9	1.2	22,213.3	2,157.2
Feb-11	6,415,188	57.9	20.0	3.1	1.1	22,216.4	2,158.3
Mar-11	6,941,436	61.7	20.0	3.6	1.2	22,220.0	2,159.5

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



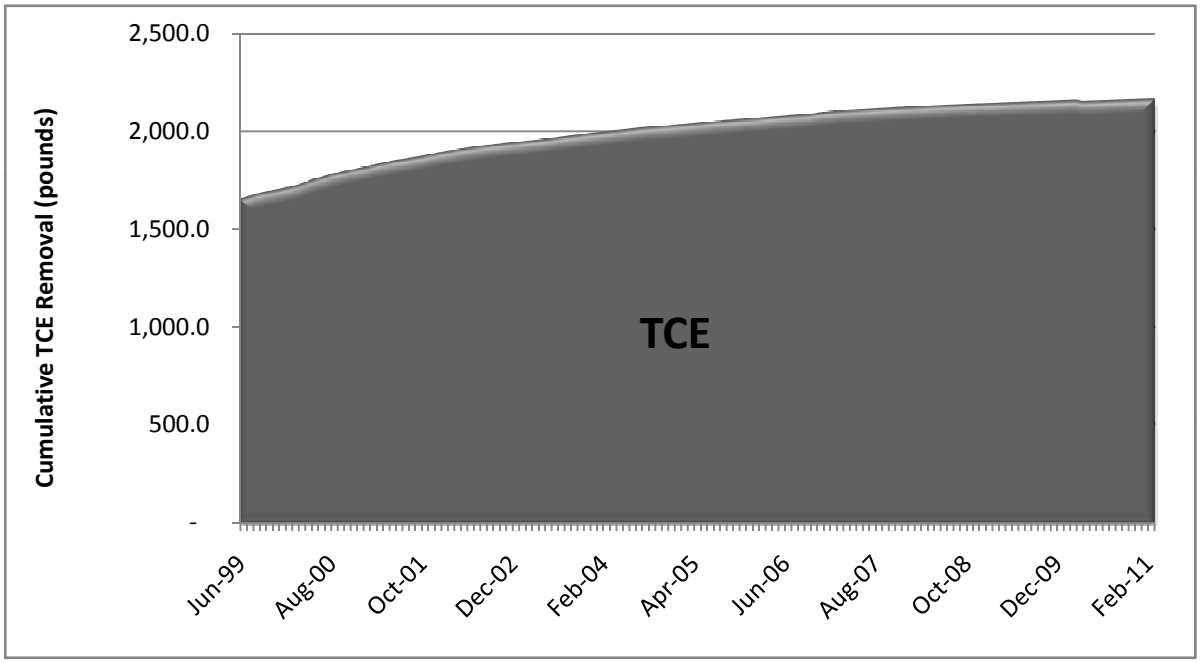
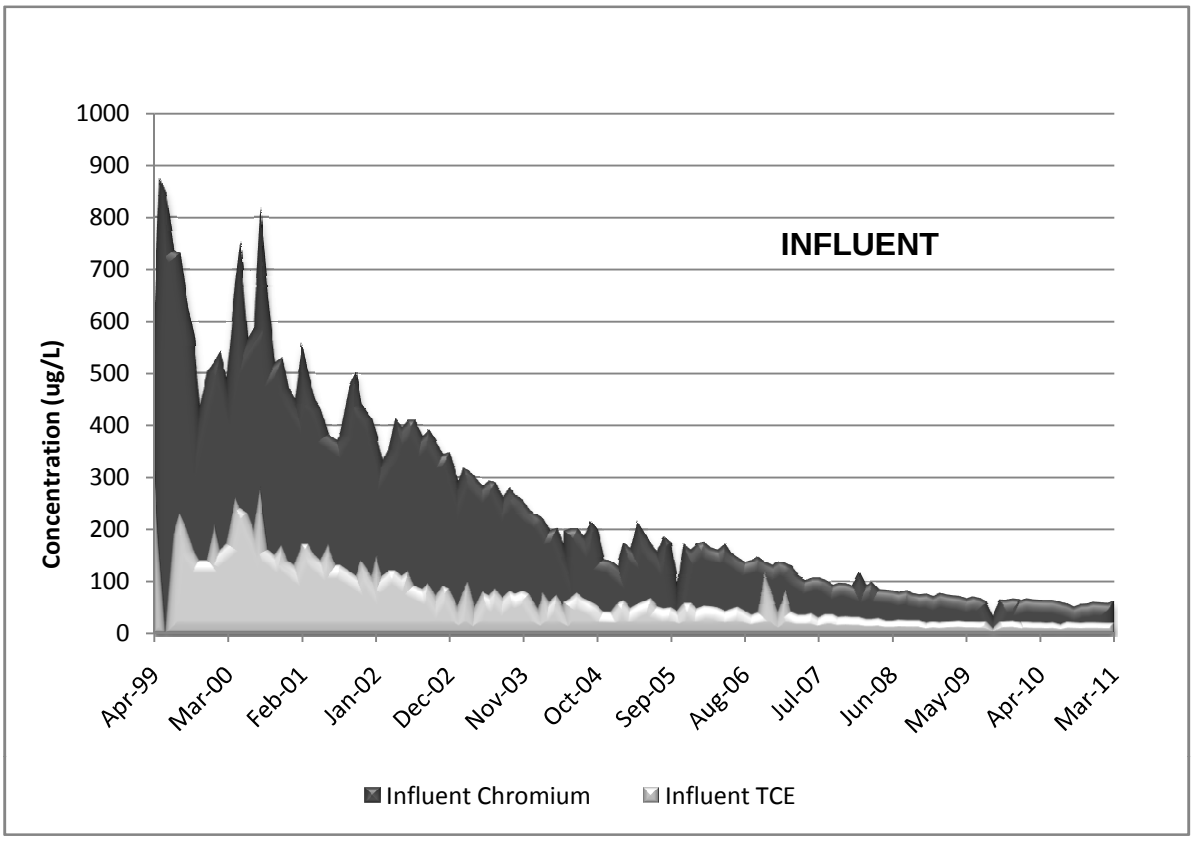


FIGURE C.3.2. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME



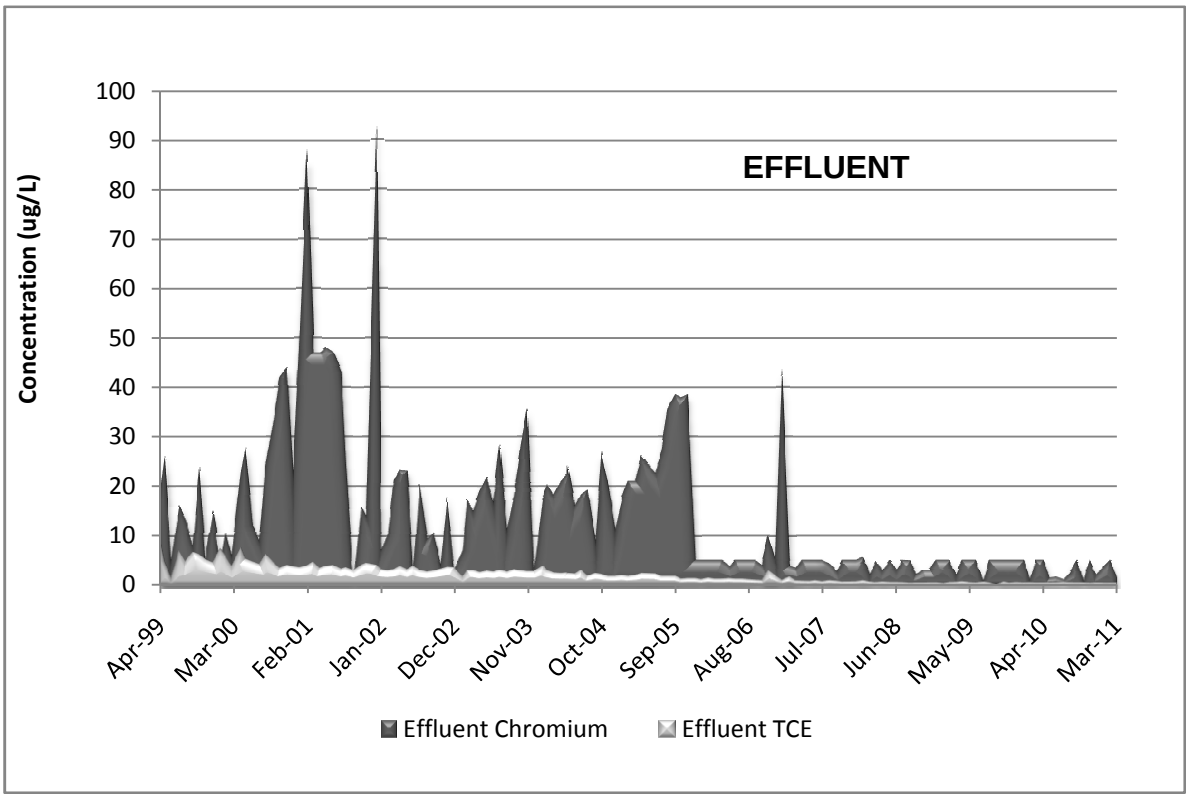
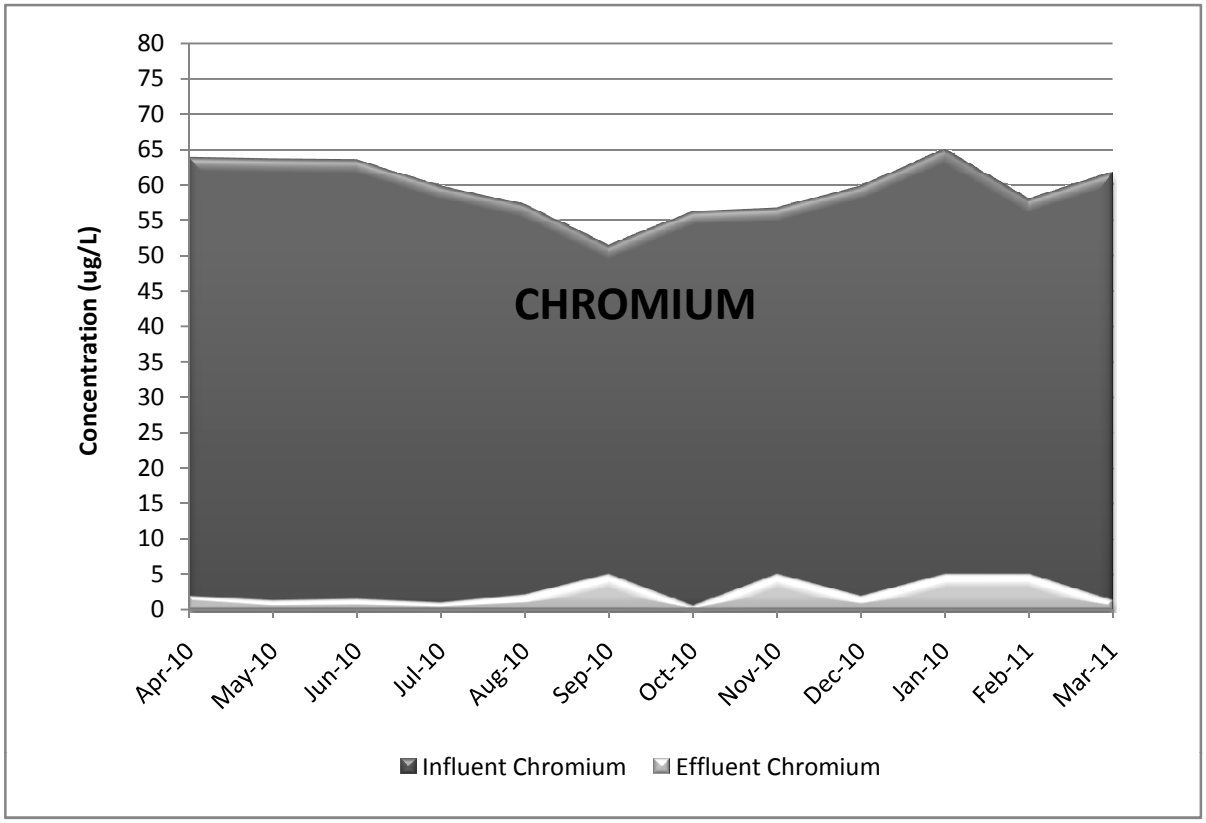


FIGURE C.3-3. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS OVER 1 YEAR



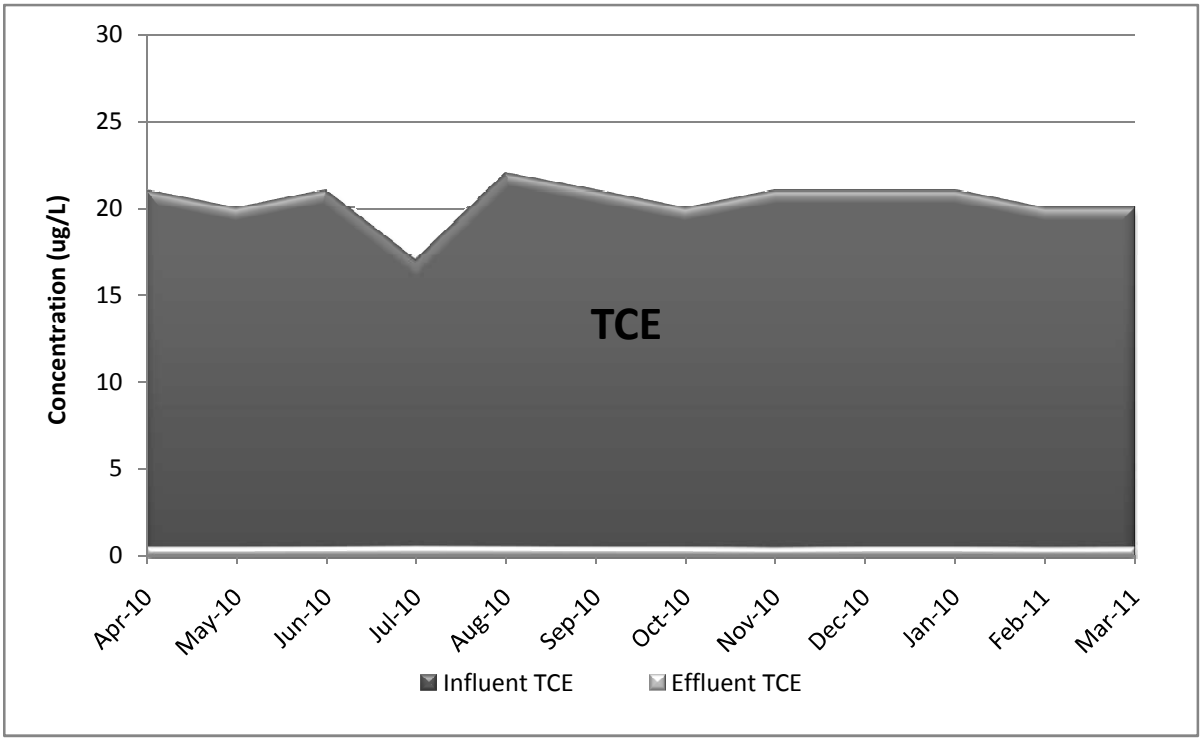
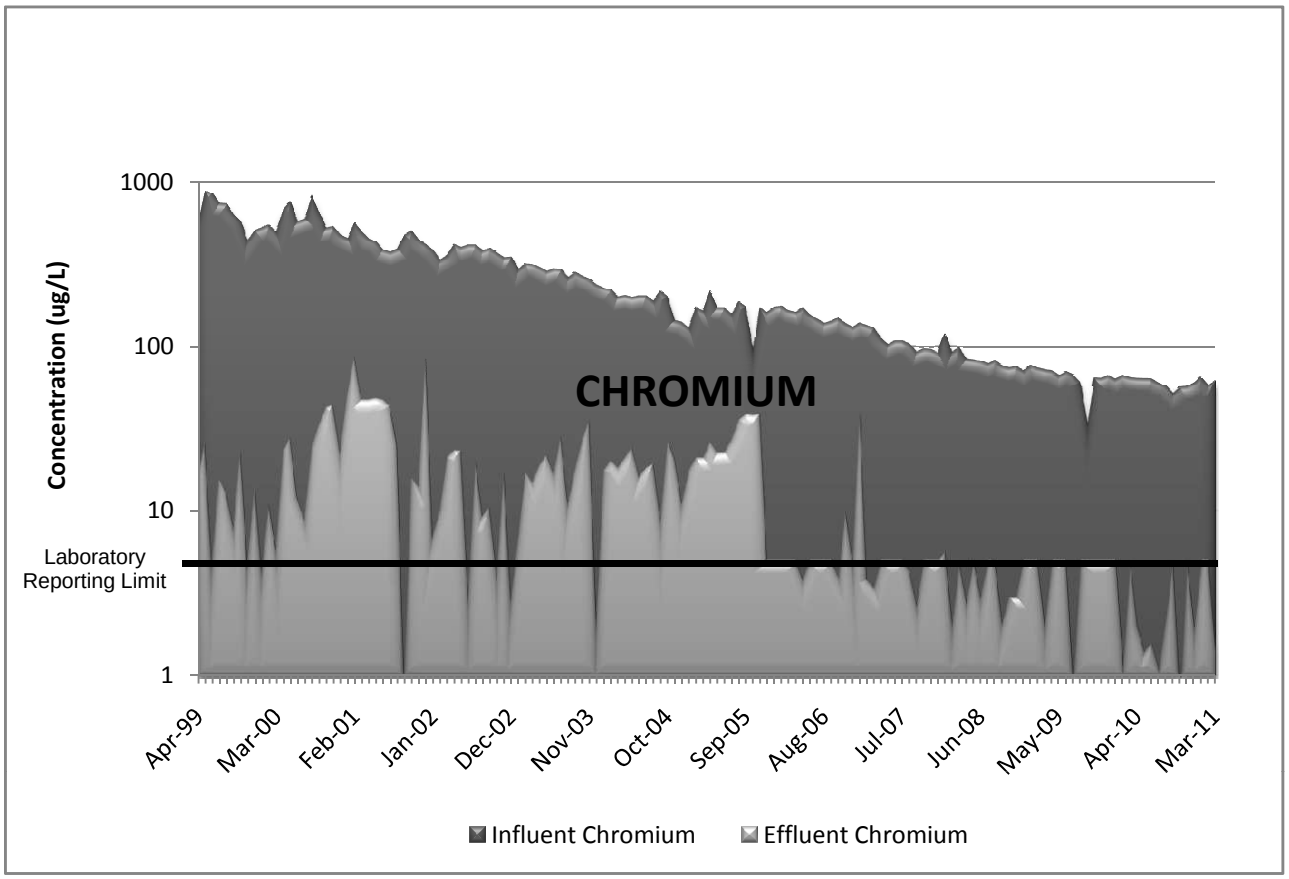
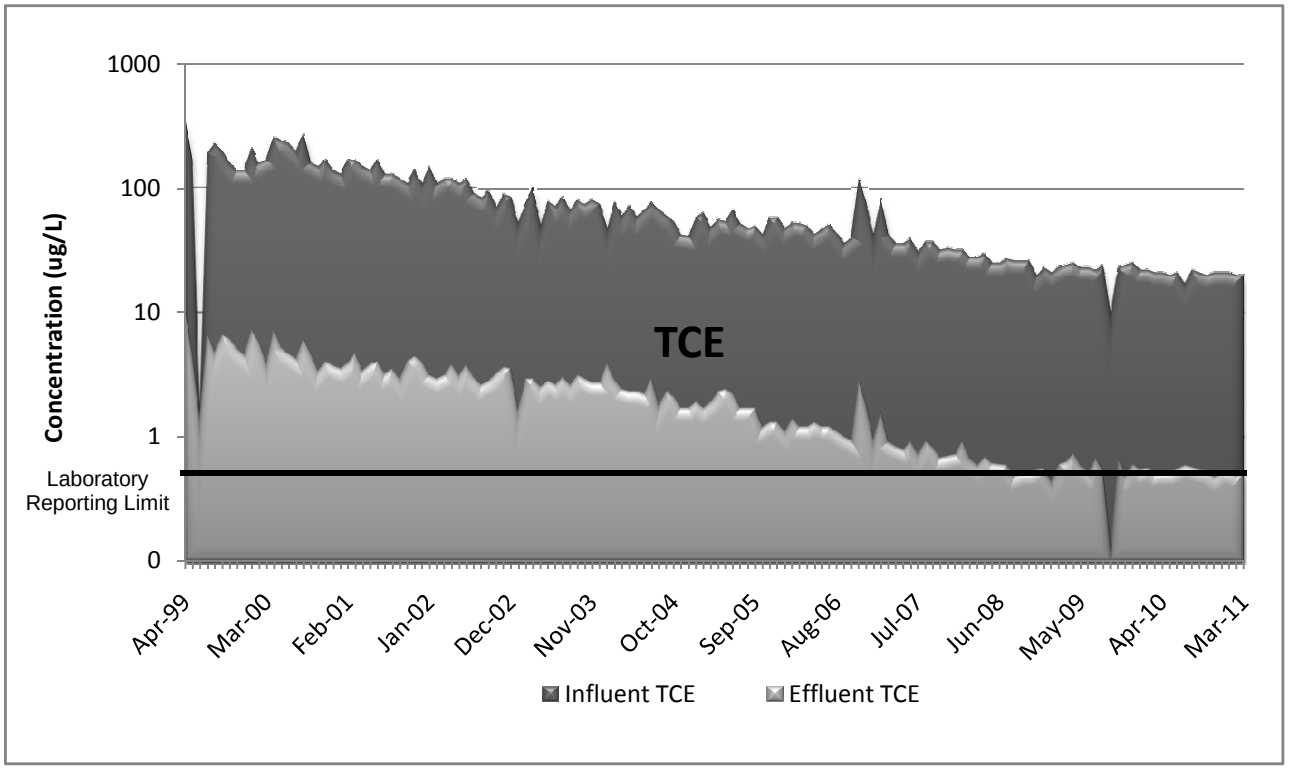


FIGURE C.3-4. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME - LOGARITHMIC SCALE





Appendix C.4

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

P.O. Box 1995
Vancouver, WA 98668-1995

City of VANCOUVER WASHINGTON

www.ci.vancouver.wa.us

City of Vancouver
Industrial Sewer Billing Form

For: Linde LLC – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date November 5, 2010 (for October 2010)	Measured Discharge	
	Gallons	Hundreds of Cubic Feet
Total	0	0
Average per day	0	0

Note: The infiltration gallery was put into operation in February 2006.
Water flowed to the sewer 0 days in October 2010.

Signature: Jil M J Date: 11.5.10

Deliver Form to the City by the 10th of each month.

Mailing Address: City of Vancouver - Industrial Pretreatment
Marine Park Engineering
PO Box 1995
Vancouver, WA 98668
Attn: Johnny Leuthold

Or Fax: 360-487-7139

P.O. Box 1995
Vancouver, WA 98668-1995

City of VANCOUVER WASHINGTON

www.ci.vancouver.wa.us

City of Vancouver
Industrial Sewer Billing Form

For: Linde LLC – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date December 7, 2010 (for November 2010)	Measured Discharge	
	Gallons	Hundreds of Cubic Feet
Total	0	0
Average per day	0	0

Note: The infiltration gallery was put into operation in February 2006.
Water flowed to the sewer 0 days in November 2010.

Signature: Jil M Z Date: 12.7.10

Deliver Form to the City by the 10th of each month.

Mailing Address: City of Vancouver - Industrial Pretreatment
Marine Park Engineering
PO Box 1995
Vancouver, WA 98668
Attn: Johnny Leuthold

Or Fax: 360-487-7139

P.O. Box 1995
Vancouver, WA 98668-1995

City of VANCOUVER WASHINGTON

www.ci.vancouver.wa.us

City of Vancouver
Industrial Sewer Billing Form

For: Linde LLC – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date January7, 2011 (for December 2010)	Measured Discharge	
	Gallons	Hundreds of Cubic Feet
Total	0	0
Average per day	0	0

Note: The infiltration gallery was put into operation in February 2006.
Water flowed to the sewer 0 days in December 2010.

Signature: Jil M Z Date: 1.7.11

Deliver Form to the City by the 10th of each month.

Mailing Address: City of Vancouver - Industrial Pretreatment
Marine Park Engineering
PO Box 1995
Vancouver, WA 98668
Attn: Johnny Leuthold

Or Fax: 360-487-7139

P.O. Box 1995
Vancouver, WA 98668-1995

City of VANCOUVER WASHINGTON

www.ci.vancouver.wa.us

City of Vancouver
Industrial Sewer Billing Form

For: Linde LLC – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date February 8, 2011 (for January 2011)	Measured Discharge	
	Gallons	Hundreds of Cubic Feet
Total	0	0
Average per day	0	0

Note: The infiltration gallery was put into operation in February 2006.
Water flowed to the sewer 0 days in January 2011.

Signature: Jil M Z Date: 2.8.11

Deliver Form to the City by the 10th of each month.

Mailing Address: City of Vancouver - Industrial Pretreatment
Marine Park Engineering
PO Box 1995
Vancouver, WA 98668
Attn: Johnny Leuthold

Or Fax: 360-487-7139

P.O. Box 1995
Vancouver, WA 98668-1995

City of VANCOUVER WASHINGTON

www.ci.vancouver.wa.us

City of Vancouver
Industrial Sewer Billing Form

For: Linde LLC – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date March 4, 2011 (for February 2011)	Measured Discharge	
	Gallons	Hundreds of Cubic Feet
Total	0	0
Average per day	0	0

Note: The infiltration gallery was put into operation in February 2006.
Water flowed to the sewer 0 days in February 2011.

Signature: Jil Frain Date: 3.4.11

Deliver Form to the City by the 10th of each month.

Mailing Address: City of Vancouver - Industrial Pretreatment
Marine Park Engineering
PO Box 1995
Vancouver, WA 98668
Attn: Johnny Leuthold

Or Fax: 360-487-7139

P.O. Box 1995
Vancouver, WA 98668-1995

City of VANCOUVER WASHINGTON

www.ci.vancouver.wa.us

City of Vancouver
Industrial Sewer Billing Form

For: Linde LLC – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date April 8, 2011 (for March 2011)	Measured Discharge	
	Gallons	Hundreds of Cubic Feet
Total	0	0
Average per day	0	0

Note: The infiltration gallery was put into operation in February 2006.
Water flowed to the sewer 0 days in March 2011.

Signature: Jil Mj Date: 4.8.11

Deliver Form to the City by the 10th of each month.

Mailing Address: City of Vancouver - Industrial Pretreatment
Marine Park Engineering
PO Box 1995
Vancouver, WA 98668
Attn: Johnny Leuthold

Or Fax: 360-487-7139

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

Semi-Annual Self-Monitoring Report

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

Lab Contracted for Analysis: Columbia Analytical Services

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	0.0011 J	1.7 mg/L	G	July 7, 2010/EA
Trichloroethene** – mg/L	0.00059	0.33 mg/L	G	July 7, 2010/EA
pH (high/low) – SU	7.97/7.90	9.0/5.5 SU	G	July 7, 2010/EA
Month 2 - August				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.0022 J	1.7 mg/L	G	August 4, 2010/EA
Trichloroethene** – mg/L	0.00057	0.33 mg/L	G	August 4, 2010/EA
pH (high/low) - SU	7.98/7.92	9.0/5.5 SU	G	August 4, 2010/EA
Month 3 - September				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.002 U	1.7 mg/L	G	September 7, 2010/EA
Trichloroethene** – mg/L	0.00054	0.33 mg/L	G	September 7, 2010/EA
pH (high/low) - SU	7.92/7.63	9.0/5.5 SU	G	September 7, 2010/EA
Month 4 - October				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.0007 J	1.7 mg/L	G	October 6, 2010/EA
Trichloroethene** – mg/L	0.00053	0.33 mg/L	G	October 6, 2010/EA
pH (high/low) – SU	8.03/8.03	9.0/5.5 SU	G	October 6, 2010/EA
Month 5 - November				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.002 U	1.7 mg/L	G	November 3, 2010/EA
Trichloroethene** – mg/L	0.00048 J	0.33 mg/L	G	November 3, 2010/EA
pH (high/low) - SU	8.09/8.08	9.0/5.5 SU	G	November 3 2010/EA
Month 6 -				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.002 J	1.7 mg/L	G	December 12, 2010/EA
Trichloroethene** – mg/L	0.00053	0.33 mg/L	G	December 12, 2010/EA
pH (high/low) - SU	8.12/8.07	9.0/5.5 SU	G	December 12, 2010/EA

Parameter	Value – mg/L	Limit	No. Samples
Semi-Annual Average - Chrome	0.0016	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] *Signature*

Head of WS SHEA Operations *Title*

1/4/11 *Date*

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value that was detected outside the quantitation range.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value that was detected outside the quantitation range.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

October 6, 2010
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1011064
Project:	Boomsnub/14495.07.2010.040-03	**Date Received:**	10/06/10
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 III 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 10/06/10. 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 8260B

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

Approved by _____ Date 11/18/10

Columbia Analytical Services

CHAIN OF CUSTODY

SR#: K1011064

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	14495.07.2010.040-03
PROJECT MANAGER	Jil Frain
COMPANY/ADDRESS	EA Engineering
	12011 NE 1st St. Suite 100
CITY/STATE/ZIP	Bellevue, WA. 98005
E-MAIL ADDRESS	jfrain@eaest.com
PHONE #	(425) 451-7400
FAX #	(425) 451-7800
SAMPLER'S SIGNATURE	Rick 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☐	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	Hex-Chrom☐	TOX 9020☐ AOX 1650☐ 506☐					REMARKS
INF-100610	10/6/10	8:00		H_2O	5		X								X		X							
EFF-100610	↓	8:05		↓	5		X								X		X							
EFFD-100610	↓	8:10		↓	5		X								X		X							
TB-100610	↓	NA	43816	↓	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

10/25/10 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: Rick Read	Signature:	Signature:	Signature:
Date/Time: 10/6/10 8:20	Date/Time: 10/6/10 1200	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: S HOPKINS	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

RCOC #1 03/10

8

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1011064
Project:	Boomsnub/14495.07.2010.040-03	**Date Collected:**	10/ 6/10
Sample Matrix:	Water	**Date Received:**	10/ 6/10
		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
INF-100610	K1011064-001	**6.88**		-		1	NA	10/6/10 16:04
EFF-100610	K1011064-002	**8.03**		-		1	NA	10/6/10 16:05
EFFD-100610	K1011064-003	**8.03**		-		1	NA	10/6/10 16:06

METALS

-1-
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1011064
Project No.:	14495.07.2010.040-03	**Date Collected:**	10/6/2010
Project Name:	Boomsnub	**Date Received:**	10/6/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-100610 **Lab Code:** K1011064-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	10/29/10	11/02/10	56.1		

% Solids: 0.0

Comments:

METALS

-1-
INORGANIC ANALYSIS DATA PACKAGE

Client: EA Engineering, Science, and Tec
Project No.: 14495.07.2010.040-03
Project Name: Boomsnub
Matrix: WATER

Service Request: K1011064
Date Collected: 10/6/2010
Date Received: 10/6/2010
Units: ug/L
Basis: N/A

Sample Name: EFF-100610
Lab Code: K1011064-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	10/29/10	11/02/10	0.7	J	

% Solids: 0.0

Comments:

METALS

- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1011064
Project No.:	14495.07.2010.040-03	**Date Collected:**	10/6/2010
Project Name:	Boomsnub	**Date Received:**	10/6/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-100610 **Lab Code:** K1011064-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	10/29/10	11/02/10	0.6	J	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1011064
Project:	Boomsnub/14495.07.2010.040-03	**Date Collected:**	10/06/2010
Sample Matrix:	Water	**Date Received:**	10/06/2010

Volatile Organic Compounds

Sample Name:	INF-100610	**Units:**	ug/L
Lab Code:	K1011064-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Trichlorofluoromethane	**0.52**		0.50	0.12	1	10/18/10	10/18/10	KWG1011218	
1,1-Dichloroethene	**0.87**		0.50	0.074	1	10/18/10	10/18/10	KWG1011218	
Methylene Chloride	ND	U	2.0	0.17	1	10/18/10	10/18/10	KWG1011218	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
cis-1,2-Dichloroethene	**0.36**	J	0.50	0.067	1	10/18/10	10/18/10	KWG1011218	
1,1,1-Trichloroethane (TCA)	**0.17**	J	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/18/10	10/18/10	KWG1011218	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/18/10	10/18/10	KWG1011218	
Trichloroethene (TCE)	**20**		0.50	0.10	1	10/18/10	10/18/10	KWG1011218	
Bromodichloromethane	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
Tetrachloroethene (PCE)	**1.5**		0.50	0.099	1	10/18/10	10/18/10	KWG1011218	
Dibromochloromethane	ND	U	0.50	0.14	1	10/18/10	10/18/10	KWG1011218	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/18/10	10/18/10	KWG1011218	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/18/10	10/18/10	KWG1011218	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/18/10	10/18/10	KWG1011218	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	10/18/10	Acceptable
Toluene-d8	93	78-129	10/18/10	Acceptable
4-Bromofluorobenzene	87	68-117	10/18/10	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.040-03
Sample Matrix: Water

Service Request: K1011064
Date Collected: 10/06/2010
Date Received: 10/06/2010

Volatile Organic Compounds

Sample Name: EFF-100610
Lab Code: K1011064-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	10/18/10	10/18/10	KWG1011218	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/18/10	10/18/10	KWG1011218	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/18/10	10/18/10	KWG1011218	
Methylene Chloride	ND	U	2.0	0.17	1	10/18/10	10/18/10	KWG1011218	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/18/10	10/18/10	KWG1011218	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/18/10	10/18/10	KWG1011218	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/18/10	10/18/10	KWG1011218	
Trichloroethene (TCE)	**0.53**		0.50	0.10	1	10/18/10	10/18/10	KWG1011218	
Bromodichloromethane	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/18/10	10/18/10	KWG1011218	
Dibromochloromethane	ND	U	0.50	0.14	1	10/18/10	10/18/10	KWG1011218	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/18/10	10/18/10	KWG1011218	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/18/10	10/18/10	KWG1011218	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/18/10	10/18/10	KWG1011218	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	73-122	10/18/10	Acceptable
Toluene-d8	91	78-129	10/18/10	Acceptable
4-Bromofluorobenzene	87	68-117	10/18/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1011064
Project:	Boomsnub/14495.07.2010.040-03	**Date Collected:**	10/06/2010
Sample Matrix:	Water	**Date Received:**	10/06/2010

Volatile Organic Compounds

Sample Name:	EFFD-100610	**Units:**	ug/L
Lab Code:	K1011064-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/18/10	10/18/10	KWG1011218	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/18/10	10/18/10	KWG1011218	
Methylene Chloride	ND	U	2.0	0.17	1	10/18/10	10/18/10	KWG1011218	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/18/10	10/18/10	KWG1011218	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/18/10	10/18/10	KWG1011218	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/18/10	10/18/10	KWG1011218	
Trichloroethene (TCE)	**0.46**	J	0.50	0.10	1	10/18/10	10/18/10	KWG1011218	
Bromodichloromethane	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/18/10	10/18/10	KWG1011218	
Dibromochloromethane	ND	U	0.50	0.14	1	10/18/10	10/18/10	KWG1011218	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/18/10	10/18/10	KWG1011218	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/18/10	10/18/10	KWG1011218	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/18/10	10/18/10	KWG1011218	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	73-122	10/18/10	Acceptable
Toluene-d8	92	78-129	10/18/10	Acceptable
4-Bromofluorobenzene	86	68-117	10/18/10	Acceptable

Comments:

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1011064
Project:	Boomsnub/14495.07.2010.040-03	**Date Collected:**	10/06/2010
Sample Matrix:	Water	**Date Received:**	10/06/2010

Volatile Organic Compounds

Sample Name:	TB-100610	**Units:**	ug/L
Lab Code:	K1011064-004	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/18/10	10/18/10	KWG1011218	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/18/10	10/18/10	KWG1011218	
Methylene Chloride	ND	U	2.0	0.17	1	10/18/10	10/18/10	KWG1011218	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/18/10	10/18/10	KWG1011218	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/18/10	10/18/10	KWG1011218	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/18/10	10/18/10	KWG1011218	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/18/10	10/18/10	KWG1011218	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	10/18/10	10/18/10	KWG1011218	
Bromodichloromethane	ND	U	0.50	0.091	1	10/18/10	10/18/10	KWG1011218	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	10/18/10	10/18/10	KWG1011218	
Dibromochloromethane	ND	U	0.50	0.14	1	10/18/10	10/18/10	KWG1011218	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/18/10	10/18/10	KWG1011218	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/18/10	10/18/10	KWG1011218	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/18/10	10/18/10	KWG1011218	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	10/18/10	Acceptable
Toluene-d8	93	78-129	10/18/10	Acceptable
4-Bromofluorobenzene	88	68-117	10/18/10	Acceptable

Comments:

November 3, 2010
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science, and Technology	**Service Request No.:**	K1012325
Project:	Boomsnub/14495.07.2010.0040.03	**Date Received:**	11/03/10
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 III 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 11/03/10. 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 8260B

Surrogate Exceptions:
The control criteria were exceeded for Toluene-d8 in sample Batch QCDMS KWG1012287-2. The associated duplicate matrix spike recoveries of target compounds were in control, indicating the analysis was in control. The surrogate outlier was flagged accordingly. No further corrective action was appropriate.

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

Approved by _____ **Date** 12/09/10

CHAIN OF CUSTODY

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

SR#: K1012325

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.07.2010.0040.03
PROJECT MANAGER: J. Frain
COMPANY/ADDRESS: EA Engineering
12011 NE 1st Street, Suite 100
CITY/STATE/ZIP: Bellevue, WA 98005
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☒	Hydrocarbons (*see below) Gas☐ 8021☐ BTEX☐ Diesel☐ Oil☐	Fuel Fingerprint (FIQ)☐ NW-HCID Screen☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHs 8310☐ SIM☐	Metals, (Total or Dissolved) (See list below)	Cyanide☐	(pH) Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle) Hex-Chrom☐	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
INF-110310	11/3/10	8:20		H_2O	5		X								X		X			
EFF-110310		8:25			5		X								X		X			
EFFD-110310		8:30			5		X								X		X			
TB-110310		NA	44061		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
11/22/10 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: 11/3/10 8:45	Date/Time: 11/3/10 1315	Date/Time:	Date/Time:
Printed Name: Rick READ	Printed Name: S HOOKINS	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1012325
Project:	Boomsnub/14495.07.2010.0040.03	**Date Collected:**	11/ 3/10
Sample Matrix:	Water	**Date Received:**	11/ 3/10
		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-110310	K1012325-001	6.91		-		1	NA	11/3/10 02:54	
EFF-110310	K1012325-002	8.08		-		1	NA	11/3/10 02:57	
EFFD-110310	K1012325-003	8.09		-		1	NA	11/3/10 02:58	

METALS

-1-
INORGANIC ANALYSIS DATA PACKAGE

Client: EA Engineering, Science, and Tec
Service Request: K1012325
Project No.: 14495.07.2010.0040.03
Date Collected: 11/3/2010
Project Name: Boomsnub
Date Received: 11/3/2010
Matrix: WATER
Units: ug/L
Basis: NA

Sample Name: INF-110310
Lab Code: K1012325-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/29/10	12/02/10	56.6		

% Solids: 0.0

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1012325
Project No.:	14495.07.2010.0040.03	**Date Collected:**	11/3/2010
Project Name:	Boomsnub	**Date Received:**	11/3/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **EFF-110310** **Lab Code:** **K1012325-002**

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/29/10	12/02/10	2.0	U	

% Solids: 0.0

Comments:

METALS

-1-
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1012325
Project No.:	14495.07.2010.0040.03	**Date Collected:**	11/3/2010
Project Name:	Boomsnub	**Date Received:**	11/3/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **EFFD-110310** **Lab Code:** **K1012325-003**

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/29/10	12/02/10	2.0	U	

% Solids: **0.0**

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1012325
Project:	Boomsnub/14495.07.2010.0040.03	**Date Collected:**	11/03/2010
Sample Matrix:	Water	**Date Received:**	11/03/2010

Volatile Organic Compounds

Sample Name:	INF-110310	**Units:**	ug/L
Lab Code:	K1012325-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	11/11/10	11/11/10	KWG1012287	
Trichlorofluoromethane	**0.42**	J	0.50	0.12	1	11/11/10	11/11/10	KWG1012287	
1,1-Dichloroethene	**0.74**		0.50	0.074	1	11/11/10	11/11/10	KWG1012287	
Methylene Chloride	ND	U	2.0	0.17	1	11/11/10	11/11/10	KWG1012287	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
cis-1,2-Dichloroethene	**0.31**	J	0.50	0.067	1	11/11/10	11/11/10	KWG1012287	
1,1,1-Trichloroethane (TCA)	**0.14**	J	0.50	0.075	1	11/11/10	11/11/10	KWG1012287	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/11/10	11/11/10	KWG1012287	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/11/10	11/11/10	KWG1012287	
Trichloroethene (TCE)	**21**		0.50	0.10	1	11/11/10	11/11/10	KWG1012287	
Bromodichloromethane	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
Tetrachloroethene (PCE)	**1.3**		0.50	0.099	1	11/11/10	11/11/10	KWG1012287	
Dibromochloromethane	ND	U	0.50	0.14	1	11/11/10	11/11/10	KWG1012287	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/11/10	11/11/10	KWG1012287	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/11/10	11/11/10	KWG1012287	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/11/10	11/11/10	KWG1012287	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	106	73-122	11/11/10	Acceptable
Toluene-d8	118	78-129	11/11/10	Acceptable
4-Bromofluorobenzene	93	68-117	11/11/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.0040.03
Sample Matrix: Water

Service Request: K1012325
Date Collected: 11/03/2010
Date Received: 11/03/2010

Volatile Organic Compounds

Sample Name: EFF-110310
Lab Code: K1012325-002

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	11/11/10	11/11/10	KWG1012287	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/11/10	11/11/10	KWG1012287	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/11/10	11/11/10	KWG1012287	
Methylene Chloride	ND	U	2.0	0.17	1	11/11/10	11/11/10	KWG1012287	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/11/10	11/11/10	KWG1012287	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/11/10	11/11/10	KWG1012287	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/11/10	11/11/10	KWG1012287	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/11/10	11/11/10	KWG1012287	
Trichloroethene (TCE)	**0.48**	J	0.50	0.10	1	11/11/10	11/11/10	KWG1012287	
Bromodichloromethane	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/11/10	11/11/10	KWG1012287	
Dibromochloromethane	ND	U	0.50	0.14	1	11/11/10	11/11/10	KWG1012287	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/11/10	11/11/10	KWG1012287	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/11/10	11/11/10	KWG1012287	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/11/10	11/11/10	KWG1012287	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	106	73-122	11/11/10	Acceptable
Toluene-d8	116	78-129	11/11/10	Acceptable
4-Bromofluorobenzene	104	68-117	11/11/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1012325
Project:	Boomsnub/14495.07.2010.0040.03	**Date Collected:**	11/03/2010
Sample Matrix:	Water	**Date Received:**	11/03/2010

Volatile Organic Compounds

Sample Name:	EFFD-110310	**Units:**	ug/L
Lab Code:	K1012325-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	11/11/10	11/11/10	KWG1012287	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/11/10	11/11/10	KWG1012287	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/11/10	11/11/10	KWG1012287	
Methylene Chloride	ND	U	2.0	0.17	1	11/11/10	11/11/10	KWG1012287	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/11/10	11/11/10	KWG1012287	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/11/10	11/11/10	KWG1012287	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/11/10	11/11/10	KWG1012287	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/11/10	11/11/10	KWG1012287	
Trichloroethene (TCE)	**0.46**	J	0.50	0.10	1	11/11/10	11/11/10	KWG1012287	
Bromodichloromethane	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/11/10	11/11/10	KWG1012287	
Dibromochloromethane	ND	U	0.50	0.14	1	11/11/10	11/11/10	KWG1012287	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/11/10	11/11/10	KWG1012287	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/11/10	11/11/10	KWG1012287	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/11/10	11/11/10	KWG1012287	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	11/11/10	Acceptable
Toluene-d8	109	78-129	11/11/10	Acceptable
4-Bromofluorobenzene	93	68-117	11/11/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.0040.03
Sample Matrix: Water

Service Request: K1012325
Date Collected: 11/03/2010
Date Received: 11/03/2010

Volatile Organic Compounds

Sample Name: TB-110310
Lab Code: K1012325-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	11/11/10	11/11/10	KWG1012287	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/11/10	11/11/10	KWG1012287	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/11/10	11/11/10	KWG1012287	
Methylene Chloride	ND	U	2.0	0.17	1	11/11/10	11/11/10	KWG1012287	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/11/10	11/11/10	KWG1012287	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/11/10	11/11/10	KWG1012287	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/11/10	11/11/10	KWG1012287	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/11/10	11/11/10	KWG1012287	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	11/11/10	11/11/10	KWG1012287	
Bromodichloromethane	ND	U	0.50	0.091	1	11/11/10	11/11/10	KWG1012287	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	11/11/10	11/11/10	KWG1012287	
Dibromochloromethane	ND	U	0.50	0.14	1	11/11/10	11/11/10	KWG1012287	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/11/10	11/11/10	KWG1012287	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/11/10	11/11/10	KWG1012287	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/11/10	11/11/10	KWG1012287	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	109	73-122	11/11/10	Acceptable
Toluene-d8	116	78-129	11/11/10	Acceptable
4-Bromofluorobenzene	92	68-117	11/11/10	Acceptable

Comments:

December 2, 2010
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science, and Technology	**Service Request No.:**	K1013383
Project:	Boomsnub/14495.07.2010.0040-03	**Date Received:**	12/02/10
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 III 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 12/02/10. 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

pH by Standard Method 4500 H+B:
In accordance with the 2007 EPA Method Update Rule published in the Federal Register, the holding time for pH is 15 minutes from sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

No other 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 8260B

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

Approved by _____ **Date** 12/21/10

CHAIN OF CUSTODY

Columbia Analytical Services

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

SR#: K1013383

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.07.2010.0040-03
PROJECT MANAGER: J. Frain
COMPANY/ADDRESS: EA Engineering
12011 NE 1st Street Suite 100
CITY/STATE/ZIP: Bellevue, WA 98005
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☒	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐ 8021☐ BTEX☐	Fuel Fingerprint (FIQ)☐ NW-HCID Screen☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCB's Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081A☐ 8141A☐ 8151A☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	PAHS 8310☐ SIM☐	Metals, (Total or Dissolved) (See list below)	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-120210	12/2/10	8:10		H_2O	5		X								X		X							
EFF-120210	↓	8:15		↓	5		X								X		X							
EFFD-120210	↓	8:20		↓	5		X								X		X							
TB-120210	↓	NA	44205	↓	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
12/22/10 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: 12/2/10 8:30	Date/Time: 12/2/10 1330	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: [illegible]	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

BCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.0040-03
Sample Matrix: Water

Service Request: K1013383
Date Collected: 12/ 2/10
Date Received: 12/ 2/10

Analysis Method: SM 4500-H+ B

Units: pH Units
Basis: NA

pH

Sample Name	Lab Code	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Note
INF-120210	K1013383-001	6.84		-		1	NA	12/2/10 15:42	*
EFF-120210	K1013383-002	8.07		-		1	NA	12/2/10 15:43	*
EFFD-120210	K1013383-003	8.12		-		1	NA	12/2/10 15:44	*

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1013383
Project No.:	14495.07.2010.0040-03	**Date Collected:**	12/02/10
Project Name:	Boomsnub	**Date Received:**	12/02/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-120210 **Lab Code:** K1013383-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	12/14/10	12/15/10	59.7		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1013383
Project No.:	14495.07.2010.0040-03	**Date Collected:**	12/02/10
Project Name:	Boomsnub	**Date Received:**	12/02/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **EFF-120210** **Lab Code:** **K1013383-002**

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	12/14/10	12/15/10	2.0	J	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1013383
Project No.:	14495.07.2010.0040-03	**Date Collected:**	12/02/10
Project Name:	Boomsnub	**Date Received:**	12/02/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-120210 **Lab Code:** K1013383-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	12/14/10	12/15/10	2.0	U	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.0040-03
Sample Matrix: Water

Service Request: K1013383
Date Collected: 12/02/2010
Date Received: 12/02/2010

Volatile Organic Compounds

Sample Name: INF-120210
Lab Code: K1013383-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	12/06/10	12/06/10	KWG1013281	
Trichlorofluoromethane	**0.58**		0.50	0.12	1	12/06/10	12/06/10	KWG1013281	
1,1-Dichloroethene	**0.95**		0.50	0.074	1	12/06/10	12/06/10	KWG1013281	
Methylene Chloride	ND	U	2.0	0.17	1	12/06/10	12/06/10	KWG1013281	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
cis-1,2-Dichloroethene	**0.36**	J	0.50	0.067	1	12/06/10	12/06/10	KWG1013281	
1,1,1-Trichloroethane (TCA)	**0.12**	J	0.50	0.075	1	12/06/10	12/06/10	KWG1013281	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/06/10	12/06/10	KWG1013281	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/06/10	12/06/10	KWG1013281	
Trichloroethene (TCE)	**21**		0.50	0.10	1	12/06/10	12/06/10	KWG1013281	
Bromodichloromethane	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
Tetrachloroethene (PCE)	**1.3**		0.50	0.099	1	12/06/10	12/06/10	KWG1013281	
Dibromochloromethane	ND	U	0.50	0.14	1	12/06/10	12/06/10	KWG1013281	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/06/10	12/06/10	KWG1013281	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/06/10	12/06/10	KWG1013281	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/06/10	12/06/10	KWG1013281	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	90	73-122	12/06/10	Acceptable
Toluene-d8	93	78-129	12/06/10	Acceptable
4-Bromofluorobenzene	77	68-117	12/06/10	Acceptable

Comments

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1013383
Project:	Boomsnub/14495.07.2010.0040-03	**Date Collected:**	12/02/2010
Sample Matrix:	Water	**Date Received:**	12/02/2010

Volatile Organic Compounds

Sample Name:	EFF-120210	**Units:**	ug/L
Lab Code:	K1013383-002	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	12/06/10	12/06/10	KWG1013281	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/06/10	12/06/10	KWG1013281	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/06/10	12/06/10	KWG1013281	
Methylene Chloride	ND	U	2.0	0.17	1	12/06/10	12/06/10	KWG1013281	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/06/10	12/06/10	KWG1013281	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/06/10	12/06/10	KWG1013281	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/06/10	12/06/10	KWG1013281	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/06/10	12/06/10	KWG1013281	
Trichloroethene (TCE)	**0.53**		0.50	0.10	1	12/06/10	12/06/10	KWG1013281	
Bromodichloromethane	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/06/10	12/06/10	KWG1013281	
Dibromochloromethane	ND	U	0.50	0.14	1	12/06/10	12/06/10	KWG1013281	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/06/10	12/06/10	KWG1013281	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/06/10	12/06/10	KWG1013281	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/06/10	12/06/10	KWG1013281	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	92	73-122	12/06/10	Acceptable
Toluene-d8	92	78-129	12/06/10	Acceptable
4-Bromofluorobenzene	79	68-117	12/06/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.0040-03
Sample Matrix: Water

Service Request: K1013383
Date Collected: 12/02/2010
Date Received: 12/02/2010

Volatile Organic Compounds

Sample Name: EFFD-120210
Lab Code: K1013383-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	12/06/10	12/06/10	KWG1013281	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/06/10	12/06/10	KWG1013281	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/06/10	12/06/10	KWG1013281	
Methylene Chloride	ND	U	2.0	0.17	1	12/06/10	12/06/10	KWG1013281	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/06/10	12/06/10	KWG1013281	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/06/10	12/06/10	KWG1013281	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/06/10	12/06/10	KWG1013281	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/06/10	12/06/10	KWG1013281	
Trichloroethene (TCE)	**0.53**		0.50	0.10	1	12/06/10	12/06/10	KWG1013281	
Bromodichloromethane	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/06/10	12/06/10	KWG1013281	
Dibromochloromethane	ND	U	0.50	0.14	1	12/06/10	12/06/10	KWG1013281	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/06/10	12/06/10	KWG1013281	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/06/10	12/06/10	KWG1013281	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/06/10	12/06/10	KWG1013281	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	91	73-122	12/06/10	Acceptable
Toluene-d8	93	78-129	12/06/10	Acceptable
4-Bromofluorobenzene	78	68-117	12/06/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2010.0040-03
Sample Matrix: Water

Service Request: K1013383
Date Collected: 12/02/2010
Date Received: 12/02/2010

Volatile Organic Compounds

Sample Name: TB-120210
Lab Code: K1013383-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	12/06/10	12/06/10	KWG1013281	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/06/10	12/06/10	KWG1013281	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/06/10	12/06/10	KWG1013281	
Methylene Chloride	ND	U	2.0	0.17	1	12/06/10	12/06/10	KWG1013281	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/06/10	12/06/10	KWG1013281	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/06/10	12/06/10	KWG1013281	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/06/10	12/06/10	KWG1013281	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/06/10	12/06/10	KWG1013281	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	12/06/10	12/06/10	KWG1013281	
Bromodichloromethane	ND	U	0.50	0.091	1	12/06/10	12/06/10	KWG1013281	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	12/06/10	12/06/10	KWG1013281	
Dibromochloromethane	ND	U	0.50	0.14	1	12/06/10	12/06/10	KWG1013281	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/06/10	12/06/10	KWG1013281	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/06/10	12/06/10	KWG1013281	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/06/10	12/06/10	KWG1013281	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	92	73-122	12/06/10	Acceptable
Toluene-d8	92	78-129	12/06/10	Acceptable
4-Bromofluorobenzene	78	68-117	12/06/10	Acceptable

Comments:

January 5, 2011
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science, and Technology	**Service Request No.:**	K1100113
Project:	Boomsnub/14495.07.2011.0040-03	**Date Received:**	01/05/11
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 01/05/11. 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

pH by Standard Method 4500 H+B:
In accordance with the 2007 EPA Method Update Rule published in the Federal Register, the holding time for pH is 15 minutes from sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

No other anomalies associated with the analysis of this sample were observed.

Total Metals

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

Volatile Organic Compounds by EPA Method 8260B

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

Approved by _____ **Date** 1/20/11

CHAIN OF CUSTODY

SR#: K1100113

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: 14495.07.2011.0040-03
PROJECT MANAGER: J. Frain
COMPANY/ADDRESS: EA Engineering
720 6th St. S.
CITY/STATE/ZIP: Kirkland, WA 98033
E-MAIL ADDRESS: jfrain@eaest.com
PHONE #: (425) 284-5401 FAX #:
SAMPLER'S SIGNATURE: Rick 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 ☐	(pH) Cond., Cl, SO4, PO4, F, NO2, NO3, BOD, TSS, TDS (circle) Hex-Chrom ☐	NH3-N, COD, Total-P, TKN, TOC, DOC (circle) NO2+NO3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	REMARKS
INF-010511	1/5/11	8:15		H2O	5		X						X		X				
EFF-010511		8:20			5		X						X		X				
EFFD-010511		8:25			5		X						X		X				
TB-010511		NA	44337		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
1/21/11 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: Rick R. Read	Signature:	Signature:	Signature:
Date/Time: 1/5/11	Date/Time: 1/5/11 1330	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name:	Printed Name:	Printed Name:
Firm: EA 8:35	Firm: CAS	Firm:	Firm:

RCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1100113
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	1/ 5/11
Sample Matrix:	Water	**Date Received:**	1/ 5/11
		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-010511	K1100113-001	6.59		-		1	NA	1/5/11 15:21	*
EFF-010511	K1100113-002	7.95		-		1	NA	1/5/11 15:22	*
EFFD-010511	K1100113-003	7.95		-		1	NA	1/5/11 15:23	*

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1100113
Project No.:	14495.07.2011.0040-03	**Date Collected:**	01/05/11
Project Name:	Boomsnub	**Date Received:**	01/05/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-010511 **Lab Code:** K1100113-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	01/07/11	01/11/11	64.9		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1100113
Project No.:	14495.07.2011.0040-03	**Date Collected:**	01/05/11
Project Name:	Boomsnub	**Date Received:**	01/05/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-010511 **Lab Code:** K1100113-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	01/07/11	01/11/11	0.7	J	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1100113
Project No.:	14495.07.2011.0040-03	**Date Collected:**	01/05/11
Project Name:	Boomsnub	**Date Received:**	01/05/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-010511 **Lab Code:** K1100113-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	01/07/11	01/11/11	0.6	U	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1100113
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	01/05/2011
Sample Matrix:	Water	**Date Received:**	01/05/2011

Volatile Organic Compounds

Sample Name:	INF-010511	**Units:**	ug/L
Lab Code:	K1100113-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Trichlorofluoromethane	**0.48**	J	0.50	0.12	1	01/10/11	01/10/11	KWG1100379	
1,1-Dichloroethene	**0.91**		0.50	0.074	1	01/10/11	01/10/11	KWG1100379	
Methylene Chloride	ND	U	2.0	0.17	1	01/10/11	01/10/11	KWG1100379	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
cis-1,2-Dichloroethene	**0.33**	J	0.50	0.067	1	01/10/11	01/10/11	KWG1100379	
1,1,1-Trichloroethane (TCA)	**0.14**	J	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/10/11	01/10/11	KWG1100379	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/10/11	01/10/11	KWG1100379	
Trichloroethene (TCE)	**21**		0.50	0.10	1	01/10/11	01/10/11	KWG1100379	
Bromodichloromethane	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
Tetrachloroethene (PCE)	**1.4**		0.50	0.099	1	01/10/11	01/10/11	KWG1100379	
Dibromochloromethane	ND	U	0.50	0.14	1	01/10/11	01/10/11	KWG1100379	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/10/11	01/10/11	KWG1100379	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/10/11	01/10/11	KWG1100379	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/10/11	01/10/11	KWG1100379	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	01/10/11	Acceptable
Toluene-d8	119	78-129	01/10/11	Acceptable
4-Bromofluorobenzene	106	68-117	01/10/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1100113
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	01/05/2011
Sample Matrix:	Water	**Date Received:**	01/05/2011

Volatile Organic Compounds

Sample Name:	EFF-010511	**Units:**	ug/L
Lab Code:	K1100113-002	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/10/11	01/10/11	KWG1100379	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/10/11	01/10/11	KWG1100379	
Methylene Chloride	ND	U	2.0	0.17	1	01/10/11	01/10/11	KWG1100379	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/10/11	01/10/11	KWG1100379	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/10/11	01/10/11	KWG1100379	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/10/11	01/10/11	KWG1100379	
Trichloroethene (TCE)	**0.53**		0.50	0.10	1	01/10/11	01/10/11	KWG1100379	
Bromodichloromethane	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/10/11	01/10/11	KWG1100379	
Dibromochloromethane	ND	U	0.50	0.14	1	01/10/11	01/10/11	KWG1100379	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/10/11	01/10/11	KWG1100379	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/10/11	01/10/11	KWG1100379	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/10/11	01/10/11	KWG1100379	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	01/10/11	Acceptable
Toluene-d8	118	78-129	01/10/11	Acceptable
4-Bromofluorobenzene	105	68-117	01/10/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1100113
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	01/05/2011
Sample Matrix:	Water	**Date Received:**	01/05/2011

Volatile Organic Compounds

Sample Name:	EFFD-010511	**Units:**	ug/L
Lab Code:	K1100113-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/10/11	01/10/11	KWG1100379	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/10/11	01/10/11	KWG1100379	
Methylene Chloride	ND	U	2.0	0.17	1	01/10/11	01/10/11	KWG1100379	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/10/11	01/10/11	KWG1100379	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/10/11	01/10/11	KWG1100379	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/10/11	01/10/11	KWG1100379	
Trichloroethene (TCE)	**0.54**		0.50	0.10	1	01/10/11	01/10/11	KWG1100379	
Bromodichloromethane	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/10/11	01/10/11	KWG1100379	
Dibromochloromethane	ND	U	0.50	0.14	1	01/10/11	01/10/11	KWG1100379	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/10/11	01/10/11	KWG1100379	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/10/11	01/10/11	KWG1100379	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/10/11	01/10/11	KWG1100379	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	109	73-122	01/10/11	Acceptable
Toluene-d8	120	78-129	01/10/11	Acceptable
4-Bromofluorobenzene	104	68-117	01/10/11	Acceptable

Comments

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2011.0040-03
Sample Matrix: Water

Service Request: K1100113
Date Collected: 01/05/2011
Date Received: 01/05/2011

Volatile Organic Compounds

Sample Name: TB-010511-44337
Lab Code: K1100113-004

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	01/10/11	01/10/11	KWG1100379	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/10/11	01/10/11	KWG1100379	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/10/11	01/10/11	KWG1100379	
Methylene Chloride	ND	U	2.0	0.17	1	01/10/11	01/10/11	KWG1100379	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/10/11	01/10/11	KWG1100379	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/10/11	01/10/11	KWG1100379	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/10/11	01/10/11	KWG1100379	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/10/11	01/10/11	KWG1100379	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	01/10/11	01/10/11	KWG1100379	
Bromodichloromethane	ND	U	0.50	0.091	1	01/10/11	01/10/11	KWG1100379	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	01/10/11	01/10/11	KWG1100379	
Dibromochloromethane	ND	U	0.50	0.14	1	01/10/11	01/10/11	KWG1100379	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/10/11	01/10/11	KWG1100379	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/10/11	01/10/11	KWG1100379	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/10/11	01/10/11	KWG1100379	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	01/10/11	Acceptable
Toluene-d8	119	78-129	01/10/11	Acceptable
4-Bromofluorobenzene	106	68-117	01/10/11	Acceptable

Comments:

February 3, 2011
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1100940
Project:	Boomsnub/14495.07.2011.0040-03	**Date Received:**	02/03/11
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 02/03/11. 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 8260B

Matrix Spike Recovery Exceptions:
The matrix spike recovery of Trichloroethene (TCE) for sample INF-020311 was outside control criteria. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicated the analytical batch was in control. No further corrective action was appropriate.

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

Approved by _____ **Date** 2/18/11

CHAIN OF CUSTODY

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

SR#: K1100940 PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.07.2011.0040-03
PROJECT MANAGER: J. Frain
COMPANY/ADDRESS: EA Engineering
720 Sixth Street South, Suite 100
CITY/STATE/ZIP: Kirkland, WA. 98003
E-MAIL ADDRESS: Jfrain@eaest.com
PHONE # 425 451-7400 FAX # 425 451-7800
SAMPLER'S SIGNATURE: Rick 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☐	BOD; TSS; TDS (circle) Cond.; Cl; SO_4; PO_4; F; NO_2; NO_3; NH3-N; COD; Total-P; TKN; TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
INF-020311	2/3/11	7:55		H_2O	5		X						X		X				
EFF-020311	↓	8:00		↓	5		X						X		X				
EFFD-020311		8:05			5		X						X		X				
TB-020311	↓	NA	44487	↓	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
2/24/11 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: Rick R. Read	Signature:	Signature:	Signature:
Date/Time: 2/3/11	Date/Time: 2-3-11 1235	Date/Time:	Date/Time:
Printed Name: Rick Read	Printed Name: Brad Tabor	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:**	K1100940
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	2/ 3/11
Sample Matrix:	Water	**Date Received:**	2/ 3/11
		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-020311	K1100940-001	6.83		-		1	NA	2/3/11 15:21	H
EFF-020311	K1100940-002	7.95		-		1	NA	2/3/11 15:23	H
EFFD-020311	K1100940-003	8.06		-		1	NA	2/3/11 15:24	H

METALS

-1-
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1100940
Project No.:	14495.07.2011.0040-03	**Date Collected:**	2/3/2011
Project Name:	Boomsnub	**Date Received:**	2/3/2011
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **INF-020311** **Lab Code:** **K1100940-001**

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	02/08/11	02/09/11	57.9		

% Solids: **0.0**

Comments:

METALS

- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1100940
Project No.:	14495.07.2011.0040-03	**Date Collected:**	2/3/2011
Project Name:	Boomsnub	**Date Received:**	2/3/2011
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: **EFF-020311** **Lab Code:** **K1100940-002**

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	02/08/11	02/09/11	2.0	U	

% Solids: 0.0

Comments:

METALS

- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1100940
Project No.:	14495.07.2011.0040-03	**Date Collected:**	2/3/2011
Project Name:	Boomsnub	**Date Received:**	2/3/2011
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-020311 **Lab Code:** K1100940-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	02/08/11	02/09/11	2.0	U	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2011.0040-03
Sample Matrix: Water

Service Request: K1100940
Date Collected: 02/03/2011
Date Received: 02/03/2011

Volatile Organic Compounds

Sample Name: INF-020311
Lab Code: K1100940-001

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	02/09/11	02/09/11	KWG1101262	
Trichlorofluoromethane	**0.43**	J	0.50	0.12	1	02/09/11	02/09/11	KWG1101262	
1,1-Dichloroethene	**0.81**		0.50	0.074	1	02/09/11	02/09/11	KWG1101262	
Methylene Chloride	ND	U	2.0	0.10	1	02/09/11	02/09/11	KWG1101262	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/09/11	02/09/11	KWG1101262	
cis-1,2-Dichloroethene	**0.31**	J	0.50	0.067	1	02/09/11	02/09/11	KWG1101262	
1,1,1-Trichloroethane (TCA)	**0.080**	J	0.50	0.075	1	02/09/11	02/09/11	KWG1101262	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/09/11	02/09/11	KWG1101262	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/09/11	02/09/11	KWG1101262	
Trichloroethene (TCE)	**20**		0.50	0.10	1	02/09/11	02/09/11	KWG1101262	
Bromodichloromethane	ND	U	0.50	0.091	1	02/09/11	02/09/11	KWG1101262	
Tetrachloroethene (PCE)	**1.4**		0.50	0.099	1	02/09/11	02/09/11	KWG1101262	
Dibromochloromethane	ND	U	0.50	0.14	1	02/09/11	02/09/11	KWG1101262	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/09/11	02/09/11	KWG1101262	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/09/11	02/09/11	KWG1101262	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/09/11	02/09/11	KWG1101262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	84	73-122	02/09/11	Acceptable
Toluene-d8	89	78-129	02/09/11	Acceptable
4-Bromofluorobenzene	75	68-117	02/09/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1100940
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	02/03/2011
Sample Matrix:	Water	**Date Received:**	02/03/2011

Volatile Organic Compounds

Sample Name:	EFF-020311	**Units:**	ug/L
Lab Code:	K1100940-002	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/09/11	02/09/11	KWG1101262	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/09/11	02/09/11	KWG1101262	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/09/11	02/09/11	KWG1101262	
Methylene Chloride	ND	U	2.0	0.10	1	02/09/11	02/09/11	KWG1101262	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/09/11	02/09/11	KWG1101262	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/09/11	02/09/11	KWG1101262	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/09/11	02/09/11	KWG1101262	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/09/11	02/09/11	KWG1101262	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/09/11	02/09/11	KWG1101262	
Trichloroethene (TCE)	**0.49**	J	0.50	0.10	1	02/09/11	02/09/11	KWG1101262	
Bromodichloromethane	ND	U	0.50	0.091	1	02/09/11	02/09/11	KWG1101262	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/09/11	02/09/11	KWG1101262	
Dibromochloromethane	ND	U	0.50	0.14	1	02/09/11	02/09/11	KWG1101262	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/09/11	02/09/11	KWG1101262	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/09/11	02/09/11	KWG1101262	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/09/11	02/09/11	KWG1101262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	85	73-122	02/09/11	Acceptable
Toluene-d8	88	78-129	02/09/11	Acceptable
4-Bromofluorobenzene	77	68-117	02/09/11	Acceptable

Comments

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2011.0040-03
Sample Matrix: Water

Service Request: K1100940
Date Collected: 02/03/2011
Date Received: 02/03/2011

Volatile Organic Compounds

Sample Name: EFFD-020311
Lab Code: K1100940-003

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	02/09/11	02/09/11	KWG1101262	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/09/11	02/09/11	KWG1101262	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/09/11	02/09/11	KWG1101262	
Methylene Chloride	ND	U	2.0	0.10	1	02/09/11	02/09/11	KWG1101262	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/09/11	02/09/11	KWG1101262	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/09/11	02/09/11	KWG1101262	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/09/11	02/09/11	KWG1101262	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/09/11	02/09/11	KWG1101262	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/09/11	02/09/11	KWG1101262	
Trichloroethene (TCE)	**0.45**	J	0.50	0.10	1	02/09/11	02/09/11	KWG1101262	
Bromodichloromethane	ND	U	0.50	0.091	1	02/09/11	02/09/11	KWG1101262	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/09/11	02/09/11	KWG1101262	
Dibromochloromethane	ND	U	0.50	0.14	1	02/09/11	02/09/11	KWG1101262	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/09/11	02/09/11	KWG1101262	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/09/11	02/09/11	KWG1101262	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/09/11	02/09/11	KWG1101262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	83	73-122	02/09/11	Acceptable
Toluene-d8	88	78-129	02/09/11	Acceptable
4-Bromofluorobenzene	75	68-117	02/09/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1100940
Project:	Boomsnub/14495.07.2011.0040-03	**Date Collected:**	02/03/2011
Sample Matrix:	Water	**Date Received:**	02/03/2011

Volatile Organic Compounds

Sample Name:	TB-020311	**Units:**	ug/L
Lab Code:	K1100940-004	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260B		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	02/09/11	02/09/11	KWG1101262	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/09/11	02/09/11	KWG1101262	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/09/11	02/09/11	KWG1101262	
Methylene Chloride	ND	U	2.0	0.10	1	02/09/11	02/09/11	KWG1101262	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	02/09/11	02/09/11	KWG1101262	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/09/11	02/09/11	KWG1101262	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/09/11	02/09/11	KWG1101262	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/09/11	02/09/11	KWG1101262	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/09/11	02/09/11	KWG1101262	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	02/09/11	02/09/11	KWG1101262	
Bromodichloromethane	ND	U	0.50	0.091	1	02/09/11	02/09/11	KWG1101262	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	02/09/11	02/09/11	KWG1101262	
Dibromochloromethane	ND	U	0.50	0.14	1	02/09/11	02/09/11	KWG1101262	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/09/11	02/09/11	KWG1101262	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/09/11	02/09/11	KWG1101262	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/09/11	02/09/11	KWG1101262	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	83	73-122	02/09/11	Acceptable
Toluene-d8	88	78-129	02/09/11	Acceptable
4-Bromofluorobenzene	77	68-117	02/09/11	Acceptable

Comments:

March 7, 2011
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1101912
Project:	Boomsnub/1449505.2011.0040-03	**Date Received:**	03/07/11
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 03/07/11. 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 8260B

Matrix Spike Recovery Exceptions:
The matrix spike recovery and duplicate matrix spike recovery of Trichlorofluoromethane and 1,1,1-Trichloroethane (TCA) for sample EFF-030711MS KWG1102238-1 and EFF-03.0711DMS KWG1102238-2 was outside control criteria. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicated the analytical batch was in control. The matrix spike outlier suggested a potential low bias in this matrix. No further corrective action was appropriate.

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

Approved by _____ **Date** 08/29/14

Columbia Analytical Services

CHAIN OF CUSTODY

SR#: K1101912

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

PAGE 1 OF 1 COC #

PROJECT NAME	Reynolds
PROJECT NUMBER	144505.2011.0040-03
PROJECT MANAGER	Jil Frain
COMPANY/ADDRESS	EA Engineering
	720 6th 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 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 (FIO) ☐ NW-HCID	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals (Total or Dissolved) (See list below)	Cyanide ☐	pH Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle) Hex-Chrom ☐	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	REMARKS
INF-030711	3/7/11	8:05		H_2O	5		X								X		X			
EFF-030711		8:10			5		X								X		X			
EFFD-030711		8:15			5		X								X		X			
TB-030711		NA	4665		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

___ 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

3/25/11
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: 3/7/11 8:30	Date/Time:	Date/Time:	Date/Time: 3/11 12:00
Printed Name: Rick READ	Printed Name:	Printed Name:	Printed Name:
Firm: EA	Firm:	Firm:	Firm: CAS

RCOC #1 03/10

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1101912
Project:	Boomsnub/1449505.2011.0040-03	**Date Collected:**	3/ 7/11
Sample Matrix:	Water	**Date Received:**	3/ 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-030711	K1101912-001	6.93		-		1	NA	3/7/11 13:37	H
EFF-030711	K1101912-002	7.97		-		1	NA	3/7/11 13:38	H
EFFD-030711	K1101912-003	8.05		-		1	NA	3/7/11 13:40	H

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1101912
Project No.:	1449505.2011.0040-03	**Date Collected:**	03/07/11
Project Name:	Boomsnub	**Date Received:**	03/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: INF-030711 **Lab Code:** K1101912-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	03/09/11	03/15/11	61.7		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1101912
Project No.:	1449505.2011.0040-03	**Date Collected:**	03/07/11
Project Name:	Boomsnub	**Date Received:**	03/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFF-030711 **Lab Code:** K1101912-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	03/09/11	03/15/11	1.0	J	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1101912
Project No.:	1449505.2011.0040-03	**Date Collected:**	03/07/11
Project Name:	Boomsnub	**Date Received:**	03/07/11
Matrix:	WATER	**Units:**	ug/L
		Basis:	NA

Sample Name: EFFD-030711 **Lab Code:** K1101912-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	03/09/11	03/15/11	1.4	J	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1101912
Project:	Boomsnub/1449505.2011.0040-03	**Date Collected:**	03/07/2011
Sample Matrix:	Water	**Date Received:**	03/07/2011

Volatile Organic Compounds

Sample Name:	INF-030711	**Units:**	ug/L
Lab Code:	K1101912-001	**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	03/10/11	03/10/11	KWG1102238	
Trichlorofluoromethane	**0.45**	J	0.50	0.12	1	03/10/11	03/10/11	KWG1102238	
1,1-Dichloroethene	**0.90**		0.50	0.074	1	03/10/11	03/10/11	KWG1102238	
Methylene Chloride	ND	U	2.0	0.10	1	03/10/11	03/10/11	KWG1102238	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	03/10/11	03/10/11	KWG1102238	
cis-1,2-Dichloroethene	**0.34**	J	0.50	0.067	1	03/10/11	03/10/11	KWG1102238	
1,1,1-Trichloroethane (TCA)	**0.090**	J	0.50	0.075	1	03/10/11	03/10/11	KWG1102238	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/11	03/10/11	KWG1102238	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/11	03/10/11	KWG1102238	
Trichloroethene (TCE)	**20**		0.50	0.10	1	03/10/11	03/10/11	KWG1102238	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/11	03/10/11	KWG1102238	
Tetrachloroethene (PCE)	**1.3**		0.50	0.099	1	03/10/11	03/10/11	KWG1102238	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/11	03/10/11	KWG1102238	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/11	03/10/11	KWG1102238	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/11	03/10/11	KWG1102238	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/10/11	03/10/11	KWG1102238	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	90	73-122	03/10/11	Acceptable
Toluene-d8	92	78-129	03/10/11	Acceptable
4-Bromofluorobenzene	82	68-117	03/10/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1101912
Project:	Boomsnub/1449505.2011.0040-03	**Date Collected:**	03/07/2011
Sample Matrix:	Water	**Date Received:**	03/07/2011

Volatile Organic Compounds

Sample Name:	EFF-030711	**Units:**	ug/L
Lab Code:	K1101912-002	**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	03/10/11	03/10/11	KWG1102238	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/10/11	03/10/11	KWG1102238	
1,1-Dichloroethene	ND	U	0.50	0.074	1	03/10/11	03/10/11	KWG1102238	
Methylene Chloride	ND	U	2.0	0.10	1	03/10/11	03/10/11	KWG1102238	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	03/10/11	03/10/11	KWG1102238	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/10/11	03/10/11	KWG1102238	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/10/11	03/10/11	KWG1102238	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/11	03/10/11	KWG1102238	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/11	03/10/11	KWG1102238	
Trichloroethene (TCE)	**0.51**		0.50	0.10	1	03/10/11	03/10/11	KWG1102238	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/11	03/10/11	KWG1102238	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/10/11	03/10/11	KWG1102238	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/11	03/10/11	KWG1102238	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/11	03/10/11	KWG1102238	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/11	03/10/11	KWG1102238	
Hexachlorobutadiene	**0.13**	J	2.0	0.11	1	03/10/11	03/10/11	KWG1102238	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	86	73-122	03/10/11	Acceptable
Toluene-d8	90	78-129	03/10/11	Acceptable
4-Bromofluorobenzene	81	68-117	03/10/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1101912
Project:	Boomsnub/1449505.2011.0040-03	**Date Collected:**	03/07/2011
Sample Matrix:	Water	**Date Received:**	03/07/2011

Volatile Organic Compounds

Sample Name:	EFFD-030711	**Units:**	ug/L
Lab Code:	K1101912-003	**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	03/10/11	03/10/11	KWG1102238	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/10/11	03/10/11	KWG1102238	
1,1-Dichloroethene	ND	U	0.50	0.074	1	03/10/11	03/10/11	KWG1102238	
Methylene Chloride	ND	U	2.0	0.10	1	03/10/11	03/10/11	KWG1102238	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	03/10/11	03/10/11	KWG1102238	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/10/11	03/10/11	KWG1102238	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/10/11	03/10/11	KWG1102238	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/11	03/10/11	KWG1102238	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/11	03/10/11	KWG1102238	
Trichloroethene (TCE)	**0.47**	J	0.50	0.10	1	03/10/11	03/10/11	KWG1102238	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/11	03/10/11	KWG1102238	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/10/11	03/10/11	KWG1102238	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/11	03/10/11	KWG1102238	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/11	03/10/11	KWG1102238	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/11	03/10/11	KWG1102238	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/10/11	03/10/11	KWG1102238	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	89	73-122	03/10/11	Acceptable
Toluene-d8	89	78-129	03/10/11	Acceptable
4-Bromofluorobenzene	82	68-117	03/10/11	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1101912
Project:	Boomsnub/1449505.2011.0040-03	**Date Collected:**	03/07/2011
Sample Matrix:	Water	**Date Received:**	03/07/2011

Volatile Organic Compounds

Sample Name:	TB-030711	**Units:**	ug/L
Lab Code:	K1101912-004	**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	03/10/11	03/10/11	KWG1102238	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/10/11	03/10/11	KWG1102238	
1,1-Dichloroethene	ND	U	0.50	0.074	1	03/10/11	03/10/11	KWG1102238	
Methylene Chloride	**0.13**	J	2.0	0.10	1	03/10/11	03/10/11	KWG1102238	
trans-1,2-Dichloroethene	ND	U	0.50	0.057	1	03/10/11	03/10/11	KWG1102238	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/10/11	03/10/11	KWG1102238	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/10/11	03/10/11	KWG1102238	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/10/11	03/10/11	KWG1102238	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/10/11	03/10/11	KWG1102238	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	03/10/11	03/10/11	KWG1102238	
Bromodichloromethane	ND	U	0.50	0.091	1	03/10/11	03/10/11	KWG1102238	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	03/10/11	03/10/11	KWG1102238	
Dibromochloromethane	ND	U	0.50	0.14	1	03/10/11	03/10/11	KWG1102238	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/10/11	03/10/11	KWG1102238	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/10/11	03/10/11	KWG1102238	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/10/11	03/10/11	KWG1102238	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	86	73-122	03/10/11	Acceptable
Toluene-d8	90	78-129	03/10/11	Acceptable
4-Bromofluorobenzene	82	68-117	03/10/11	Acceptable

Comments: