Progress Report
October 2009 — March 2010
Boomsnub/Airco Superfund Site
Hazel Dell, Washington

Prepared for

Linde, LLC
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Prepared by

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LIST OF ACRONYMS

CAS	Columbia Analytical Services
City	City of Vancouver
EA	EA Engineering, Science, and Technology, Inc.
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
GAC	Granular Activated Carbon
IWS	In-Well Stripping
IX	Ion Exchange
lb	Pound(s)
Linde	Linde, Inc.
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
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TOPPS	Toe-of-Plume Pilot Study
µg/L	Micrograms per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
VFD	Variable Frequency Drive
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 2010
Reporting Period: October 2009 – March 2010.

A. PROGRESS MADE THIS PERIOD

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

A.1 SYSTEM OPERATIONS AND AVAILABILITY (see appendices for further details).

Figures 1 and 2 identify Operable Units (OU)-2 and OU-3, along with project areas, and well locations. 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, as modified with approval from 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 2009 to 31 March 2010: 4,367.
Total hours of routine IWS system maintenance downtime: 3.
Total operating hours: 4,364.
System availability: ~ 99.9 percent.

A.1.2 OU-3 Site-wide 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. Tables 1A through 1F summarize the groundwater flow information for October 2009 through March 2010. 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 4,368 hours, over 99 percent of the reporting period, exceeding the requirements of the Consent Decree.

From 1 October 2009 to 31 March 2010, 39,751,959 gallons of groundwater were treated, removing 7.6 pounds (lb) of trichloroethene (TCE) and 21.6 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 2009. 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) 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 2009 to 31 March 2010 is included in Appendix C.4

Synopsis of OU-3 System Downtime

Unscheduled system shut-downs and system maintenance shut-offs for periods longer than one hour are discussed below. Other system shut-downs and shut-offs are discussed in the Daily Operation and Maintenance Summary in Appendix A.

October 2009

In October the system had one unscheduled shut-down lasting 42 minutes, and no maintenance shut-offs. There were no unscheduled system shut-downs or maintenance shut-offs lasting longer than one hour.

November 2009

In November the system had four unscheduled shut-downs lasting a total of 4 hours and 50 minutes, and three maintenance shut-offs lasting a total of 2 hours and 20 minutes. The following events lasted longer than one hour.

Unscheduled system shut-downs lasting longer than one hour:

- On 7 November the system shut down due to a sump pump failure in the air stripper pad vault during a heavy precipitation event. The sump pump was replaced with a sump pump removed from CV-24, and the filters were changed. The system was down for 2 hours and 44 minutes.

- On 20 November the system shut down due to a high level fault in CV-18. A storm water catch basin at the Church of God was plugged with leaves causing water to

overflow a corner of the parking lot curb and down the west fence line into CV-18. The leaves were removed and the vault pumped. The system was down for 1 hour and 26 minutes.

Scheduled system maintenance shut-off lasting longer than one hour:

- On 20 November the system was shut off to replace a pump contactor to MW-10C and a timer for MW-6B. A system shut off bypass switch was installed in the sheep shed in anticipation of flooding in CV-13 in the low part of the field between the proposed Hazel Dell sport fields and the Church of God field. The system was off for 2 hours and 3 minutes.

December 2009

In December the system had three unscheduled shut-downs lasting a total of 6 hours and 17 minutes, and three maintenance shut-offs lasting a total of 1 hour and 21 minutes. There were no scheduled system maintenance shut-offs lasting longer than one hour.

Unscheduled system shut-downs lasting longer than one hour:

- On 14 December the system shut down due to a high level fault in CV-3. The system was down for 1 hour and 46 minutes.

- On 17 December the system shut down. The breaker for the power to the proximal well panel kept tripping and the low flow rates would upset the balance of the tank levels and pump speeds. The breaker was switched out and the system restarted. The system was off for 2 hours and 4 minutes.

- On 31 December the system shut down due to a high level fault in CV-3. The system was restarted remotely. The system was down for 2 hours and 27 minutes.

January 2010

In January the system had two unscheduled shut-downs lasting a total of 3 hours and 19 minutes, and two maintenance shut-offs lasting a total of 19 minutes. There were no scheduled system maintenance shut-offs lasting longer than one hour.

Unscheduled system shut-downs lasting longer than one hour:

- **January 3 and 4.** The circuit breaker powering the proximal well control panel tripped and shut off the proximal extraction wells (PW-1B, MW-6B, MW-10B, MW-10C, MW-14C, MW-14E, MW-18D, and MW-19D). Due to the holiday weekend, the loss of flow from the proximal wells went undetected until Monday, January 4. The system shut down numerous times during the day on January 4 while troubleshooting the cause of the

proximal well breaker tripping. The system was off for 1 hour and 20 minutes combined for the day.

- **January 5.** The system continued having problems and shut down several more times. The trouble was determined to be a loose wire that was shorting out the panel and tripping the proximal well breaker. The wire was tightened down and the circuit breaker was replaced. The system was down for 1 hour and 59 minutes.

From 3 January through 5 January, 45% of the wells were operational and the water treatment rate was cut to 65.9% of normal system flow for approximately 46 hours.

February 2010

In February the system had no unscheduled shut-downs, and two maintenance shut-offs lasting a total of 1 hour and 6 minutes. There were no unscheduled system shut-downs or maintenance shut-offs lasting longer than one hour.

March 2010

In March the system had one unscheduled shut-down lasting 25 minutes, and two maintenance shut-offs lasting a total of 24 minutes. There were no unscheduled system shut-downs or maintenance shut-offs lasting longer than one hour.

A.2 SYSTEM MODIFICATIONS AND RECOMMENDATIONS

OU-2

Partial IWS System Shutdown - The groundwater concentration of TCE in individual wells generally has not changed significantly over the past three years. The IWS system has been in the shutdown process since the Fall of 2006 because the system is no longer removing substantial TCE mass from the source area groundwater. Based on the current site conditions, granular activated carbon (GAC) treatment of the discharge from the IWS system was discontinued in October 2009, with EPA approval. Current concentrations of volatile organics in the discharge do not pose a risk to human health or the environment and are significantly lower than regulatory limits for air releases. The IWS system now vents directly to the atmosphere and vapor samples are no longer collected.

EA is currently pulse-pumping 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 after each groundwater sampling event. The IWS wells were operating during this reporting period as follows: in October, IWS-3, IWS-4, IWS-5 and IWS-6 were operating. Wells IWS-5 and IWS-6 were operating from November 2009 through March 2010.

OU-3

As a result of development plans for some properties within the Site area, modifications to the existing system may be required. These properties include the Padden Parkway development site and properties owned by Clark County and the First Church of God. EA is working with the developers to understand the impact that their plans will have on the operating system and will propose system modifications, as necessary, based on their final plans.

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 CAS Kelso for these analyses.

Effluent samples were collected by EA on 5 October, 3 November, and 3 December 2009, and on 7 January, 3 February, and 4 March 2010. 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 October 2009 to March 2010. It also presents the discharge permit limits, the infiltration gallery discharge limits, and the current sampling results. A summary of the estimated mass removed by month is presented in Appendix C.3.

A.4 MEETINGS

- Periodic status calls were held between EA and EPA.

- 27 October meeting with EPA to discuss various issues at the Site. Meeting participants were Claire Hong, EPA; Bernie Zavala, EPA; Cathy Böhlke, EA; Jil Frain, EA; and Glenn Hayman, EA.

A.5 MISCELLANEOUS

- Continue pursuing access easement agreements.

B. ANTICIPATED PROBLEM AREAS AND RECOMMENDED SOLUTIONS

- For site safety and security it is recommended that a gate sensor be installed with audible alarm to detect entry to the site while site personnel are working in buildings.

- To isolate the inactive toe of plume extraction wells a valve will be installed in CV-18.

- Monitoring well MW-33 will be repaired by installing a new flush mount well monument and a new dedicated pump.

C. PROBLEMS RESOLVED

- MW-6B and MW-10C weren't always engaging on a start up from the main control panel. A pump contactor to MW-10C and a timer for MW-6B were replaced to alleviate the problem.

D. DELIVERABLES

D.1 DELIVERABLES SUBMITTED

- **12 October –** Letter clarifying OU-2 IWS air discharge limits submitted to EPA.
- **2 October –** September monthly Flow Report submitted to the City.
- **19 November –** Progress Report, April through September 2009, submitted to EPA.
- **4 November –** October monthly Flow Report submitted to the City.
- **4 December –** November monthly Flow Report submitted to the City.
- **18 December** – Letter Summarizing Action Items from Meeting on 27 October 2009 between EA and EPA, submitted to EPA.
- **8 January –** December monthly Flow Report submitted to the City.
- **13 January –** Semiannual (July – December 2009) Self Monitoring Report submitted to the City.
- **20 January –** Carbon and resin Dangerous Waste Reports submitted to Washington State Department of Ecology (Ecology).
- **3 February –** January monthly Flow Report submitted to the City.
- **23 February –** Fall 2009 Semiannual Report submitted to EPA.
- **25 February –** QASP Addendum for the Spring 2010 Semiannual Sampling Event submitted to EPA.
- **3 March –** February monthly Flow Report submitted to the City.
- **31 March –** 2009 Annual Status Report (including a CD with laboratory data and the updated version of the Boomsnub/Airco User Interface) submitted to EPA.

D.2 ANTICIPATED SUBMITTAL DATES

- Monthly Flow Reports are due to City on the 10th of every month.
- **9 April –** Spring 2010 sampling event notification letters due to the property owners.
- **10 July –** Quarterly (January – June 2010) Self Monitoring Report to be submitted to the City.
- **28 August –** Spring 2010 Semiannual Groundwater Sampling Report due to EPA.
- **22 September –** QASP Addendum for the Fall 2010 Semiannual Sampling Event to be submitted to EPA.
- **24 September –** Fall 2010 sampling event notification letters due to the property owners.

E. EVENTS

E.1 FIELD EVENTS COMPLETED

- **Monthly –** O&M influent and effluent sampling.
- **12 through 22 October 2009 –** Fall 2009 semiannual groundwater sampling event.
- **6 January –** MW-27D sampling.
- **17 February –** MW-25D sampling.

E.2 UPCOMING EVENTS

- **Monthly –** O&M influent and effluent sampling.
- **26 through 29 May 2010 –** Spring 2010 semiannual groundwater sampling event.
- **29 July –** MW-25D and MW-27D 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.

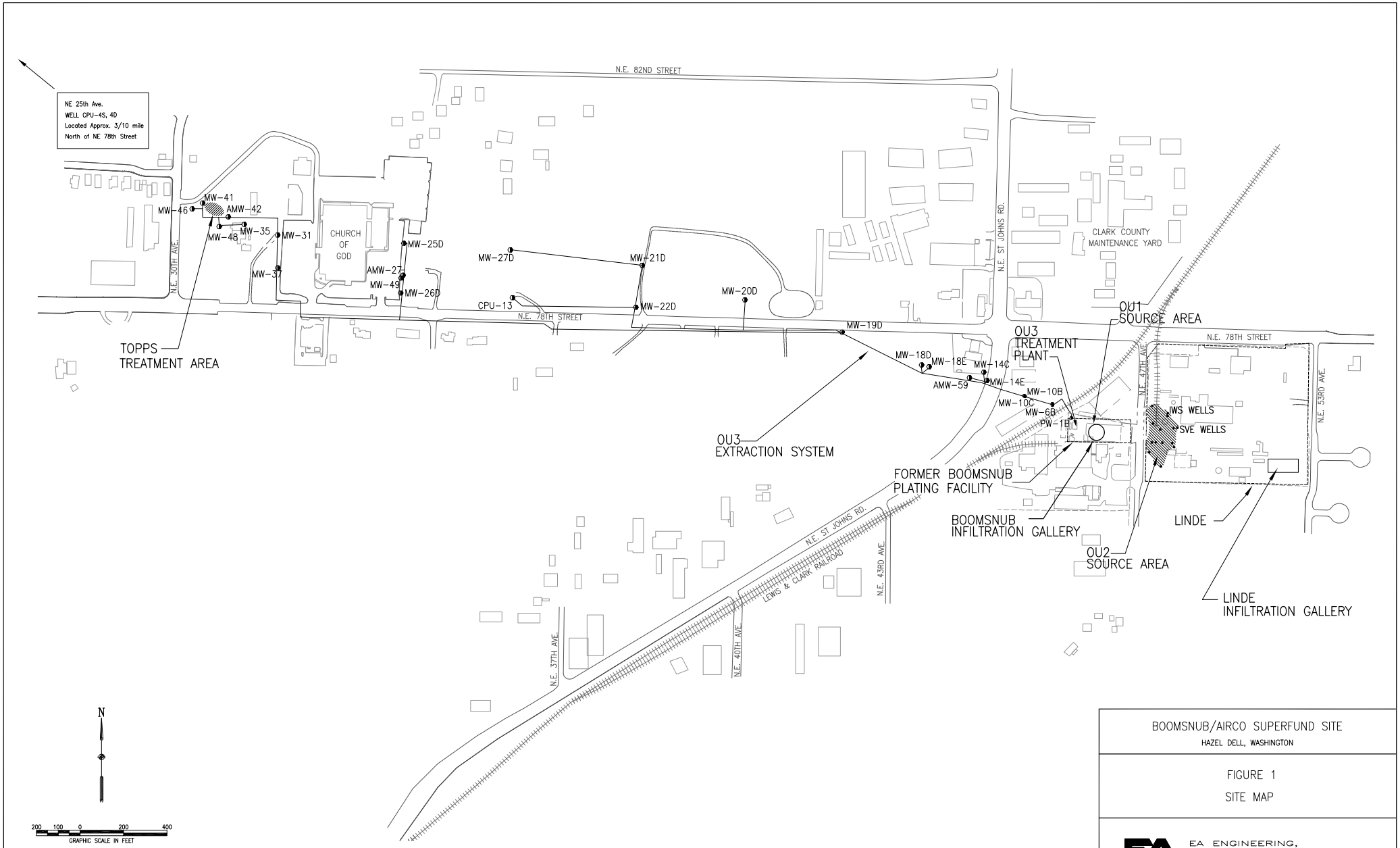
Temperature blanks and cooler temperature blanks were within the acceptable range, except for the March data. The temperature blank for March was 0.1 degree out of the acceptable range at 6.1 degrees Celsius, but the cooler temperature blank remained within the acceptable range

required by the QASP. The warm temperature blank is not expected to impact the data and was most likely due to the short travel time to the lab.

In March, the data was not analyzed immediately for pH as required by the QASP, but was reported with the standard lab turn-around time of 24 hours. pH results were typical of previous sampling results.

The ICP serial dilution for the March data was out of range (<10% as required by the QASP) at 13.5 percent. The original sample result for chromium is less than 100 and not a large enough number to be effected by the serial dilution. The chromium results were not flagged by the laboratory.

Figures



BOOMSNUB/AIRCO SUPERFUND SITE

HAZEL DELL, WASHINGTON

FIGURE 1

SITE MAP

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

NE 25th Ave.
WELL CPU-4S, 4D
Located Approx. 3/10 mile
North of NE 78th Street

NE 25th Ave.

N.E. 82ND STREET

N.E. 78TH STREET

N.E. 30TH AVE.

N.E. ST JOHNS RD.

N.E. 47TH AVE.

N.E. 53RD AVE.

N.E. 43RD AVE.

N.E. 40TH AVE.

N.E. 37TH AVE.

LEWIS & CLARK RAILROAD

CHURCH OF GOD

CLARK COUNTY MAINTENANCE YARD

FORMER BOOMSNUB PLATING FACILITY

LINDE

CROCKFORD

COLUMBIA VET

PERMALUME

FERGUSON

HORN

GARRISON

GRIMM

ZENT

BENNETT

COLF

FITZGERALD

AMW-23 AMW-43 AMW-30 AMW-44 AMW-45 AMW-46 AMW-63 AMW-42 AMW-47 AMW-48 AMW-41 AMW-36 AMW-35 AMW-31 AMW-32 AMW-29 AMW-28 CPU-16 AMW-37 AMW-61 AMW-49 AMW-27 AMW-62 AMW-51 AMW-24 AMW-22 AMW-15 AMW-16 AMW-14 AMW-17 AMW-18 AMW-60 AMW-59 AMW-13C AMW-34 AMW-33 AMW-5 AMW-1 AMW-3 AMW-2 AMW-4 AMW-4A AMW-25 AMW-9A AMW-5A AMW-8A AMW-13A AMW-26 AMW-1C AMW-2B AMW-2A AMW-12A AMW-19A AMW-19B AMW-11A AMW-10A PZ-2 AMW-7A AMW-57 AMW-6A AMW-21 AMW-3A AMW-20 PZ-1 AMW-56A AMW-55C AMW-55A AMW-50 AMW-54C AMW-52A AMW-52C AMW-53A AMW-53B AMW-53C AMW-58 AMW-1A AMW-1B AMW-1C AMW-2C AMW-12C AMW-9C AMW-9B AMW-8B AMW-10B AMW-6D AMW-6C AMW-6B AMW-7B AMW-4A AMW-4B AMW-4C AMW-3A AMW-3B AMW-3C AMW-7C AMW-2A AMW-2B AMW-2C AMW-14E AMW-14C AMW-18E AMW-18D AMW-15E AMW-16E AMW-17E AMW-19D AMW-39/PZ-39 AMW-40/PZ-40 AMW-20D AMW-38 AMW-21D AMW-23D AMW-22D AMW-25D AMW-26D AMW-27D CPU-1S, 1D CPU-2 CPU-3S, 3D CPU-4S, 4D CPU-7 CPU-10 CPU-12 CPU-13 CPU-14 CPU-15 EC-1 CV-1 CV-2 CV-3 CV-4 CV-5 CV-6 CV-7 CV-8 CV-9 CV-10 CV-11 CV-12 CV-13 CV-14 CV-14A CV-15 CV-16 CV-17 CV-18 CV-19 CV-20 CV-21 CV-22 CV-23 CV-24 MW-24D

LEGEND

- EC1 — DEPARTMENT OF ECOLOGY WELL LOCATION
- AMW-51 — WELLS SCREENED IN THE TROUTDALE AQUIFER
- GWSW-1 — GROUNDWATER SUPPLY WELL
- MW-17E — GROUNDWATER MONITORING WELL
- MW-10A — GROUNDWATER EXTRACTION WELL
- MW-3A, 3B — MULTIPLE WELLS IN PROXIMITY OR COMPLETED AS NESTED SETS
- MW-27D — ABANDONED MONITORING WELL
- CV-9 — CONTAINMENT VAULT
- EXTRACTION SYSTEM FORCEMAIN

NOTE: MONITORING WELL LOCATIONS ARE APPROXIMATE.

N

200 100 0 200 400
GRAPHIC SCALE IN FEET

BOOMSNUB/AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

FIGURE 2.
WELL LOCATION MAP

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

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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 site-wide groundwater treatment system. Routine and other site activities are recorded in this section.

Synopsis of the Activities:

October 2009

October 1. Downloaded and tabulated data.

October 5. Collected treatment system influent and effluent samples.

October 7. Inspected the containment vaults.

October 12. Assisted with semiannual sampling. Pulled the pump out of MW-48 since it was not working.

October 13. Conducted bi-weekly system inspection. Inspected the IWS system.

October 15. Repaired the sump pump connection in CV-13. Downloaded and tabulated run-time data. Shut off extraction wells CPU-13, MW-22, MW-21 and MW-27 to accommodate a pipe repair in CV-13.

October 21. Measured and recorded water level elevations.

October 22. Installed an isolation valve in CV-12 in anticipation of future modifications to CV-13 and MW-21. Pulled the dedicated pump out of MW-33 for repairs. Shut off extraction wells CPU-13, MW-22, MW-21 and MW-27 to install an isolation valve in CV-12.

October 23. Collected groundwater sample from MW-33 using a non-dedicated pump.

October 27. Conducted bi-weekly system inspection.

October 28. Sampled primary GAC carbon on both the soil vapor extraction (SVE) and IWS systems for disposal profiling. The system was shut off to accommodate pumping of water from containment vaults containing sump pumps. The system was down for 42 minutes.

October 29. Recorded and tabulated monthly extraction well flow rates.

November 2009

November 2. Downloaded and tabulated data.

November 3. Worked on monthly reporting. Collected treatment system influent and effluent samples. Shut down IWS-3 and IWS-4.

November 6. Shut off the system to accommodate pumping of water from containment vaults containing sump pumps. The system was down for 16 minutes.

November 7. The system shut down due to heavy precipitation and a sump pump that failed in the air stripper pad vault. The sump pump was replaced with a sump pump removed from CV-24, and the filters were changed. The system was down for 2 hours and 44 minutes.

November 9. Tested, cleaned, and repaired sump pumps.

November 10. Shut the system off to test the float switch in the air stripper pad sump. The system was off for 1 minute.

November 11. Conducted bi-weekly system inspection. Inspected the IWS system.

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

November 18. Gave a system tour to group from Hanford. The Department of Energy at Hanford has a similar chromium pump and treat system that they want to optimize and received word from EPA that we had already done what they are planning to do. They sent out a team of engineers and consultants to look at the Site.

November 20. The system was shut off to replace a pump contactor to MW-10C and a timer for MW-6B. A system shutoff bypass switch was installed in the sheep shed in anticipation of flooding in CV-13 in the low part of the field between the proposed Hazel Dell sport fields and Church of God field. The system was off for 2 hours and 3 minutes.

The system shut down due to a high level in CV-18. A stormwater catch basin at the Church of God was plugged with leaves causing water to overflow a corner of the parking lot curb and down the west fence line into CV-18. The leaves were removed and the vault pumped out. The system was down for 1 hour and 26 minutes.

November 24. Conducted the bi-weekly system inspection.

November 25. The system shut down due to a high level fault in CV-3. The system was restarted remotely. The system was down for 39 minutes.

November 30. Recorded and tabulated monthly extraction well flow rates. The system was down for one minute to pump the remaining water out of CV-3.

December 2009

December 1. Downloaded and tabulated data.

December 3. Worked on monthly reporting. Collected the treatment system influent and effluent samples.

December 8. Pumped water out of vaults.

December 9. Conducted the bi-weekly system inspection

December 11. Shut the system off to accommodate pumping of water from containment vaults containing sump pumps. The system was down for 31 minutes.

December 14. Conducted routine maintenance and inspection on the OU-2 system. The system shut down due to a high level fault in CV-3. The system was down for 1 hour and 46 minutes.

December 15. The system was shut off for EC Electric to work on the wiring in the proximal well panel to determine the cause of MW-14C not starting upon system reset. The system was off for 45 minutes.

December 17. The system shut down in the early morning hours and it was a difficult time restarting the system and keeping it running. The breaker for the power to the proximal well panel kept tripping and the low flow rates would upset the balance of the tank levels and pump speeds. The breaker was switched out and the system restarted. The system was off for 2 hours and 4 minutes.

December 18. The system was shut off to pump water out of CV-3. The system was down for 5 minutes.

December 23. Conducted the bi-weekly system inspection.

December 24. Inspected the containment vaults.

December 28. Dug post holes and electrical trench for gate sensor.

December 29. Assisted EC Electric with gate sensor installation.

December 30. Recorded and tabulated monthly extraction well flow rates. The system shut down due to a high level fault in CV-3. The system was restarted remotely and was down for 2 hours and 27 minutes.

January 2010

January 3. The circuit breaker powering the proximal well control panel tripped and shut off the proximal extraction wells (PW-1B, MW-6B, MW-10B, MW-10C, MW-14C, MW-14E, MW-18D, and MW-19D). Due to the holiday weekend, the loss of flow from the proximal wells went undetected until Monday, January 4.

January 4. The system shut down numerous times during the day while troubleshooting the cause of the proximal well breaker tripping. The system was off for 1 hour and 20 minutes combined for the day. Downloaded and tabulated data.

January 5. The system continued having problems and shut down several more times. The trouble was determined to be a loose wire that was shorting out the panel and tripping the proximal well breaker. The wire was tightened down and the circuit breaker was replaced. The system was down for 1 hour and 59 minutes.

January 5. Sampled MW-27D.

January 7. Collected the treatment system influent and effluent samples. Installed new pumps in monitoring wells MW-21D and MW-14C.

January 8. Completed wiring in MW-21D and restarted the well. Conducted the bi-weekly system inspection

January 11. Worked on wiring to the pump in MW-14C at the vault.

January 12. Worked on wiring to MW-14C at the control panel and restarted well.

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

January 15. Shut the system off to pump water out of CV-3. The system was off for 9 minutes.

January 18. Replaced insulation on the air-stripper influent and effluent pipes damaged during a windstorm.

January 22. Conducted the bi-weekly system inspection.

January 25. Inspected the containment vaults.

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

February 2010

February 1. Downloaded and tabulated data.

February 3. Collected treatment system influent and effluent samples. Collected split effluent sample with City of Vancouver.

February 4. Conducted the bi-weekly system inspection.

February 5. Shut the system off to pump water out of vaults containing sump pumps and to change filters. The system was off for 45 minutes.

February 8. Worked on wiring to MW-14C at the control panel and restarted the well.

February 12. Performed routine maintenance on the OU-2 IWS system.

February 15. Re-installed piping in IWS-8 for future use.

February 17. Sampled MW-25D.

February 19. Inspected the containment vaults.

February 22. Conducted the bi-weekly system inspection.

February 26. Shut the system off to pump water out of vaults containing sump pumps. The system was off for 21 minutes.

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

March 2010

March 1. Downloaded and tabulated data.

March 4. Collected treatment system influent and effluent samples. Collected split effluent sample with City of Vancouver.

March 5. Inspected the containment vaults.

March 9. Conducted the bi-weekly system inspection.

March 11. The system shutdown due to a vault high level fault at CV-3 caused by several days of heavy precipitation. The system was down for 25 minutes.

March 12. Inspected the containment vaults.

March 18. Performed routine maintenance on the OU2 IWS system. Changed oil in the blower.

March 22. Conducted the bi-weekly system inspection.

March 23. Marked pipelines on county property on a locate request.

March 25. Noticed field had been plowed east of King's Way school. Located and marked AMW-15 with a stake. Looked for and could not locate AMW-14 at the surface.

March 26. Located AMW-14 using a metal detector, dug away dirt, inspected well and marked location with a stake. Inspected the containment vaults.

March 29. Shut the system off to pump water out of vaults containing sump pumps. The system was off for 17 minutes.

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

March 31. The system was shut off to change the ion exchange building sump pump bag filter, which had become clogged while pumping water from the trailer tank. The system was off for 7 minutes.

Appendix B

OU-2 Monthly Operating Field Forms

Name: Richard Read **Date:** 10/13/2009

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	scfm	off	210
Vacuum Blower In	in H_20	off	-28
Vacuum Blower Ou	in H_20	off	20
Pressure Blower D	deg F	off	165
Operating Hz	%	off	100
Secondary GAC Ou	deg F	off	122

Individual Well Measurements

	Flow (scfm)	Depth to Water (ft btc)
IWS-1	Off	26.14
IWS-2	Off	27.13
IWS-3	40	26.97
IWS-4	40	26.54
IWS-5	40	26.12
IWS-6	40	26.70
IWS-7	Off	27.26
IWS-8	Off	26.96
IWS-9	Off	26.94

Comments on IWS System

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?
IWS System (Effluent of primary GAC)		
SVE System (Effluent of primary GAC)		

If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples coll Yes ☐ No ☒

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

Pulse Pumping Schedule for IWS System

Wells Pumping after January 2009Sampling event	IWS-4, IWS-6
Wells Pumping after May 2009 sampling event	IWS-3, IWS-5, IWS-6
Wells Pumping after August 2009 Sampling event	IWS-3, IWS-6
Wells Pumping after October 2009 Sampling event	IWS-5, IWS-6

Name: Richard Read **Date:** 11/11/2009

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	scfm	off	210
Vacuum Blower In	in H_20	off	-28
Vacuum Blower Ou	in H_20	off	20
Pressure Blower D	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Ou	deg F	off	120

Individual Well Measurements

	Flow (scfm)	Depth to Water (ft btc)
IWS-1	Off	26.18
IWS-2	Off	27.17
IWS-3	Off	27.01
IWS-4	Off	26.58
IWS-5	40	26.16
IWS-6	40	26.74
IWS-7	Off	27.30
IWS-8	Off	27.00
IWS-9	Off	26.98

Comments on IWS System

Changed oil in Blower.

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?
IWS System (Effluent of primary GAC)		
SVE System (Effluent of primary GAC)		

If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples coll Yes ☐ No ☒

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

Pulse Pumping Schedule for IWS System

Wells Pumping after January 2009Sampling event	IWS-4, IWS-6
Wells Pumping after May 2009 sampling event	IWS-3, IWS-5, IWS-6
Wells Pumping after August 2009 Sampling event	IWS-3, IWS-6
Wells Pumping after October 2009 Sampling event	IWS-5, IWS-6

Richard Read **Date:** 12/14/2009

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	scfm	off	210
Vacuum Blower In	in H_20	off	-28
Vacuum Blower Ou	in H_20	off	20
Pressure Blower C	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Ou	deg F	off	120

Individual Well Measurements

	Flow (scfm)	Depth to Water (ft btc)
IWS-1	Off	26.58
IWS-2	Off	27.57
IWS-3	Off	27.41
IWS-4	Off	26.98
IWS-5	40	26.56
IWS-6	40	27.14
IWS-7	Off	27.65
IWS-8	Off	27.40
IWS-9	Off	27.38

Comments on IWS System

Off Gas Treatment System

PID Measurement

	PPM	> 5 ?
IWS System (Effluent of primary GAC)		
SVE System (Effluent of primary GAC)		

If > 5 ppm, contact carbon service for carbon disposal and replacement

Samples Collected

Were samples coll **Yes** ☐ **No** ☒

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

Pulse Pumping Schedule for IWS System

Wells Pumping after January 2009Sampling event	IWS-4, IWS-6
Wells Pumping after May 2009 sampling event	IWS-3, IWS-5, IWS-6
Wells Pumping after August 2009 Sampling event	IWS-3, IWS-6
Wells Pumping after October 2009 Sampling event	IWS-5, IWS-6

Name: Richard Read **Date:** 1/22/2010

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	scfm	off	210
Vacuum Blower In	in H_20	off	-28
Vacuum Blower Ou	in H_20	off	20
Pressure Blower C	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Ou	deg F	off	120

Individual Well Measurements

	Flow (scfm)	Depth to Water (ft btc)
IWS-1	off	26.76
IWS-2	off	27.75
IWS-3	off	27.60
IWS-4	off	27.16
IWS-5	40	26.74
IWS-6	40	27.32
IWS-7	off	27.73
IWS-8	off	27.82
IWS-9	off	27.58

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 coll **Yes** ☐ **No** ☒

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

Name: Richard Read **Date:** 2/12/2010

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	scfm	off	210
Vacuum Blower Inl	in H_20	off	-28
Vacuum Blower Ou	in H_20	off	20
Pressure Blower O	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Ou	deg F	off	120

Individual Well Measurements

	Flow (scfm)	Depth to Water (ft btc)
IWS-1	off	26.80
IWS-2	off	27.79
IWS-3	off	27.64
IWS-4	off	27.20
IWS-5	40	26.75
IWS-6	40	27.34
IWS-7	off	27.78
IWS-8	off	27.86
IWS-9	off	27.62

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 coll **Yes** ☐ **No** ☒

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

Name: Richard Read **Date:** 3/18/2010

In Well Stripping System

Operating Parameters

		System 1 (South Side)	System 2 (North Side)
Total System Flow	scfm	off	210
Vacuum Blower In	in H_20	off	-28
Vacuum Blower Ou	in H_20	off	20
Pressure Blower C	deg F	off	150
Operating Hz	%	off	100
Secondary GAC Ou	deg F	off	120

Individual Well Measurements

	Flow (scfm)	Depth to Water (ft btc)
IWS-1	off	26.24
IWS-2	off	26.82
IWS-3	off	26.80
IWS-4	off	26.30
IWS-5	40	26.04
IWS-6	40	26.32
IWS-7	off	26.89
IWS-8	off	26.50
IWS-9	off	26.74

Comments on IWS System

Changed oil in Blower.

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 coll 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

Boomsnub Biweekly System Monitoring Checklist

Name: Rick Read **Date:** 10/13/09

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.010	3	13%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.00, 3.99 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	6.32
Pre-IX	6.33
IX Effluent	6.34
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	78778790	10:38
IX Influent Flow Meter	156	11436145	10:28
AS Influent Flow Meter	156	38043636	10:27
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

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

TCE Concentrations:

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

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	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	16 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	4
Bag Filters	13
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	39
20 Micron 30 inch	4
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes
INF-100509	CAS	10/5/09	8260b, T.Cr, pH
INFD-100509	CAS	10/5/09	8260b, T.Cr, pH
EFF-100509	CAS	10/5/09	8260b, T.Cr, pH
EFFD-100509	CAS	10/5/09	8260b, T.Cr, pH
TB-100509	CAS	10/5/09	8260b

Comments:

Pulled pump out of MW-48 on 10/12/09 due to damaged pump.

Boomsnub Biweekly System Monitoring Checklist

Name: Rick Read **Date:** 10/27/09

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.010	3	13%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

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

Location:	pH
Well Field	6.32
Pre-IX	6.33
IX Effluent	6.34
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	154		
Well Field Influent	154	81847205	16:50
IX Influent Flow Meter	155	71742547	16:52
AS Influent Flow Meter	154	38405450	16:53
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)	72

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? Repairs were made to the sump pump connection in CV-13 on 10/15/09.
A butterfly valve was intalled in CV-12 on 10/22/09.

Inventory:

	Quantity
Gloves	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	11
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	35
20 Micron 30 inch	4
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes

Comments:

Boomsnub Biweekly System Monitoring Checklist

Name: Rick Read **Date:** 11/10/09

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.010	3	13%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

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

Location:	pH
Well Field	6.32
Pre-IX	6.33
IX Effluent	6.34
Final Discharge	7.84

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	84849552	14:08
IX Influent Flow Meter	156	72044884	14:01
AS Influent Flow Meter	156	38739209	14:03
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)	72

Maintenance:

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

Inventory:

	Quantity
Gloves	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	11
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	35
20 Micron 30 inch	4
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes
INF-110309	CAS	11/3/09	8260b, T.Cr, pH
EFF-110309	CAS	11/3/09	8260b, T.Cr, pH
EFFD-110309	CAS	11/3/09	8260b, T.Cr, pH
TB-110309	CAS	11/3/09	8260b

Comments:

Boomsnub Biweekly System Monitoring Checklist

Name: Rick Read **Date:** 11/24/09

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.013	3	16%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.01, 3.98 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	6.33
Pre-IX	6.34
IX Effluent	6.34
Final Discharge	7.84

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	87851900	12:19
IX Influent Flow Meter	156	72347222	12:16
AS Influent Flow Meter	156	39072968	12:17
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)	70

Maintenance:

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

Inventory:

	Quantity
Gloves	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	10
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	35
20 Micron 30 inch	4
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes

Comments:

Boomsnub Biweekly System Monitoring Checklist

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

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.016	3	20%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.01, 3.98 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	6.34
Pre-IX	6.35
IX Effluent	6.35
Final Discharge	7.86

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	154		
Well Field Influent	154	91145485	15:22
IX Influent Flow Meter	154	72680220	15:35
AS Influent Flow Meter	154	39438135	15:34
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	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	10
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	35
20 Micron 30 inch	0
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes
INF-120309	CAS	12/3/09	8260b, T.Cr, pH
EFF-120309	CAS	12/3/09	8260b, T.Cr, pH
EFFD-120309	CAS	12/3/09	8260b, T.Cr, pH
TB-120309	CAS	12/3/09	8260b

Comments:

Boomsnub Biweekly System Monitoring Checklist

Name: Rick Read **Date:** 12/23/09

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.016	3	20%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

Initial Calibration 7.01, 3.98 **Final Calibration** 7.0, 4.0

Location:	pH
Well Field	6.34
Pre-IX	6.35
IX Effluent	6.37
Final Discharge	7.86

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	147		
Well Field Influent	147	94008675	15:23
IX Influent Flow Meter	147	72970165	15:17
AS Influent Flow Meter	147	39755485	15:18
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	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	9
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	27
20 Micron 30 inch	0
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes

Comments:

Noticed MW-21D not pumping.

Name: Rick Read **Date:** 01/08/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.016	3	20%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

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

Location:	pH
Well Field	6.35
Pre-IX	6.36
IX Effluent	6.37
Final Discharge	7.87

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	149		
Well Field Influent	149	97410714	16:24
IX Influent Flow Meter	149	73310369	16:18
AS Influent Flow Meter	149	40095689	16:19
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	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	9
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	27
20 Micron 30 inch	0
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes
INF-010710	CAS	1/7/10	8260b, T.Cr, pH
EFF-010710	CAS	1/7/10	8260b, T.Cr, pH
EFFD-010710	CAS	1/7/10	8260b, T.Cr, pH
TB-010710	CAS	1/7/10	8260b

Comments:

MW-21D re-started on 01/08/10. Split EFF sample with COV.

MW-14C is still not hooked up.

Name: Rick Read **Date:** 01/22/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.016	3	20%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

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

Location:	pH
Well Field	6.34
Pre-IX	6.36
IX Effluent	6.36
Final Discharge	7.85

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	252799	16:30
IX Influent Flow Meter	155	73602262	16:24
AS Influent Flow Meter	155	40437417	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	10 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	9
Canister Filters	
10 Micron 29.25 inch	40
10 Micron 30 inch	27
20 Micron 30 inch	0
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes

Comments:

Got MW-14C running on 1/12/10.

Name: Rick Read **Date:** 02/04/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.07		
Primary	0.00	3	0%
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	6.35
Pre-IX	6.36
IX Effluent	6.38
Final Discharge	7.88

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	3024320	16:55
IX Influent Flow Meter	155	73885746	16:58
AS Influent Flow Meter	155	40762845	16:59
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	10 Boxes
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	23
20 Micron 30 inch	0
75 Micron 30 inch	

Sampling:

Location	Lab	Date	Analytes
INF-020310	CAS	2/3/10	8260b, T.Cr, pH
EFF-020310	CAS	2/3/10	8260b, T.Cr, pH
EFFD-020310	CAS	2/3/10	8260b, T.Cr, pH
TB-020310	CAS	2/3/10	8260b

Comments:

Name: Rick Read **Date:** 02/22/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.07		
Primary	0.00	3	0%
Secondary	ND	1	
Final Discharge	ND		

System pH Measurements:

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

Location:	pH
Well Field	6.34
Pre-IX	6.36
IX Effluent	6.38
Final Discharge	7.88

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	155		
Well Field Influent	155	6971460	14:45
IX Influent Flow Meter	155	7428783	14:41
AS Influent Flow Meter	155	41218602	14:42
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)	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	9 Boxes
Drums Empty 55-gal	11
Super sacks Spent Resin	0
Bag Filters	5
Canister Filters	
10 Micron 29.25 inch	6
10 Micron 30 inch	23
20 Micron 29.25 inch	20
20 Micron 30 inch	20

Sampling:

Location	Lab	Date	Analytes

Comments:

Name: Rick Read **Date:** 03/09/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.07		
Primary	0.00	3	0%
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	6.35
Pre-IX	6.36
IX Effluent	6.39
Final Discharge	7.88

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	156		
Well Field Influent	156	10277385	14:27
IX Influent Flow Meter	157	74619154	14:24
AS Influent Flow Meter	156	41717602	14:25
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)	52
Pre-Carbon Air Temperature (F^o)	70

Maintenance:

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

Inventory:

	Quantity
Gloves	10 Boxes
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	3
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes
INF-030410	CAS	3/4/10	8260b, T.Cr, pH
EFF-030410	CAS	3/4/10	8260b, T.Cr, pH
EFFD-030410	CAS	3/4/10	8260b, T.Cr, pH
TB-030410	CAS	3/4/10	8260b

Comments:

Name: Rick Read **Date:** 03/22/10

Groundwater Treatment:

Ion Exchange System Chromium Testing:

Kit Used: DR 100 Colorimeter

Test Location:	Chromium (ppm)	ID#	%
Well Field Influent	0.08		
Primary	0.01	3	13%
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	6.36
Pre-IX	6.37
IX Effluent	6.39
Final Discharge	7.89

System Flow Rates:

Location:	GPM	Totalizer	Time
Total Flow from Wells	156		
Well Field Influent	156	13151870	16:10
IX Influent Flow Meter	157	74909770	16:15
AS Influent Flow Meter	156	42156920	16:16
COV Sewer Flow Meter			
Boomsnub Inf. Gal. Flow Meter			
Calculated Flow to BOC Inf. Gal.			

Air Stripper Monitoring:

Pressure Readings:

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

TCE Concentrations:

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

Capsulhelic Gauge (In. H_2O)	1
Pre-Heater Air Temperature (F^o)	54
Pre-Carbon Air Temperature (F^o)	72

Maintenance:

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

Inventory:

	Quantity
Gloves	10 Boxes
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	3
20 Micron 30 inch	0
30 Micron 30 inch	20
75 Micron 30 inch	0

Sampling:

Location	Lab	Date	Analytes

Comments:

Appendix C.2

OU-3 System Operation Tables

APPENDIX C.2 - TABLE 1A
OU-3 OCTOBER 2009 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
10/01/09	226,385	24.00	100.00%
10/02/09	226,076	24.00	100.00%
10/03/09	226,161	24.00	100.00%
10/04/09	226,127	24.00	100.00%
10/05/09	226,033	24.00	100.00%
10/06/09	225,907	24.00	100.00%
10/07/09	225,894	24.00	100.00%
10/08/09	225,822	24.00	100.00%
10/09/09	225,833	24.00	100.00%
10/10/09	225,839	24.00	100.00%
10/11/09	226,047	24.00	100.00%
10/12/09	225,798	24.00	100.00%
10/13/09	226,005	24.00	100.00%
10/14/09	226,020	24.00	100.00%
10/15/09	213,636	24.00	100.00%
10/16/09	208,065	24.00	100.00%
10/17/09	225,421	24.00	100.00%
10/18/09	225,453	24.00	100.00%
10/19/09	225,574	24.00	100.00%
10/20/09	225,604	24.00	100.00%
10/21/09	224,537	24.00	100.00%
10/22/09	215,348	24.00	100.00%
10/23/09	209,530	24.00	100.00%
10/24/09	223,468	24.00	100.00%
10/25/09	223,414	24.00	100.00%
10/26/09	223,021	24.00	100.00%
10/27/09	222,926	24.00	100.00%
10/28/09	222,367	23.30	97.08%
10/29/09	223,180	24.00	100.00%
10/30/09	223,009	24.00	100.00%
10/31/09	222,965	24.00	100.00%
Subtotals	**6,921,469**	**743.30**	**99.91%**
Scheduled Downtime/Maintenance[3]		0.70	
Total Hours/Month		744	
Total Operating Hours/Availability %		**744.00**	**100.00%**
Daily Breakdown		**October 2009**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		223,283	230,400
Maximum Daily Flow (gallons)		226,385	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		9253	
Average Daily Flow (hundreds of cubic feet)		298	

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 2009 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
11/01/09	232,424	24.00	100.00%[5]
11/02/09	223,162	24.00	100.00%
11/03/09	222,527	24.00	100.00%
11/04/09	221,504	24.00	100.00%
11/05/09	221,513	24.00	100.00%
11/06/09	219,146	23.73	98.89%
11/07/09	195,234	21.27	88.61%
11/08/09	219,681	24.00	100.00%
11/09/09	219,604	24.00	100.00%
11/10/09	216,137	23.98	99.93%
11/11/09	221,916	24.00	100.00%
11/12/09	220,988	24.00	100.00%
11/13/09	221,911	24.00	100.00%
11/14/09	221,922	24.00	100.00%
11/15/09	221,860	24.00	100.00%
11/16/09	221,826	24.00	100.00%
11/17/09	221,771	24.00	100.00%
11/18/09	221,847	24.00	100.00%
11/19/09	221,766	24.00	100.00%
11/20/09	189,191	20.52	85.49%
11/21/09	222,345	24.00	100.00%
11/22/09	222,401	24.00	100.00%
11/23/09	222,422	24.00	100.00%
11/24/09	222,332	24.00	100.00%
11/25/09	222,359	24.00	100.00%
11/26/09	216,900	23.35	97.29%
11/27/09	222,416	24.00	100.00%
11/28/09	222,301	24.00	100.00%
11/29/09	222,257	24.00	100.00%
11/30/09	221,962	23.98	99.93%
Subtotals	**6,593,625**	**712.83**	**99.00%**

Scheduled Downtime/Maintenance[3]	2.34	
Total Hours/Month	720	
Total Operating Hours/Availability %	**715.17**	**99.33%**
Daily Breakdown	**November 2009**	**Vancouver Permit Limits**[4]
Average Daily Flow (gallons)	219,788	230,400
Maximum Daily Flow (gallons)	232,424	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	8815	
Average Daily Flow (hundreds of cubic feet)	294	

Notes:

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

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

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

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

[5] Data reflects daylight savings time on November 2.

APPENDIX C.2 - TABLE 1C
OU-3 DECEMBER 2009 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
12/01/09	222,227	24.00	100.00%
12/02/09	222,383	24.00	100.00%
12/03/09	222,402	24.00	100.00%
12/04/09	222,494	24.00	100.00%
12/05/09	222,488	24.00	100.00%
12/06/09	222,434	24.00	100.00%
12/07/09	222,507	24.00	100.00%
12/08/09	222,573	24.00	100.00%
12/09/09	222,539	24.00	100.00%
12/10/09	222,541	24.00	100.00%
12/11/09	211,862	23.48	97.85%
12/12/09	214,336	24.00	100.00%
12/13/09	214,249	24.00	100.00%
12/14/09	189,558	22.23	92.64%
12/15/09	208,189	23.25	96.88%
12/16/09	209,475	24.00	100.00%
12/17/09	191,542	21.93	91.39%
12/18/09	211,198	23.92	99.65%
12/19/09	213,275	24.00	100.00%
12/20/09	213,313	24.00	100.00%
12/21/09	211,700	24.00	100.00%
12/22/09	209,567	24.00	100.00%
12/23/09	209,550	24.00	100.00%
12/24/09	209,221	24.00	100.00%
12/25/09	209,722	24.00	100.00%
12/26/09	209,722	24.00	100.00%
12/27/09	209,707	24.00	100.00%
12/28/09	209,651	24.00	100.00%
12/29/09	209,763	24.00	100.00%
12/30/09	209,674	24.00	100.00%
12/31/09	189,135	21.55	89.79%
Subtotals	**6,588,997**	**736.37**	**98.97%**

Scheduled Downtime/Maintenance[3]	1.35	
Total Hours/Month	744	
Total Operating Hours/Availability %	**737.72**	**99.16%**

Daily Breakdown	**December 2009**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)	213,329	230,400
Maximum Daily Flow (gallons)	222,573	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	8809	
Average Daily Flow (hundreds of cubic feet)	284	

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 2010 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
01/01/10	209,570	24.00	100.00%
01/02/10	209,489	24.00	100.00%
01/03/10	148,640	24.00	100.00%
01/04/10	147,340	22.67	94.44%
01/05/10	182,242	22.02	91.74%
01/06/10	208,894	24.00	100.00%
01/07/10	208,690	24.00	100.00%
01/08/10	211,275	24.00	100.00%
01/09/10	214,305	24.00	100.00%
01/10/10	214,219	24.00	100.00%
01/11/10	214,249	24.00	100.00%
01/12/10	218,879	23.83	99.31%
01/13/10	224,543	24.00	100.00%
01/14/10	224,561	24.00	100.00%
01/15/10	223,689	23.85	99.38%
01/16/10	225,006	24.00	100.00%
01/17/10	225,059	24.00	100.00%
01/18/10	224,956	24.00	100.00%
01/19/10	224,929	24.00	100.00%
01/20/10	225,067	24.00	100.00%
01/21/10	224,982	24.00	100.00%
01/22/10	224,987	24.00	100.00%
01/23/10	224,917	24.00	100.00%
01/24/10	224,940	24.00	100.00%
01/25/10	224,958	24.00	100.00%
01/26/10	224,865	24.00	100.00%
01/27/10	224,854	24.00	100.00%
01/28/10	224,833	24.00	100.00%
01/29/10	224,858	24.00	100.00%
01/30/10	224,880	24.00	100.00%
01/31/10	225,095	24.00	100.00%
Subtotals	**6,659,770**	**740.37**	**99.51%**
Scheduled Downtime/Maintenance[3]		0.32	
Total Hours/Month		744	
Total Operating Hours/Availability %		**740.69**	**99.55%**
Daily Breakdown		**January 2010**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)		214,489	230,400
Maximum Daily Flow (gallons)		225,095	230,400
Hundreds of Cubic Feet Breakdown			
Total Flow (hundreds of cubic feet)		8903	
Average Daily Flow (hundreds of cubic feet)		287	

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 2010 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
02/01/10	225,168	24.00	100.00%
02/02/10	225,053	24.00	100.00%
02/03/10	225,013	24.00	100.00%
02/04/10	225,044	24.00	100.00%
02/05/10	224,774	23.25	96.88%
02/06/10	225,761	24.00	100.00%
02/07/10	225,769	24.00	100.00%
02/08/10	225,877	24.00	100.00%
02/09/10	225,833	24.00	100.00%
02/10/10	225,883	24.00	100.00%
02/11/10	225,786	24.00	100.00%
02/12/10	225,820	24.00	100.00%
02/13/10	225,711	24.00	100.00%
02/14/10	225,882	24.00	100.00%
02/15/10	225,764	24.00	100.00%
02/16/10	225,804	24.00	100.00%
02/17/10	225,903	24.00	100.00%
02/18/10	225,908	24.00	100.00%
02/19/10	225,864	24.00	100.00%
02/20/10	225,914	24.00	100.00%
02/21/10	225,952	24.00	100.00%
02/22/10	225,947	24.00	100.00%
02/23/10	225,998	24.00	100.00%
02/24/10	225,977	24.00	100.00%
02/25/10	225,903	24.00	100.00%
02/26/10	222,938	23.65	98.54%
02/27/10	225,734	24.00	100.00%
02/28/10	225,755	24.00	100.00%
Subtotals	**6,316,735**	**670.90**	**99.84%**

Scheduled Downtime/Maintenance[3]	1.10	
Total Hours/Month	672	
Total Operating Hours/Availability %	**672.00**	**100.00%**
Daily Breakdown	**February 2010**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)	225,598	230,400
Maximum Daily Flow (gallons)	225,998	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	8445	
Average Daily Flow (hundreds of cubic feet)	302	

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 2010 GROUNDWATER EXTRACTION SUMMARY
BOOMSNUB/AIRCO SUPERFUND SITE

Date	Total Flow gpd[1]	System Operating Hours[2]	System Operating Percentage
03/01/10	225,780	24.00	100.00%
03/02/10	225,828	24.00	100.00%
03/03/10	225,927	24.00	100.00%
03/04/10	225,866	24.00	100.00%
03/05/10	225,857	24.00	100.00%
03/06/10	225,765	24.00	100.00%
03/07/10	225,721	24.00	100.00%
03/08/10	225,770	24.00	100.00%[5]
03/09/10	225,810	24.00	100.00%
03/10/10	225,695	24.00	100.00%
03/11/10	221,702	23.58	98.26%
03/12/10	225,807	24.00	100.00%
03/13/10	225,643	24.00	100.00%
03/14/10	216,248	23.00	95.83%
03/15/10	225,743	24.00	100.00%
03/16/10	225,513	24.00	100.00%
03/17/10	225,684	24.00	100.00%
03/18/10	225,769	24.00	100.00%
03/19/10	225,635	24.00	100.00%
03/20/10	225,604	24.00	100.00%
03/21/10	225,379	24.00	100.00%
03/22/10	225,317	24.00	100.00%
03/23/10	225,272	24.00	100.00%
03/24/10	225,158	24.00	100.00%
03/25/10	225,413	24.00	100.00%
03/26/10	225,421	24.00	100.00%
03/27/10	225,607	24.00	100.00%
03/28/10	225,645	24.00	100.00%
03/29/10	223,592	23.72	98.82%
03/30/10	226,411	24.00	100.00%
03/31/10	224,901	23.88	99.51%
Subtotals	**6,979,482**	**742.18**	**99.76%**

Scheduled Downtime/Maintenance[3]	0.40	
Total Hours/Month	744	
Total Operating Hours/Availability %	**742.58**	**99.81%**
Daily Breakdown	**March 2010**	**Vancouver Permit Limits[4]**
Average Daily Flow (gallons)	225,153	230,400
Maximum Daily Flow (gallons)	226,411	230,400
Hundreds of Cubic Feet Breakdown		
Total Flow (hundreds of cubic feet)	9331	
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.

[5] Data reflects daylight savings time on March 8.

APPENDIX C.2 - TABLE 2A

OU-3 EXTRACTION WELL PUMPING RATES FOR OCTOBER 2009
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.5	9323680	12:59
MW-6B	8.0	3205490	14:02
MW-10B	7.2	3147300	13:59
MW-10C	9.0	436630	14:00
CPU-13	12.0	284024	13:31
MW-14C	12.0	1939940	13:55
MW-14E	7.0	166190	13:56
MW-18D	7.5	453140	13:52
MW-19D	12.7	8903780	13:46
MW-20D	15.3	22663	13:11
MW-21D	6.9	499728	13:17
MW-22D	10.5	565760	13:22
MW-25D	11.2	8403610	13:39
MW-26D	12.3	533420	13:34
MW-27D	3.7	401520	13:29
AMW-27	1.0	5146460	13:38
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	9.0	1980080	13:36
Total	154.8		

Notes:
Pumps in MW-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 2009
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.2	9741910	13:04
MW-6B	8.0	3543950	13:59
MW-10B	8.0	3484470	13:57
MW-10C	8.8	832880	13:56
CPU-13	13.3	364324	13:29
MW-14C	12.0	2482100	13:53
MW-14E	7.0	470800	13:54
MW-18D	7.6	754201	13:49
MW-19D	12.7	9488970	13:45
MW-20D	18.7	116562	13:13
MW-21D	7.2	542357	13:19
MW-22D	11.0	631983	13:22
MW-25D	11.3	8920900	13:39
MW-26D	12.9	5910490	13:32
MW-27D	off	404942	13:26
AMW-27	1.0	5166340	13:37
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	9.0	2404740	13:35
Total	157.7		

Notes:
Pumps in MW- 31, 37, 48 and AMW-42 were off during the reporting period.
Turned off MW-27D on 11/3/09.

APPENDIX C.2 - TABLE 2C

OU-3 EXTRACTION WELL PUMPING RATES FOR DECEMBER 2009
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.2	137660	15:25
MW-6B	8.0	3820100	16:15
MW-10B	8.0	3805970	16:13
MW-10C	9.0	1214360	16:14
CPU-13	13.5	440629	15:45
MW-14C	off	2743062	16:10
MW-14E	7.0	759870	16:09
MW-18D	8.0	1126270	16:05
MW-19D	13.2	31320	16:01
MW-20D	15.7	206174	15:32
MW-21D	off	570644	15:28
MW-22D	12.9	698896	15:42
MW-25D	11.9	9416880	15:54
MW-26D	14.5	6490000	15:49
MW-27D	off	404942	
AMW-27	1.0	5185932	15:57
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	11.6	2850730	15:51
Total	143.5		

Notes:
Pumps in MW- 31, 37, 48 and AMW-42 were off during the reporting period.
MW-21D pump motor went out on 12/11/09.
MW-14C pump motor went out on 12/21/09.
Turned off MW-27D on 11/3/09.

APPENDIX C.2 - TABLE 2D

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

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.0	492760	13:13
MW-6B	7.5	4115630	14:15
MW-10B	7.3	4097700	14:16
MW-10C	8.6	1560830	14:18
CPU-13	13.1	513906	13:49
MW-14C	12.0	3017930	14:11
MW-14E	7.0	1021570	14:12
MW-18D	7.6	1426240	14:08
MW-19D	12.7	535960	14:04
MW-20D	15.4	292426	13:24
MW-21D	10.5	609892	13:40
MW-22D	11.1	762252	13:44
MW-25D	11.0	9894610	13:59
MW-26D	12.5	7141840	13:52
MW-27D	off		
AMW-27	1.0	5204300	13:58
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	9.2	3269490	13:55
Total	155.5		

Notes:
Pumps in MW- 27, 31, 37, 48 and AMW-42 were off during the reporting period.
MW-21D pump replaced on 1/7/10. Restarted on 1/8/10
MW-14C pump replaced on 1/7/10. Restarted on 1/12/10

APPENDIX C.2 - TABLE 2E

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

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.0	898347	13:47
MW-6B	7.6	4448720	14:33
MW-10B	7.4	4427930	14:30
MW-10C	8.6	1954960	14:29
CPU-13	13.2	592125	14:06
MW-14C	12.0	3545630	14:25
MW-14E	7.0	1315420	14:26
MW-18D	7.7	1760640	14:22
MW-19D	12.8	1100840	14:18
MW-20D	15.3	383857	13:52
MW-21D	10.1	671032	13:59
MW-22D	11.0	824957	14:02
MW-25D	11.5	398930	14:15
MW-26D	12.5	7548950	14:11
MW-27D	off		
AMW-27	1.0	5224670	14:13
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	9.1	3675640	14:09
Total	155.8		

Notes:
Pumps in MW-27, 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 2010
BOOMSNUB/AIRCO SUPERFUND SITE

Well ID	Flow Rate (GPM)	Totalizer Reading	Time
PW-1B	9.0	1292360	15:10
MW-6B	7.6	4772020	16:05
MW-10B	7.4	4748350	16:03
MW-10C	8.6	2338160	16:02
CPU-13	13.2	667964	15:34
MW-14C	12.0	1597980	16:00
MW-14E	7.0	4056460	15:59
MW-18D	7.7	2085840	15:55
MW-19D	12.4	1638230	15:50
MW-20D	15.4	42682	15:18
MW-21D	10.6	730704	15:24
MW-22D	11.0	885963	15:28
MW-25D	11.4	888710	15:44
MW-26D	12.0	8011830	15:37
MW-27D	off		
AMW-27	1.0	5241490	15:42
MW-31	off		
MW-37	off		
AMW-42	off		
MW-48	off		
MW-49	9.6	4073020	15:39
Total	155.9		

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

APPENDIX C.2 - TABLE 3
OCTOBER 2009 THROUGH MARCH 2010
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 2009						
Influent	INF-100509	10/5/2009	23	1.7	64.2	6.62
Influent Duplicate	INFD-100509	10/5/2009	23	1.6	63.6	6.67
Effluent	EFF-100509	10/5/2009	0.67	0.5U	5U	7.98
Effluent Duplicate	EFFD-100509	10/5/2009	0.65	0.5U	5U	8.06
Trip Blank	TB-100509	10/5/2009	0.5U	0.5U	NA	NA
November 2009						
Influent	INF-110309	11/3/2009	24	1.6	63.7	6.51
Effluent	EFF-110309	11/3/2009	0.48J	0.5U	5U	7.88
Effluent Duplicate	EFFD-110309	11/3/2009	0.5	0.5U	5U	7.92
Trip Blank	TB-110309	11/3/2009	0.5U	0.5U	NA	NA
December 2009						
Influent	INF-120309	12/3/2009	25	1.7	66.2	6.57
Effluent	EFF-120309	12/3/2009	0.60	0.5U	5U	7.89
Effluent Duplicate	EFFD-120309	12/3/2009	0.57	0.5U	5U	7.96
Trip Blank	TB-120309	12/2/2009	0.5U	0.5U	NA	NA
January 2010						
Influent	INF-010710	1/7/2010	22	1.6	63.1	6.79
Effluent	EFF-010710	1/7/2010	0.54	0.5U	5U	8.01
Effluent Duplicate	EFFD-010710	1/7/2010	0.51	0.5U	5U	8.12
Trip Blank	TB-010710	1/7/2010	0.5U	0.5U	NA	NA
February 2010						
Influent	INF-020310	2/3/2010	22	1.5	66.4	6.89
Effluent	EFF-020310	2/3/2010	0.56	0.5U	0.9J	8.11
Effluent Duplicate	EFFD-020310	2/3/2010	0.52	0.5U	1.2J	8.12
Trip Blank	TB-020310	2/3/2010	0.5U	0.5U	NA	NA
March 2010						
Influent	INF-030410	3/4/2010	21	1.6	66.4	6.74
Effluent	EFF-030410	3/4/2010	0.51	0.5U	5U	8.05
Effluent Duplicate	EFFD-030410	3/4/2010	0.51	0.5U	5U	8.06
Trip Blank	TB-030410	3/4/2010	0.5U	0.5U	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

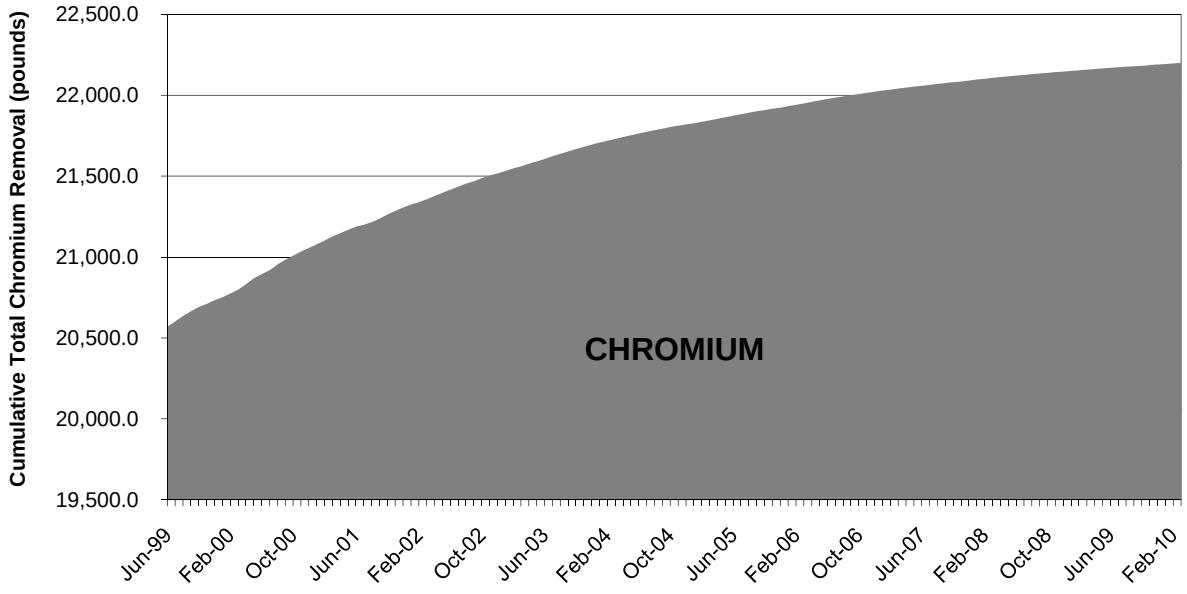
Date	Monthly Flow (Gallons)	Influent Chromium (ug/L)	Influent TCE (ug/L)	Monthly Chromium Removal (lbs)	Monthly TCE Removal (lbs)	Cumulative Chromium Removed (lbs)	Cumulative TCE Removed (lbs)
1990 to 1995[1]						13,751.0	
1995 to May 1999[1]						6,787.0	
1990 to 1999[1]							1,645.7
Ave. Jun-Dec 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
Jan-08	6,833,169	119.0	32.0	6.8	1.8	22,097.7	2,119.1
Feb-08	6,002,172	92.0	28.0	4.6	1.4	22,102.3	2,120.5
Mar-08	6,687,676	98.0	28.0	5.5	1.6	22,107.8	2,122.1
Apr-08	6,750,916	83.4	30.0	4.7	1.7	22,112.5	2,123.8
May-08	6,939,545	82.2	25.0	4.8	1.4	22,117.2	2,125.2
Jun-08	6,663,172	81.0	25.0	4.5	1.4	22,121.7	2,126.6
Jul-08	6,805,123	78.0	27.0	4.4	1.5	22,126.2	2,128.2
Aug-08	6,735,334	81.8	26.0	4.6	1.5	22,130.8	2,129.6
Sep-08	6,556,666	75.8	26.0	4.1	1.4	22,134.9	2,131.0
Oct-08	6,698,931	73.6	26.0	4.1	1.5	22,139.0	2,132.5
Nov-08	6,568,134	75.0	20.0	4.1	1.1	22,143.2	2,133.6
Dec-08	5,333,703	70.6	23.0	3.1	1.0	22,146.3	2,134.6
Jan-09	6,549,104	76.3	21.0	4.2	1.1	22,150.5	2,135.8
Feb-09	6,161,087	73.4	23.0	3.8	1.2	22,154.2	2,137.0
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	2,148.1
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	2,150.7
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

[1] - Provided by ICF Kaiser

Note:

June 1999 through March 2002 data provided by URS

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



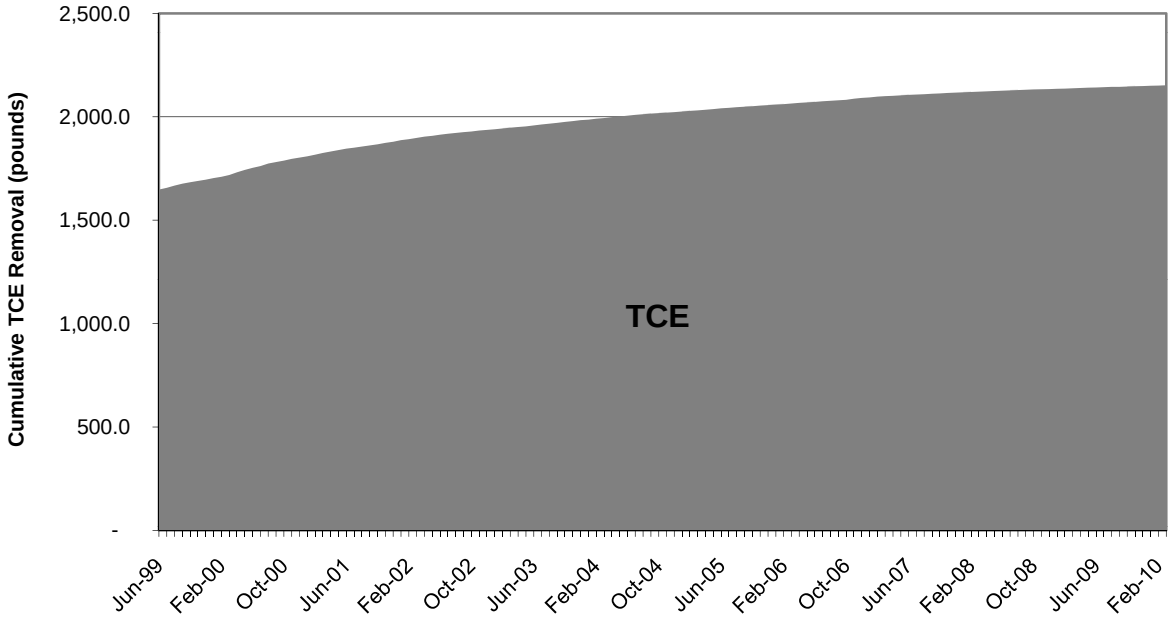
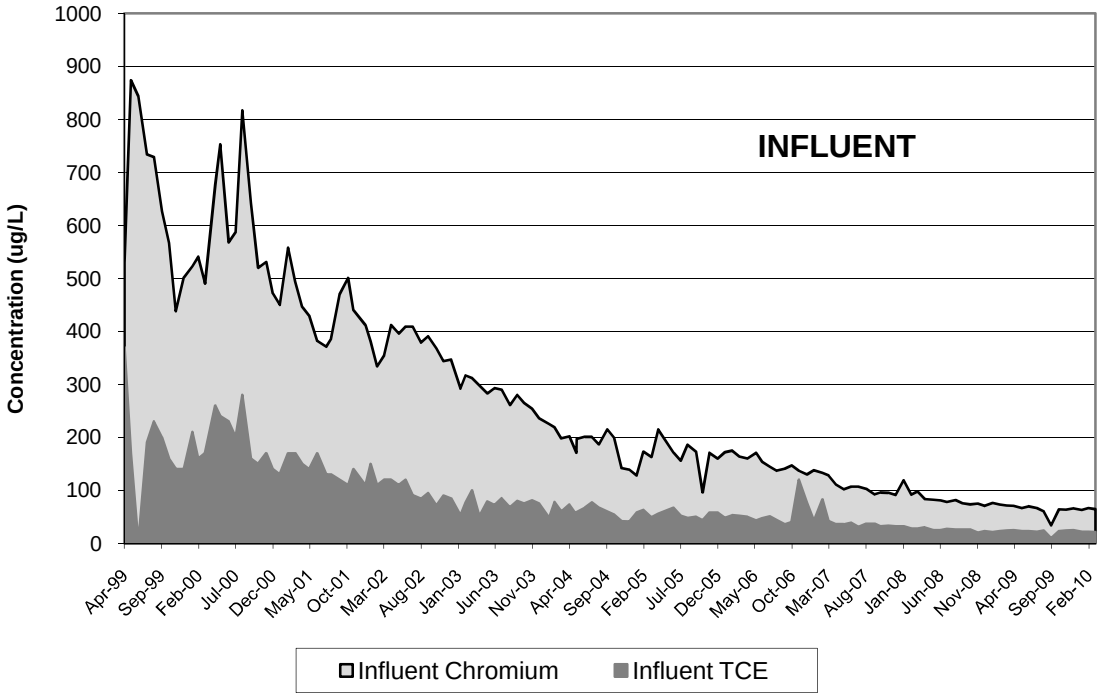


FIGURE C.3.2. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME



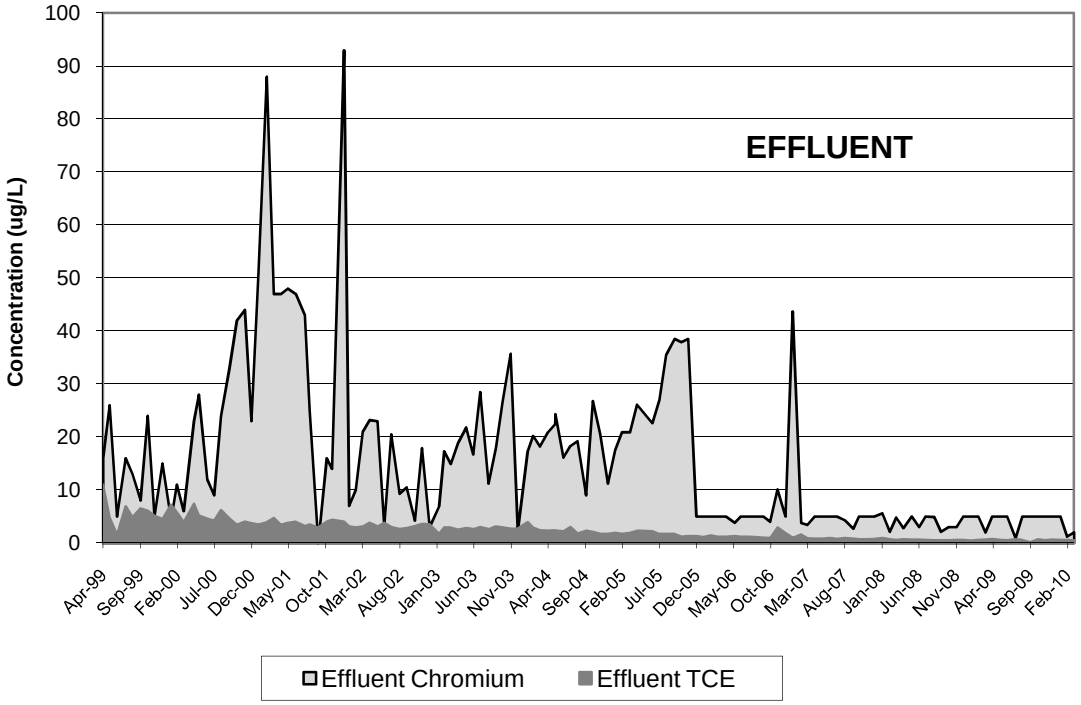
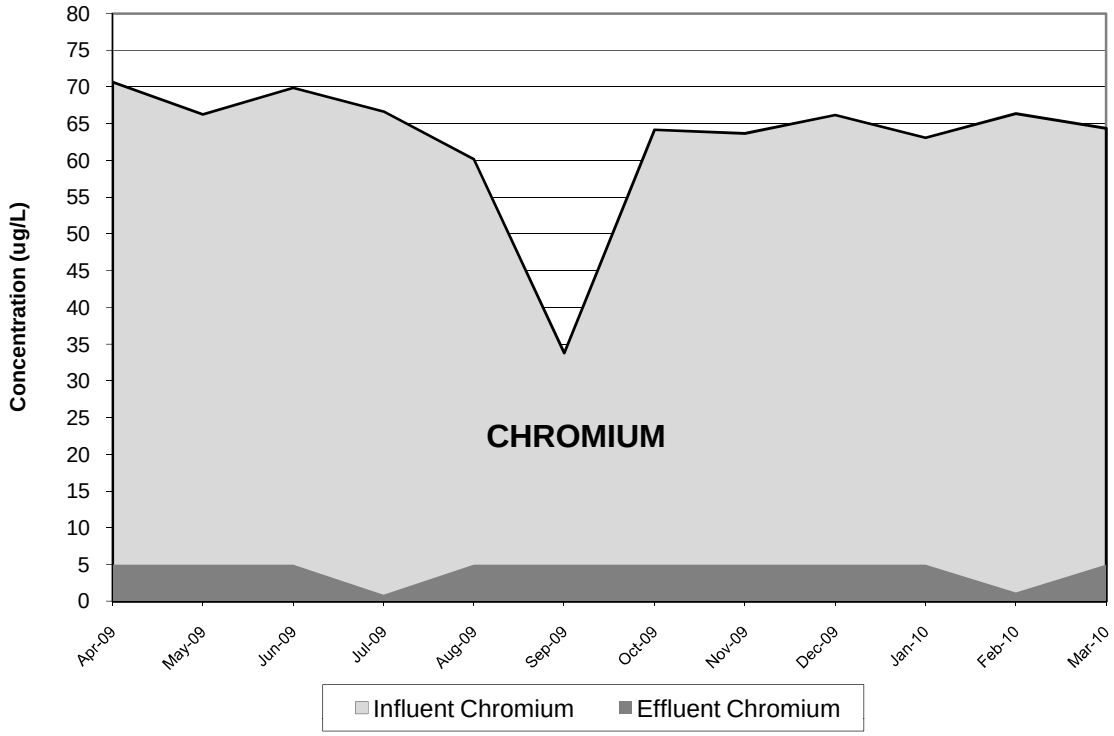


FIGURE C.3-3. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS OVER 1 YEAR



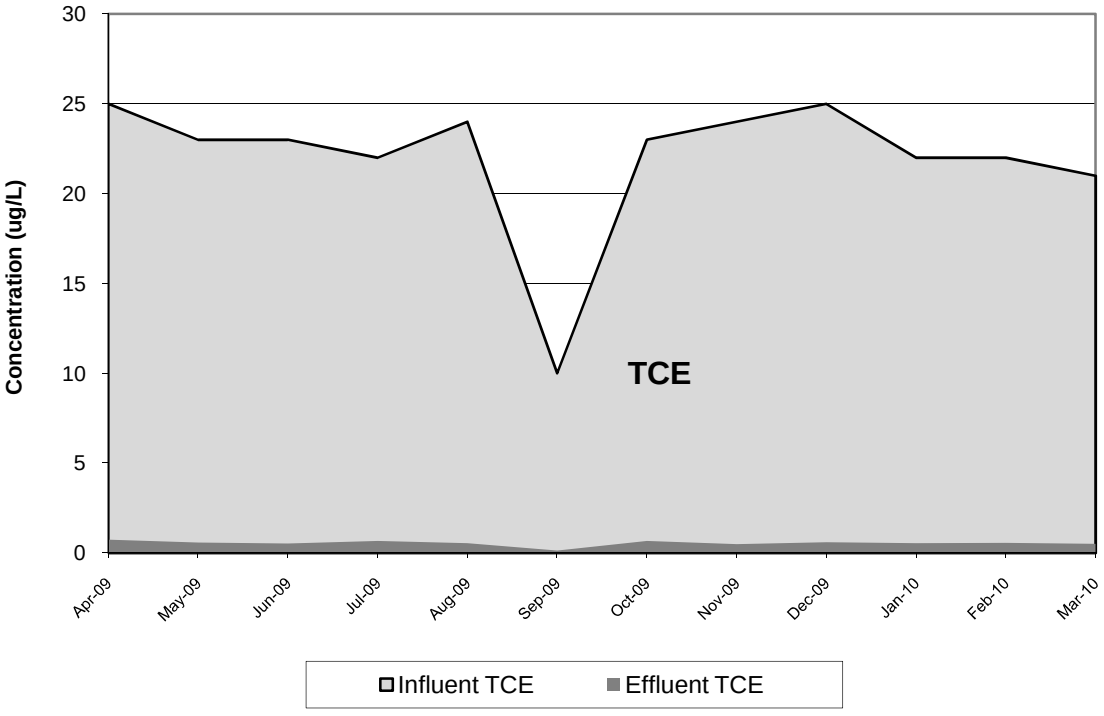
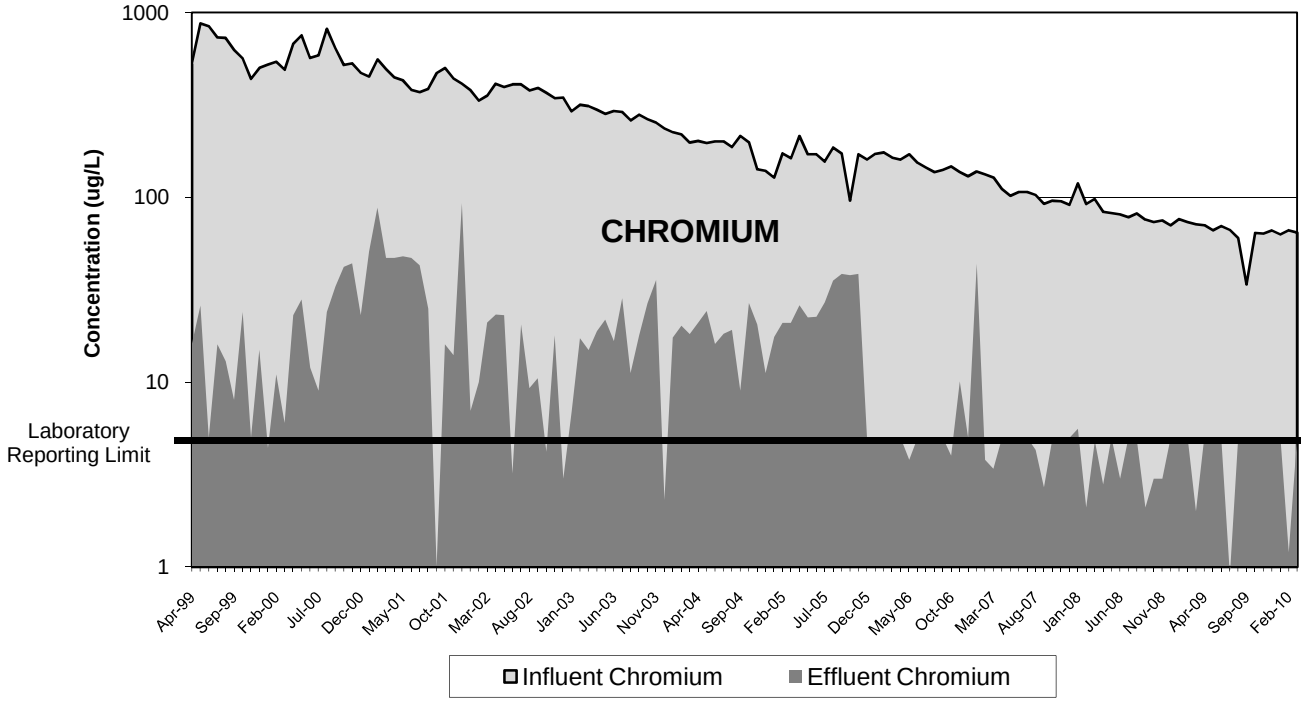
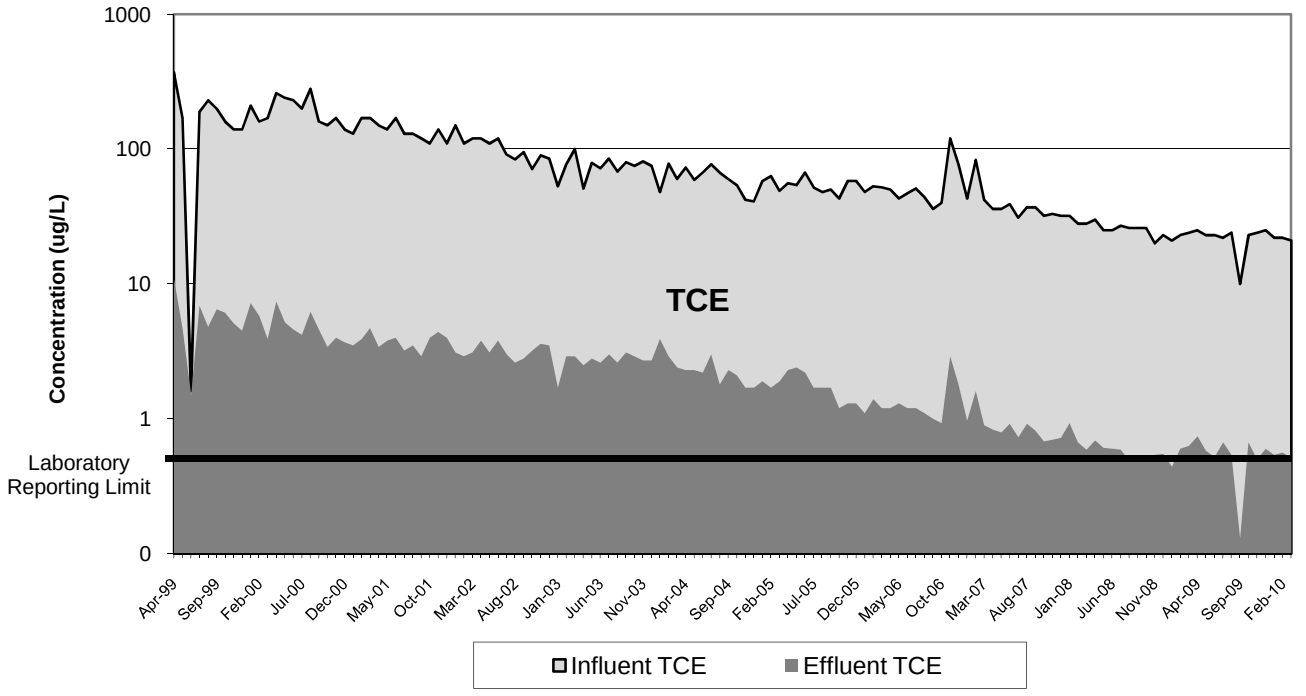


FIGURE C.3-4. OU-3 INFLUENT AND EFFLUENT CONCENTRATIONS VERSUS TIME - LOGARITHMIC SCALE





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: BOC Gases – Permit No. 2009-07

Contact: Jil Frain Phone: 425-451-7400

Report Date November 4, 2009 (for October 2009)	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 2009.

Signature: Jil M Z. Date: 11/4/09

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 4, 2009 (for November 2009)	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 2009.

Signature: Jim Z Date: 12-8-09

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 January 8, 2010 (for December 2009)	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 2009.

Signature: Jil M Z Date: 1/8/10

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 February 3, 2010 (for January 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 January 2010.

Signature: Jil M Z Date: 2/3/10

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 March 3, 2010 (for February 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 February 2010.

Signature: Jil M Z Date: 3/3/10

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 April 7, 2010 (for March 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 March 2010.

Signature: Jil Frain Date: 4.7.10

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

***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	270 gal. total	230,400 gpd	NA	One time discharge (7/21/09)
Peak Chrome** – mg/L	0.0009 B	1.7 mg/L	G	July 7, 2009/EA
Trichloroethene** – mg/L	0.00067	0.33 mg/L	G	July 7, 2009/EA
pH (high/low) – SU	8.11/8.06	9.0/5.5 SU	G	July 7, 2009/EA
Month 2 - August				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.002 U	1.7 mg/L	G	August 4, 2009/EA
Trichloroethene** – mg/L	0.00054	0.33 mg/L	G	August 4, 2009/EA
pH (high/low) - SU	8.20/8.19	9.0/5.5 SU	G	August 4, 2009/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 3, 2009/EA
Trichloroethene** – mg/L	0.00013 J	0.33 mg/L	G	September 3, 2009/EA
pH (high/low) - SU	8.15/8.10	9.0/5.5 SU	G	September 3, 2009/EA
Month 4 - October				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.002 U	1.7 mg/L	G	October 5, 2009/EA
Trichloroethene** – mg/L	0.00067	0.33 mg/L	G	October 5, 2009/EA
pH (high/low) – SU	8.06/7.98	9.0/5.5 SU	G	October 5, 2009/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, 2009/EA
Trichloroethene** – mg/L	0.0005	0.33 mg/L	G	November 3, 2009/EA
pH (high/low) - SU	7.92/7.88	9.0/5.5 SU	G	November 3, 2009/EA
Month 6 - December				
Peak Flow – gpd	0	230,400 gpd	NA	NA
Peak Chrome** – mg/L	0.002 U	1.7 mg/L	G	December 3, 2009/EA
Trichloroethene** – mg/L	0.0006	0.33 mg/L	G	December 3, 2009/EA
pH (high/low) - SU	7.96/7.89	9.0/5.5 SU	G	December 3, 2009/EA

Parameter	Value – mg/L	Limit	No. Samples
Semi-Annual Average - Chrome	0.0018	0.572 mg/L	12

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

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

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

Signature | Head of US SHE2 Operation *Title* | 1/13/10 *Date*

October 5, 2009
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K0909431
Project:	Boomsnub	**Date Received:**	10/05/09
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

Four field samples were received for analysis at Columbia Analytical Services on 10/05/09. 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

Initial Calibration Exceptions:
The primary evaluation criterion was exceeded for Vinyl Chloride, Trichlorofluoromethane, 1,1-Dichloroethene, 1,1,1-Trichloroethane and Carbon Tetrachloride in Initial Calibration (ICAL) ID 8893. In accordance with CAS standard operating procedures, the alternative evaluation specified in the EPA method was performed using the mean Relative Standard Deviation (RSD) of all analytes in the calibration. The result of the mean RSD calculation was 12.4%. The calibration met the alternative evaluation criteria. Note that CAS/Kelso policy does not allow the use of averaging if any analyte in the ICAL exceeds 30% RSD.

Matrix Spike Recovery Exceptions:
The control criteria for matrix spike recovery of Trichloroethene (TCE) for Batch QC were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

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

11/03/09

Approved by_____ **Date**_____

CHAIN OF CUSTODY

Columbia Analytical Services INC

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: 1090944-01

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.07.2009.0040-03
PROJECT MANAGER: J. I 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☐	Hex-Chrom☐ pH; Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020☐ AOX 1650☐ 506☐	REMARKS
INF - 100509	10/5/09	9:50		H_2O	5		X							X		X			
INFD-100509		9:55			5		X							X		X			
EFF-100509		10:00			5		X							X		X			
EFFD-100509		10:05			5		X							X		X			
TB-100509		NA	41131		2		X												

REPORT REQUIREMENTS

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

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

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

Requested Report Date

Circle which metals are to be analyzed:

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

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

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

SPECIAL INSTRUCTIONS/COMMENTS:

VOCs - 8260B
Total Metals - Cr
pH

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard Read	Signature: Jerra Jones	Signature:	Signature:
Date/Time: 10/5/09 10:15	Date/Time: 10/5/09 1120	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: Jerra Jones	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

RCOC #1 07/09

8

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : EA Engineering, Science, and Technology
Project Name : Boomsnub
Project Number : 14495.07.2009.0040-03
Sample Matrix : WATER

Service Request : K0909431
Date Collected : 10/05/09
Date Received : 10/05/09

pH

Analysis Method: SM 4500-H+ B
Test Notes :

Units : pH Units
Basis : NA

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date/Time Analyzed	Result	Result Notes
INF-100509	K0909431-001	-	-	1	10/05/09 16:34	6.62	
INFD-100509	K0909431-002	-	-	1	10/05/09 16:36	6.67	
EFF-100509	K0909431-003	-	-	1	10/05/09 16:37	7.98	
EFFD-100509	K0909431-004	-	-	1	10/05/09 16:38	8.06	

SM Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998.

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0909431
Project No.:	14495.07.2009.0040-03	**Date Collected:**	10/5/2009
Project Name:	Boomsnub	**Date Received:**	10/5/2009
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-100509 **Lab Code:** K0909431-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/26/09	10/28/09	64.2		

% Solids: 0.0

Comments:

METALS

-1-

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0909431
Project No.:	14495.07.2009.0040-03	**Date Collected:**	10/5/2009
Project Name:	Boomsnub	**Date Received:**	10/5/2009
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INFD-100509 **Lab Code:** K0909431-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/26/09	10/28/09	63.6		

% Solids: 0.0

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0909431
Project No.:	14495.07.2009.0040-03	**Date Collected:**	10/5/2009
Project Name:	Boomsnub	**Date Received:**	10/5/2009
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFF-100509 **Lab Code:** K0909431-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/26/09	10/28/09	2.0	U	

% Solids: 0.0

Comments:

METALS

- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0909431
Project No.:	14495.07.2009.0040-03	**Date Collected:**	10/5/2009
Project Name:	Boomsnub	**Date Received:**	10/5/2009
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-100509 **Lab Code:** K0909431-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	10/26/09	10/28/09	2.0	U	

% Solids: 0.0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0909431
Date Collected: 10/05/2009
Date Received: 10/05/2009

Volatile Organic Compounds

Sample Name: INF-100509
Lab Code: K0909431-001

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	10/13/09	10/13/09	KWG0909468	
Trichlorofluoromethane	**1.2**		0.50	0.12	1	10/13/09	10/13/09	KWG0909468	
1,1-Dichloroethene	**1.2**		0.50	0.074	1	10/13/09	10/13/09	KWG0909468	
Methylene Chloride	ND	U	2.0	0.17	1	10/13/09	10/13/09	KWG0909468	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
cis-1,2-Dichloroethene	**0.39**	J	0.50	0.067	1	10/13/09	10/13/09	KWG0909468	
1,1,1-Trichloroethane (TCA)	**0.27**	J	0.50	0.075	1	10/13/09	10/13/09	KWG0909468	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/09	10/13/09	KWG0909468	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/09	10/13/09	KWG0909468	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/09	10/13/09	KWG0909468	
Trichloroethene (TCE)	**23**		0.50	0.10	1	10/13/09	10/13/09	KWG0909468	
Tetrachloroethene (PCE)	**1.7**		0.50	0.066	1	10/13/09	10/13/09	KWG0909468	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/09	10/13/09	KWG0909468	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/09	10/13/09	KWG0909468	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/09	10/13/09	KWG0909468	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	118	73-122	10/13/09	Acceptable
Toluene-d8	105	78-129	10/13/09	Acceptable
4-Bromofluorobenzene	79	68-117	10/13/09	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0909431
Date Collected: 10/05/2009
Date Received: 10/05/2009

Volatile Organic Compounds

Sample Name: INFD-100509
Lab Code: K0909431-002

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	10/13/09	10/13/09	KWG0909468	
Trichlorofluoromethane	**1.1**		0.50	0.12	1	10/13/09	10/13/09	KWG0909468	
1,1-Dichloroethene	**1.4**		0.50	0.074	1	10/13/09	10/13/09	KWG0909468	
Methylene Chloride	ND	U	2.0	0.17	1	10/13/09	10/13/09	KWG0909468	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
cis-1,2-Dichloroethene	**0.48**	J	0.50	0.067	1	10/13/09	10/13/09	KWG0909468	
1,1,1-Trichloroethane (TCA)	**0.25**	J	0.50	0.075	1	10/13/09	10/13/09	KWG0909468	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/09	10/13/09	KWG0909468	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/09	10/13/09	KWG0909468	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/09	10/13/09	KWG0909468	
Trichloroethene (TCE)	**23**		0.50	0.10	1	10/13/09	10/13/09	KWG0909468	
Tetrachloroethene (PCE)	**1.6**		0.50	0.066	1	10/13/09	10/13/09	KWG0909468	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/09	10/13/09	KWG0909468	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/09	10/13/09	KWG0909468	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/09	10/13/09	KWG0909468	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	117	73-122	10/13/09	Acceptable
Toluene-d8	105	78-129	10/13/09	Acceptable
4-Bromofluorobenzene	80	68-117	10/13/09	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K0909431
Project:	Boomsnub/14495.07.2009.0040-03	**Date Collected:**	10/05/2009
Sample Matrix:	Water	**Date Received:**	10/05/2009

Volatile Organic Compounds

Sample Name:	EFF-100509	**Units:**	ug/L
Lab Code:	K0909431-003	**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	10/13/09	10/13/09	KWG0909468	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/13/09	10/13/09	KWG0909468	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/13/09	10/13/09	KWG0909468	
Methylene Chloride	ND	U	2.0	0.17	1	10/13/09	10/13/09	KWG0909468	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/13/09	10/13/09	KWG0909468	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/13/09	10/13/09	KWG0909468	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/09	10/13/09	KWG0909468	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/09	10/13/09	KWG0909468	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/09	10/13/09	KWG0909468	
Trichloroethene (TCE)	**0.67**		0.50	0.10	1	10/13/09	10/13/09	KWG0909468	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	10/13/09	10/13/09	KWG0909468	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/09	10/13/09	KWG0909468	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/09	10/13/09	KWG0909468	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/09	10/13/09	KWG0909468	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	118	73-122	10/13/09	Acceptable
Toluene-d8	104	78-129	10/13/09	Acceptable
4-Bromofluorobenzene	78	68-117	10/13/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0909431
Date Collected: 10/05/2009
Date Received: 10/05/2009

Volatile Organic Compounds

Sample Name: EFFD-100509
Lab Code: K0909431-004

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	10/13/09	10/13/09	KWG0909468	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/13/09	10/13/09	KWG0909468	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/13/09	10/13/09	KWG0909468	
Methylene Chloride	ND	U	2.0	0.17	1	10/13/09	10/13/09	KWG0909468	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/13/09	10/13/09	KWG0909468	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/13/09	10/13/09	KWG0909468	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/09	10/13/09	KWG0909468	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/09	10/13/09	KWG0909468	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/09	10/13/09	KWG0909468	
Trichloroethene (TCE)	**0.65**		0.50	0.10	1	10/13/09	10/13/09	KWG0909468	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	10/13/09	10/13/09	KWG0909468	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/09	10/13/09	KWG0909468	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/09	10/13/09	KWG0909468	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/09	10/13/09	KWG0909468	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	113	73-122	10/13/09	Acceptable
Toluene-d8	100	78-129	10/13/09	Acceptable
4-Bromofluorobenzene	80	68-117	10/13/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0909431
Date Collected: 10/05/2009
Date Received: 10/05/2009

Volatile Organic Compounds

Sample Name: TB-100509
Lab Code: K0909431-005

Units: ug/L
Basis: NA

Extraction Method: EPA 5030B
Analysis Method: 8260B

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	10/13/09	10/13/09	KWG0909468	
Trichlorofluoromethane	ND	U	0.50	0.12	1	10/13/09	10/13/09	KWG0909468	
1,1-Dichloroethene	ND	U	0.50	0.074	1	10/13/09	10/13/09	KWG0909468	
Methylene Chloride	ND	U	2.0	0.17	1	10/13/09	10/13/09	KWG0909468	
Bromodichloromethane	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	10/13/09	10/13/09	KWG0909468	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	10/13/09	10/13/09	KWG0909468	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	10/13/09	10/13/09	KWG0909468	
Dibromochloromethane	ND	U	0.50	0.14	1	10/13/09	10/13/09	KWG0909468	
Carbon Tetrachloride	ND	U	0.50	0.096	1	10/13/09	10/13/09	KWG0909468	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	10/13/09	10/13/09	KWG0909468	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	10/13/09	10/13/09	KWG0909468	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	10/13/09	10/13/09	KWG0909468	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	10/13/09	10/13/09	KWG0909468	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	10/13/09	10/13/09	KWG0909468	
Hexachlorobutadiene	ND	U	2.0	0.11	1	10/13/09	10/13/09	KWG0909468	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	116	73-122	10/13/09	Acceptable
Toluene-d8	102	78-129	10/13/09	Acceptable
4-Bromofluorobenzene	79	68-117	10/13/09	Acceptable

Comments:

November 3, 2009
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K0910632
Project:	Boomsnub	**Date Received:**	11/03/09
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 field samples were received for analysis at Columbia Analytical Services on 11/03/09. 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.

12/01/09

Approved by_____ Date_____

Columbia Analytical Services

CHAIN OF CUSTODY

SR#: K0910632

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

PAGE 1 OF 1 COC #

PROJECT NAME	Boomsnub
PROJECT NUMBER	14495.07.2009.0040-03
PROJECT MANAGER	J. I Frain
COMPANY/ADDRESS	EA Engineering
	12011 NE 1st St. Suite 100
CITY/STATE/ZIP	Bellevue, WA 98005
E-MAIL ADDRESS	jfrain@aaest.com
PHONE #	(425) 451-7400
FAX #	(425) 451-7860
SAMPLER'S SIGNATURE	Richard R. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐	Volatile Organics 624 ☐ 8260 X 8021 ☐ BTEX ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐	☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals, (Total or Dissolved) (See list below)	Cyanide ☐	Cr(VI) ☐ Hex-Chrom ☐	Cond., Cl, SO_4, P, 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-110309	11/3/09	8:00		H_2O	5		X								X		X				
EFF-110309		8:05			5		X								X		X				
EFFD-110309		8:10			5		X								X		X				
TB-110309	↓	NA	41329	↓	2		X														

REPORT REQUIREMENTS

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

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

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

___ IV. CLP Deliverable Report

X V. EDD

INVOICE INFORMATION

P.O. # _____

Bill To: _____

TURNAROUND REQUIREMENTS

____ 24 hr. ____ 48 hr.

____ 5 Day

X Standard (10-15 working days)

____ Provide FAX Results

Requested Report Date: _____

Circle which metals are to be analyzed:

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

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

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

SPECIAL INSTRUCTIONS/COMMENTS:

VOCs - 8260B
Total Metals - Cr
pH

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Richard Read 11/3/09 8:30	[illegible] 11/3/09 1300		
Signature / Date/Time	Signature / Date/Time	Signature / Date/Time	Signature / Date/Time
RICK READ EA	[illegible]		
Printed Name / Firm	Printed Name / Firm	Printed Name / Firm	Printed Name / Firm

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client :	EA Engineering, Science, and Technology	**Service Request :**	K0910632
Project Name :	Boomsnub	**Date Collected :**	11/03/09
Project Number :	14495.07.2009.0040-03	**Date Received :**	11/03/09
Sample Matrix :	WATER		

pH

Units : pH Units
Basis : NA

Analysis Method SM 4500-H+ B
Test Notes :

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date/Time Analyzed	Result	Result Notes
INF-110309	K0910632-001	-	-	1	11/03/09 15:46	6.51	
EFF-110309	K0910632-002	-	-	1	11/03/09 15:47	7.88	
EFFD-110309	K0910632-003	-	-	1	11/03/09 15:48	7.92	

SM Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0910632
Project No.:	14495.07.2009.0040-03	**Date Collected:**	11/03/09
Project Name:	Boomsnub	**Date Received:**	11/03/09
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-110309 **Lab Code:** K0910632-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/19/09	11/20/09	63.7		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0910632
Project No.:	14495.07.2009.0040-03	**Date Collected:**	11/03/09
Project Name:	Boomsnub	**Date Received:**	11/03/09
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFF-110309 **Lab Code:** K0910632-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/19/09	11/20/09	2.0	U	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0910632
Project No.:	14495.07.2009.0040-03	**Date Collected:**	11/03/09
Project Name:	Boomsnub	**Date Received:**	11/03/09
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-110309 **Lab Code:** K0910632-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	11/19/09	11/20/09	2.0	U	

% Solids: 0.0

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0910632
Date Collected: 11/03/2009
Date Received: 11/03/2009

Volatile Organic Compounds

Sample Name: INF-110309
Lab Code: K0910632-001

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	11/16/09	11/16/09	KWG0910741	
Trichlorofluoromethane	**0.99**		0.50	0.12	1	11/16/09	11/16/09	KWG0910741	
1,1-Dichloroethene	**1.0**		0.50	0.074	1	11/16/09	11/16/09	KWG0910741	
Methylene Chloride	ND	U	2.0	0.17	1	11/16/09	11/16/09	KWG0910741	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
cis-1,2-Dichloroethene	**0.40**	J	0.50	0.067	1	11/16/09	11/16/09	KWG0910741	
1,1,1-Trichloroethane (TCA)	**0.22**	J	0.50	0.075	1	11/16/09	11/16/09	KWG0910741	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/16/09	11/16/09	KWG0910741	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/16/09	11/16/09	KWG0910741	
Trichloroethene (TCE)	**24**		0.50	0.10	1	11/16/09	11/16/09	KWG0910741	
Bromodichloromethane	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
Tetrachloroethene (PCE)	**1.6**		0.50	0.066	1	11/16/09	11/16/09	KWG0910741	
Dibromochloromethane	ND	U	0.50	0.14	1	11/16/09	11/16/09	KWG0910741	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/16/09	11/16/09	KWG0910741	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/16/09	11/16/09	KWG0910741	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/16/09	11/16/09	KWG0910741	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	109	73-122	11/16/09	Acceptable
Toluene-d8	114	78-129	11/16/09	Acceptable
4-Bromofluorobenzene	89	68-117	11/16/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0910632
Date Collected: 11/03/2009
Date Received: 11/03/2009

Volatile Organic Compounds

Sample Name: EFF-110309
Lab Code: K0910632-002

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	11/16/09	11/16/09	KWG0910741	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/16/09	11/16/09	KWG0910741	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/16/09	11/16/09	KWG0910741	
Methylene Chloride	ND	U	2.0	0.17	1	11/16/09	11/16/09	KWG0910741	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/16/09	11/16/09	KWG0910741	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/16/09	11/16/09	KWG0910741	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/16/09	11/16/09	KWG0910741	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/16/09	11/16/09	KWG0910741	
Trichloroethene (TCE)	**0.48**	J	0.50	0.10	1	11/16/09	11/16/09	KWG0910741	
Bromodichloromethane	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	11/16/09	11/16/09	KWG0910741	
Dibromochloromethane	ND	U	0.50	0.14	1	11/16/09	11/16/09	KWG0910741	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/16/09	11/16/09	KWG0910741	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/16/09	11/16/09	KWG0910741	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/16/09	11/16/09	KWG0910741	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	110	73-122	11/16/09	Acceptable
Toluene-d8	114	78-129	11/16/09	Acceptable
4-Bromofluorobenzene	88	68-117	11/16/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0910632
Date Collected: 11/03/2009
Date Received: 11/03/2009

Volatile Organic Compounds

Sample Name: EFFD-110309
Lab Code: K0910632-003

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	11/16/09	11/16/09	KWG0910741	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/16/09	11/16/09	KWG0910741	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/16/09	11/16/09	KWG0910741	
Methylene Chloride	ND	U	2.0	0.17	1	11/16/09	11/16/09	KWG0910741	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/16/09	11/16/09	KWG0910741	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/16/09	11/16/09	KWG0910741	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/16/09	11/16/09	KWG0910741	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/16/09	11/16/09	KWG0910741	
Trichloroethene (TCE)	**0.50**		0.50	0.10	1	11/16/09	11/16/09	KWG0910741	
Bromodichloromethane	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	11/16/09	11/16/09	KWG0910741	
Dibromochloromethane	ND	U	0.50	0.14	1	11/16/09	11/16/09	KWG0910741	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/16/09	11/16/09	KWG0910741	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/16/09	11/16/09	KWG0910741	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/16/09	11/16/09	KWG0910741	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	108	73-122	11/16/09	Acceptable
Toluene-d8	114	78-129	11/16/09	Acceptable
4-Bromofluorobenzene	88	68-117	11/16/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0910632
Date Collected: 11/03/2009
Date Received: 11/03/2009

Volatile Organic Compounds

Sample Name: TB-110309
Lab Code: K0910632-004

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	11/16/09	11/16/09	KWG0910741	
Trichlorofluoromethane	ND	U	0.50	0.12	1	11/16/09	11/16/09	KWG0910741	
1,1-Dichloroethene	ND	U	0.50	0.074	1	11/16/09	11/16/09	KWG0910741	
Methylene Chloride	ND	U	2.0	0.17	1	11/16/09	11/16/09	KWG0910741	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	11/16/09	11/16/09	KWG0910741	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	11/16/09	11/16/09	KWG0910741	
Carbon Tetrachloride	ND	U	0.50	0.096	1	11/16/09	11/16/09	KWG0910741	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	11/16/09	11/16/09	KWG0910741	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	11/16/09	11/16/09	KWG0910741	
Bromodichloromethane	ND	U	0.50	0.091	1	11/16/09	11/16/09	KWG0910741	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	11/16/09	11/16/09	KWG0910741	
Dibromochloromethane	ND	U	0.50	0.14	1	11/16/09	11/16/09	KWG0910741	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	11/16/09	11/16/09	KWG0910741	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	11/16/09	11/16/09	KWG0910741	
Hexachlorobutadiene	ND	U	2.0	0.11	1	11/16/09	11/16/09	KWG0910741	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	107	73-122	11/16/09	Acceptable
Toluene-d8	114	78-129	11/16/09	Acceptable
4-Bromofluorobenzene	91	68-117	11/16/09	Acceptable

Comments:

December 3, 2009
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K0911714
Project:	Boomsnub	**Date Received:**	12/03/09
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 field samples were received for analysis at Columbia Analytical Services on 12/03/09. 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.

12/18/09

Approved by_____ **Date**_____

CHAIN OF CUSTODY

Columbia Analytical Services™

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K0911714

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.07.2009.0040-03
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 E. Read

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐	Volatile Organics 624☐ 8260☒	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-120309	12/3/09	7:55		H2O	5		X								X		X			
EFF-120309		8:00			5		X								X		X			
EFFD-120309		8:05			5		X								X		X			
TB-120309		NA	41561		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
12/18/09
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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Richard Read	John Jones		
Signature	Signature	Signature	Signature
12/3/09 8:20	12/3/09 1315		
Date/Time	Date/Time	Date/Time	Date/Time
RICK READ	JOHN JONES		
Printed Name	Printed Name	Printed Name	Printed Name
EA	CAS		
Firm	Firm	Firm	Firm

RCOC #1 07/09

8

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : EA Engineering, Science, and Technology
Project Name : Boomsnub
Project Number : 14495.07.2009.0040-03
Sample Matrix : WATER

Service Request : K0911714
Date Collected : 12/03/09
Date Received : 12/03/09

pH

Units : pH Units
Basis : NA

Analysis Method SM 4500-H+ B
Test Notes :

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date/Time Analyzed	Result	Result Notes
INF-120309	K0911714-001	-	-	1	12/03/09 16:32	6.57	
EFF-120309	K0911714-002	-	-	1	12/03/09 16:33	7.89	
EFFD-120309	K0911714-003	-	-	1	12/03/09 16:35	7.96	

SM Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998.

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0911714
Project No.:	14495.07.2009.0040-03	**Date Collected:**	12/3/2009
Project Name:	Boomsnub	**Date Received:**	12/3/2009
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-120309 **Lab Code:** K0911714-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	12/09/09	12/10/09	66.2		

% Solids: 0.0

Comments:

METALS

-1-
INORGANIC ANALYSIS DATA PACKAGE

Client: EA Engineering, Science, and Tec
Project No.: 14495.07.2009.0040-03
Project Name: Boomsnub
Matrix: WATER

Service Request: K0911714
Date Collected: 12/3/2009
Date Received: 12/3/2009
Units: ug/L
Basis: N/A

Sample Name: EFF-120309
Lab Code: K0911714-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	12/09/09	12/10/09	2.0	U	

% Solids: 0.0

Comments:

METALS

- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K0911714
Project No.:	14495.07.2009.0040-03	**Date Collected:**	12/3/2009
Project Name:	Boomsnub	**Date Received:**	12/3/2009
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-120309 **Lab Code:** K0911714-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	12/09/09	12/10/09	2.0	U	

% Solids: 0.0

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0911714
Date Collected: 12/03/2009
Date Received: 12/03/2009

Volatile Organic Compounds

Sample Name: INF-120309
Lab Code: K0911714-001

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	12/11/09	12/11/09	KWG0911698	
Trichlorofluoromethane	**0.94**		0.50	0.12	1	12/11/09	12/11/09	KWG0911698	
1,1-Dichloroethene	**1.1**		0.50	0.074	1	12/11/09	12/11/09	KWG0911698	
Methylene Chloride	ND	U	2.0	0.17	1	12/11/09	12/11/09	KWG0911698	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/11/09	12/11/09	KWG0911698	
cis-1,2-Dichloroethene	**0.43**	J	0.50	0.067	1	12/11/09	12/11/09	KWG0911698	
1,1,1-Trichloroethane (TCA)	**0.21**	J	0.50	0.075	1	12/11/09	12/11/09	KWG0911698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/11/09	12/11/09	KWG0911698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/11/09	12/11/09	KWG0911698	
Trichloroethene (TCE)	**25**		0.50	0.10	1	12/11/09	12/11/09	KWG0911698	
Bromodichloromethane	ND	U	0.50	0.091	1	12/11/09	12/11/09	KWG0911698	
Tetrachloroethene (PCE)	**1.7**		0.50	0.066	1	12/11/09	12/11/09	KWG0911698	
Dibromochloromethane	ND	U	0.50	0.14	1	12/11/09	12/11/09	KWG0911698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/11/09	12/11/09	KWG0911698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/11/09	12/11/09	KWG0911698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/11/09	12/11/09	KWG0911698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	106	73-122	12/11/09	Acceptable
Toluene-d8	118	78-129	12/11/09	Acceptable
4-Bromofluorobenzene	90	68-117	12/11/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0911714
Date Collected: 12/03/2009
Date Received: 12/03/2009

Volatile Organic Compounds

Sample Name: EFF-120309
Lab Code: K0911714-002

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	12/11/09	12/11/09	KWG0911698	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/11/09	12/11/09	KWG0911698	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/11/09	12/11/09	KWG0911698	
Methylene Chloride	ND	U	2.0	0.17	1	12/11/09	12/11/09	KWG0911698	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/11/09	12/11/09	KWG0911698	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/11/09	12/11/09	KWG0911698	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/11/09	12/11/09	KWG0911698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/11/09	12/11/09	KWG0911698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/11/09	12/11/09	KWG0911698	
Trichloroethene (TCE)	**0.60**		0.50	0.10	1	12/11/09	12/11/09	KWG0911698	
Bromodichloromethane	ND	U	0.50	0.091	1	12/11/09	12/11/09	KWG0911698	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	12/11/09	12/11/09	KWG0911698	
Dibromochloromethane	ND	U	0.50	0.14	1	12/11/09	12/11/09	KWG0911698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/11/09	12/11/09	KWG0911698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/11/09	12/11/09	KWG0911698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/11/09	12/11/09	KWG0911698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	104	73-122	12/11/09	Acceptable
Toluene-d8	117	78-129	12/11/09	Acceptable
4-Bromofluorobenzene	89	68-117	12/11/09	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0911714
Date Collected: 12/03/2009
Date Received: 12/03/2009

Volatile Organic Compounds

Sample Name: EFFD-120309
Lab Code: K0911714-003

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	12/11/09	12/11/09	KWG0911698	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/11/09	12/11/09	KWG0911698	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/11/09	12/11/09	KWG0911698	
Methylene Chloride	ND	U	2.0	0.17	1	12/11/09	12/11/09	KWG0911698	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/11/09	12/11/09	KWG0911698	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/11/09	12/11/09	KWG0911698	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/11/09	12/11/09	KWG0911698	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/11/09	12/11/09	KWG0911698	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/11/09	12/11/09	KWG0911698	
Trichloroethene (TCE)	**0.57**		0.50	0.10	1	12/11/09	12/11/09	KWG0911698	
Bromodichloromethane	ND	U	0.50	0.091	1	12/11/09	12/11/09	KWG0911698	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	12/11/09	12/11/09	KWG0911698	
Dibromochloromethane	ND	U	0.50	0.14	1	12/11/09	12/11/09	KWG0911698	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/11/09	12/11/09	KWG0911698	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/11/09	12/11/09	KWG0911698	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/11/09	12/11/09	KWG0911698	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	105	73-122	12/11/09	Acceptable
Toluene-d8	117	78-129	12/11/09	Acceptable
4-Bromofluorobenzene	89	68-117	12/11/09	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.07.2009.0040-03
Sample Matrix: Water

Service Request: K0911714
Date Collected:
Date Received: 12/03/2009

Volatile Organic Compounds

Sample Name: TB-120309
Lab Code: K0911714-004

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	12/14/09	12/14/09	KWG0911741	
Trichlorofluoromethane	ND	U	0.50	0.12	1	12/14/09	12/14/09	KWG0911741	
1,1-Dichloroethene	ND	U	0.50	0.074	1	12/14/09	12/14/09	KWG0911741	
Methylene Chloride	ND	U	2.0	0.17	1	12/14/09	12/14/09	KWG0911741	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	12/14/09	12/14/09	KWG0911741	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	12/14/09	12/14/09	KWG0911741	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	12/14/09	12/14/09	KWG0911741	
Carbon Tetrachloride	ND	U	0.50	0.096	1	12/14/09	12/14/09	KWG0911741	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	12/14/09	12/14/09	KWG0911741	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	12/14/09	12/14/09	KWG0911741	
Bromodichloromethane	ND	U	0.50	0.091	1	12/14/09	12/14/09	KWG0911741	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	12/14/09	12/14/09	KWG0911741	
Dibromochloromethane	ND	U	0.50	0.14	1	12/14/09	12/14/09	KWG0911741	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	12/14/09	12/14/09	KWG0911741	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	12/14/09	12/14/09	KWG0911741	
Hexachlorobutadiene	ND	U	2.0	0.11	1	12/14/09	12/14/09	KWG0911741	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	106	73-122	12/14/09	Acceptable
Toluene-d8	118	78-129	12/14/09	Acceptable
4-Bromofluorobenzene	91	68-117	12/14/09	Acceptable

Comments:

January 7, 2010
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1000161
Project:	Boomsnub	**Date Received:**	01/07/10
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

Four field samples were received for analysis at Columbia Analytical Services on 01/07/10. 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 01/22/10

CHAIN OF CUSTODY

Columbia Analytical Services™

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K1002161

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.07.2010.0040
PROJECT MANAGER: J. I 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 X 8021 ☐ BTEX ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐	Fuel Fingerprint (FIQ) ☐ NW-HCID Screen	Oil & Grease/TRPH 1664 HEM ☐ 1664 SGT ☐	PCB's Aroclors ☐ Congeners ☐	Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐	Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐	PAHS 8310 ☐ SIM ☐	Metals: (Total or Dissolved) (See list below)	Cyanide ☐	pH ☐ Hex-Chrom ☐ Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	REMARKS
1002-001	1/6/10	13:20		H_2O	4		X								X					
INF-010710	1/7/10	10:20			5		X								X		X			
EFF-010710	1/7/10	10:25			5		X								X		X			
EFFD-010710	1/7/10	10:30			5		X								X		X			
TB-010710	1/7/10	NA	41739	↓	2		X													

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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
1/22/10 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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Richard R. Read	Signature:	Signature:	Signature:
Date/Time: 1/7/10 11:00	Date/Time: 1/7/10	Date/Time:	Date/Time:
Printed Name: Rick Reap	Printed Name: Brad Han	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : EA Engineering, Science, and Technology
Project Name : Boomsnub
Project Number : 14495.07.2010.0040
Sample Matrix : WATER

Service Request : K1000161
Date Collected : 01/07/10
Date Received : 01/07/10

pH

Analysis Method : SM 4500-H+ B
Test Notes :

Units : pH Units
Basis : NA

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date/Time Analyzed	Result	Result Notes
INF-010710	K1000161-002	-	-	1	01/07/10 17:18	6.79	
EFF-010710	K1000161-003	-	-	1	01/07/10 17:21	8.01	
EFFD-010710	K1000161-004	-	-	1	01/07/10 17:22	8.12	

SM Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998.

METALS

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INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1000161
Project No.:	14495.07.2010.0040	**Date Collected:**	1/7/2010
Project Name:	Boomsnub	**Date Received:**	1/7/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-010710 **Lab Code:** K1000161-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	01/11/10	01/12/10	63.1		

% Solids: 0.0

Comments:

METALS

- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1000161
Project No.:	14495.07.2010.0040	**Date Collected:**	1/7/2010
Project Name:	Boomsnub	**Date Received:**	1/7/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFF-010710 **Lab Code:** K1000161-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	01/11/10	01/12/10	2.0	U	

% Solids: 0.0

Comments:

METALS

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1000161
Project No.:	14495.07.2010.0040	**Date Collected:**	1/7/2010
Project Name:	Boomsnub	**Date Received:**	1/7/2010
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-010710 **Lab Code:** K1000161-004

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	01/11/10	01/12/10	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
Sample Matrix: Water

Service Request: K1000161
Date Collected: 01/07/2010
Date Received: 01/07/2010

Volatile Organic Compounds

Sample Name: INF-010710
Lab Code: K1000161-002

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	01/12/10	01/12/10	KWG1000353	
Trichlorofluoromethane	**0.83**		0.50	0.12	1	01/12/10	01/12/10	KWG1000353	
1,1-Dichloroethene	**1.1**		0.50	0.074	1	01/12/10	01/12/10	KWG1000353	
Methylene Chloride	ND	U	2.0	0.17	1	01/12/10	01/12/10	KWG1000353	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
cis-1,2-Dichloroethene	**0.43**	J	0.50	0.067	1	01/12/10	01/12/10	KWG1000353	
1,1,1-Trichloroethane (TCA)	**0.18**	J	0.50	0.075	1	01/12/10	01/12/10	KWG1000353	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/12/10	01/12/10	KWG1000353	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/12/10	01/12/10	KWG1000353	
Trichloroethene (TCE)	**22**		0.50	0.10	1	01/12/10	01/12/10	KWG1000353	
Bromodichloromethane	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
Tetrachloroethene (PCE)	**1.6**		0.50	0.066	1	01/12/10	01/12/10	KWG1000353	
Dibromochloromethane	ND	U	0.50	0.14	1	01/12/10	01/12/10	KWG1000353	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/12/10	01/12/10	KWG1000353	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/12/10	01/12/10	KWG1000353	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/12/10	01/12/10	KWG1000353	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	100	73-122	01/12/10	Acceptable
Toluene-d8	112	78-129	01/12/10	Acceptable
4-Bromofluorobenzene	94	68-117	01/12/10	Acceptable

Comments:

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

Service Request: K1000161
Date Collected: 01/07/2010
Date Received: 01/07/2010

Volatile Organic Compounds

Sample Name: EFF-010710
Lab Code: K1000161-003

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	01/12/10	01/12/10	KWG1000353	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/12/10	01/12/10	KWG1000353	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/12/10	01/12/10	KWG1000353	
Methylene Chloride	**0.58**	J	2.0	0.17	1	01/12/10	01/12/10	KWG1000353	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/12/10	01/12/10	KWG1000353	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/12/10	01/12/10	KWG1000353	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/12/10	01/12/10	KWG1000353	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/12/10	01/12/10	KWG1000353	
Trichloroethene (TCE)	**0.54**		0.50	0.10	1	01/12/10	01/12/10	KWG1000353	
Bromodichloromethane	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	01/12/10	01/12/10	KWG1000353	
Dibromochloromethane	ND	U	0.50	0.14	1	01/12/10	01/12/10	KWG1000353	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/12/10	01/12/10	KWG1000353	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/12/10	01/12/10	KWG1000353	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/12/10	01/12/10	KWG1000353	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	98	73-122	01/12/10	Acceptable
Toluene-d8	111	78-129	01/12/10	Acceptable
4-Bromofluorobenzene	95	68-117	01/12/10	Acceptable

Comments:

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

Service Request: K1000161
Date Collected: 01/07/2010
Date Received: 01/07/2010

Volatile Organic Compounds

Sample Name: EFFD-010710
Lab Code: K1000161-004

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	01/12/10	01/12/10	KWG1000353	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/12/10	01/12/10	KWG1000353	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/12/10	01/12/10	KWG1000353	
Methylene Chloride	**0.40**	J	2.0	0.17	1	01/12/10	01/12/10	KWG1000353	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/12/10	01/12/10	KWG1000353	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/12/10	01/12/10	KWG1000353	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/12/10	01/12/10	KWG1000353	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/12/10	01/12/10	KWG1000353	
Trichloroethene (TCE)	**0.51**		0.50	0.10	1	01/12/10	01/12/10	KWG1000353	
Bromodichloromethane	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	01/12/10	01/12/10	KWG1000353	
Dibromochloromethane	ND	U	0.50	0.14	1	01/12/10	01/12/10	KWG1000353	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/12/10	01/12/10	KWG1000353	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/12/10	01/12/10	KWG1000353	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/12/10	01/12/10	KWG1000353	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	99	73-122	01/12/10	Acceptable
Toluene-d8	113	78-129	01/12/10	Acceptable
4-Bromofluorobenzene	93	68-117	01/12/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

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

Service Request: K1000161
Date Collected: 01/07/2010
Date Received: 01/07/2010

Volatile Organic Compounds

Sample Name: TB-010710
Lab Code: K1000161-005

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	01/12/10	01/12/10	KWG1000353	
Trichlorofluoromethane	ND	U	0.50	0.12	1	01/12/10	01/12/10	KWG1000353	
1,1-Dichloroethene	ND	U	0.50	0.074	1	01/12/10	01/12/10	KWG1000353	
Methylene Chloride	ND	U	2.0	0.17	1	01/12/10	01/12/10	KWG1000353	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	01/12/10	01/12/10	KWG1000353	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	01/12/10	01/12/10	KWG1000353	
Carbon Tetrachloride	ND	U	0.50	0.096	1	01/12/10	01/12/10	KWG1000353	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	01/12/10	01/12/10	KWG1000353	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	01/12/10	01/12/10	KWG1000353	
Bromodichloromethane	ND	U	0.50	0.091	1	01/12/10	01/12/10	KWG1000353	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	01/12/10	01/12/10	KWG1000353	
Dibromochloromethane	ND	U	0.50	0.14	1	01/12/10	01/12/10	KWG1000353	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	01/12/10	01/12/10	KWG1000353	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	01/12/10	01/12/10	KWG1000353	
Hexachlorobutadiene	ND	U	2.0	0.11	1	01/12/10	01/12/10	KWG1000353	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	97	73-122	01/12/10	Acceptable
Toluene-d8	113	78-129	01/12/10	Acceptable
4-Bromofluorobenzene	95	68-117	01/12/10	Acceptable

Comments:

February 3, 2010
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering	**Service Request No.:**	K1000979
Project:	Boomsnub	**Date Received:**	02/03/10
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

Three field samples and one trip blank were received for analysis at Columbia Analytical Services on 02/03/10. 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

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

Approved by_____ Date 02/22/10

CHAIN OF CUSTODY

Columbia Analytical Services™

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K1000979

PAGE 1 OF 1 COC #

PROJECT NAME	Boomsnub
PROJECT NUMBER	14495.07.2010.0040-03
PROJECT MANAGER	J. I 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	Robert 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 SGT ☐ 1664 HEM ☐	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 ☐	6010 ☐ Hex-Chrom ☐	Cond., Cl, SO_4, PO4, F, NO_2, NO_3, BOD, TSS, TDS (circle)	NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3	TOX 9020 ☐ AOX 1650 ☐ 506 ☐	REMARKS
INF-020310	2/3/10	10:40		H_2O	5		X								X		X				
EFF-020310	↓	10:30		↓	5		X								X		X				
EFFD-020310	↓	10:35		↓	5		X								X		X				
TB-020310	↓	NA	41868	↓	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

2/22/10
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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Robert Read	Signature: John Jones	Signature:	Signature:
Date/Time: 2/3/10 11:15	Date/Time: 2/3/10 1420	Date/Time:	Date/Time:
Printed Name: RICK READ	Printed Name: John Jones	Printed Name:	Printed Name:
Firm: EA	Firm: CAS	Firm:	Firm:

RCOC #1 07/09

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : EA Engineering, Science, and Technology
Project Name : Boomsnub
Project Number : 14495.07.2010.0040-03
Sample Matrix : WATER

Service Request : K1000979
Date Collected : 02/03/10
Date Received : 02/03/10

pH

Analysis Method SM 4500-H+ B
Test Notes :

Units : pH Units
Basis : NA

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date/Time Analyzed	Result	Result Notes
INF-020310	K1000979-001	-	-	1	02/04/10 09:12	6.89	
EFF-020310	K1000979-002	-	-	1	02/04/10 09:09	8.11	
EFFD-020310	K1000979-003	-	-	1	02/04/10 09:10	8.12	

SM Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1000979
Project No.:	14495.07.2010.0040-03	**Date Collected:**	02/03/10
Project Name:	Boomsnub	**Date Received:**	02/03/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-020310 **Lab Code:** K1000979-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	02/05/10	02/10/10	66.4		

% Solids: 0.0

Comments:

Metals

-1-

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1000979
Project No.:	14495.07.2010.0040-03	**Date Collected:**	02/03/10
Project Name:	Boomsnub	**Date Received:**	02/03/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFF-020310 **Lab Code:** K1000979-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	02/05/10	02/10/10	0.9	J	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1000979
Project No.:	14495.07.2010.0040-03	**Date Collected:**	02/03/10
Project Name:	Boomsnub	**Date Received:**	02/03/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-020310 **Lab Code:** K1000979-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	0.6	1.0	02/05/10	02/10/10	1.2	J	

% 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: K1000979
Date Collected: 02/03/2010
Date Received: 02/03/2010

Volatile Organic Compounds

Sample Name: INF-020310
Lab Code: K1000979-001

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	02/11/10	02/11/10	KWG1001216	
Trichlorofluoromethane	**0.76**		0.50	0.12	1	02/11/10	02/11/10	KWG1001216	
1,1-Dichloroethene	**1.2**		0.50	0.074	1	02/11/10	02/11/10	KWG1001216	
Methylene Chloride	ND	U	2.0	0.17	1	02/11/10	02/11/10	KWG1001216	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
cis-1,2-Dichloroethene	**0.44**	J	0.50	0.067	1	02/11/10	02/11/10	KWG1001216	
1,1,1-Trichloroethane (TCA)	**0.16**	J	0.50	0.075	1	02/11/10	02/11/10	KWG1001216	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/11/10	02/11/10	KWG1001216	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/11/10	02/11/10	KWG1001216	
Trichloroethene (TCE)	**22**		0.50	0.10	1	02/11/10	02/11/10	KWG1001216	
Bromodichloromethane	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
Tetrachloroethene (PCE)	**1.5**		0.50	0.066	1	02/11/10	02/11/10	KWG1001216	
Dibromochloromethane	ND	U	0.50	0.14	1	02/11/10	02/11/10	KWG1001216	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/11/10	02/11/10	KWG1001216	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/11/10	02/11/10	KWG1001216	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/11/10	02/11/10	KWG1001216	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	89	73-122	02/11/10	Acceptable
Toluene-d8	91	78-129	02/11/10	Acceptable
4-Bromofluorobenzene	85	68-117	02/11/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1000979
Project:	Boomsnub/14495.07.2010.0040-03	**Date Collected:**	02/03/2010
Sample Matrix:	Water	**Date Received:**	02/03/2010

Volatile Organic Compounds

Sample Name:	EFF-020310	**Units:**	ug/L
Lab Code:	K1000979-002	**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	02/11/10	02/11/10	KWG1001216	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/11/10	02/11/10	KWG1001216	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/11/10	02/11/10	KWG1001216	
Methylene Chloride	ND	U	2.0	0.17	1	02/11/10	02/11/10	KWG1001216	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/11/10	02/11/10	KWG1001216	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/11/10	02/11/10	KWG1001216	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/11/10	02/11/10	KWG1001216	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/11/10	02/11/10	KWG1001216	
Trichloroethene (TCE)	**0.56**		0.50	0.10	1	02/11/10	02/11/10	KWG1001216	
Bromodichloromethane	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	02/11/10	02/11/10	KWG1001216	
Dibromochloromethane	ND	U	0.50	0.14	1	02/11/10	02/11/10	KWG1001216	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/11/10	02/11/10	KWG1001216	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/11/10	02/11/10	KWG1001216	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/11/10	02/11/10	KWG1001216	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	91	73-122	02/11/10	Acceptable
Toluene-d8	92	78-129	02/11/10	Acceptable
4-Bromofluorobenzene	86	68-117	02/11/10	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: K1000979
Date Collected: 02/03/2010
Date Received: 02/03/2010

Volatile Organic Compounds

Sample Name: EFFD-020310
Lab Code: K1000979-003

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	02/11/10	02/11/10	KWG1001216	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/11/10	02/11/10	KWG1001216	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/11/10	02/11/10	KWG1001216	
Methylene Chloride	ND	U	2.0	0.17	1	02/11/10	02/11/10	KWG1001216	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/11/10	02/11/10	KWG1001216	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/11/10	02/11/10	KWG1001216	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/11/10	02/11/10	KWG1001216	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/11/10	02/11/10	KWG1001216	
Trichloroethene (TCE)	**0.52**		0.50	0.10	1	02/11/10	02/11/10	KWG1001216	
Bromodichloromethane	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	02/11/10	02/11/10	KWG1001216	
Dibromochloromethane	ND	U	0.50	0.14	1	02/11/10	02/11/10	KWG1001216	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/11/10	02/11/10	KWG1001216	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/11/10	02/11/10	KWG1001216	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/11/10	02/11/10	KWG1001216	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	89	73-122	02/11/10	Acceptable
Toluene-d8	90	78-129	02/11/10	Acceptable
4-Bromofluorobenzene	85	68-117	02/11/10	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1000979
Project:	Boomsnub/14495.07.2010.0040-03	**Date Collected:**	02/03/2010
Sample Matrix:	Water	**Date Received:**	02/03/2010

Volatile Organic Compounds

Sample Name:	TB-020310	**Units:**	ug/L
Lab Code:	K1000979-004	**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	02/11/10	02/11/10	KWG1001216	
Trichlorofluoromethane	ND	U	0.50	0.12	1	02/11/10	02/11/10	KWG1001216	
1,1-Dichloroethene	ND	U	0.50	0.074	1	02/11/10	02/11/10	KWG1001216	
Methylene Chloride	ND	U	2.0	0.17	1	02/11/10	02/11/10	KWG1001216	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	02/11/10	02/11/10	KWG1001216	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	02/11/10	02/11/10	KWG1001216	
Carbon Tetrachloride	ND	U	0.50	0.096	1	02/11/10	02/11/10	KWG1001216	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	02/11/10	02/11/10	KWG1001216	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	02/11/10	02/11/10	KWG1001216	
Bromodichloromethane	ND	U	0.50	0.091	1	02/11/10	02/11/10	KWG1001216	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	02/11/10	02/11/10	KWG1001216	
Dibromochloromethane	ND	U	0.50	0.14	1	02/11/10	02/11/10	KWG1001216	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	02/11/10	02/11/10	KWG1001216	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	02/11/10	02/11/10	KWG1001216	
Hexachlorobutadiene	ND	U	2.0	0.11	1	02/11/10	02/11/10	KWG1001216	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	90	73-122	02/11/10	Acceptable
Toluene-d8	91	78-129	02/11/10	Acceptable
4-Bromofluorobenzene	86	68-117	02/11/10	Acceptable

Comments:

March 4, 2010
OU-3 Laboratory Analytical Results

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	EA Engineering, Science and Technology	**Service Request No.:**	K1001964
Project:	Boomsnub	**Date Received:**	03/04/10
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 field samples and one trip blank were received for analysis at Columbia Analytical Services on 03/04/10. 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.

03/22/10

Approved by_____ **Date**_____

CHAIN OF CUSTODY

Columbia Analytical Services™

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K1001964

PAGE 1 OF 1 COC #

PROJECT NAME	Boomsnub
PROJECT NUMBER	14495.07.2010.0040-03
PROJECT MANAGER	Jil 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☒ 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-030410	3/4/10			H_2O	5		X								X		X							
EFF-030410	↓			↓	5		X								X		X							
EFFD-030410	↓			↓	5		X								X		X							
TB-030410	↓			↓	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

3/25/10 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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Richard Read	[signature]		
Signature	Signature	Signature	Signature
3/4/10 8:20	3/4/10 1300		
Date/Time	Date/Time	Date/Time	Date/Time
RICK READ	Les Kennedy		
Printed Name	Printed Name	Printed Name	Printed Name
EA	CAS		
Firm	Firm	Firm	Firm

RCOC #1 07/09

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : EA Engineering, Science, and Technology
Project Name : Boomsnub
Project Number : 14495.07.2010.0040-03
Sample Matrix : WATER

Service Request : K1001964
Date Collected : 03/04/10
Date Received : 03/04/10

pH

Units : pH Units
Analysis Method : SM 4500-H+ B
Basis : NA
Test Notes :

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date/Time Analyzed	Result	Result Notes
INF-030410	K1001964-001	-	-	1	03/05/10 09:15	6.74	
EFF-030410	K1001964-002	-	-	1	03/05/10 09:17	8.05	
EFFD-030410	K1001964-003	-	-	1	03/05/10 09:18	8.06	

SM Standard Methods for the Examination of Water and Wastewater, 20th Ed., 1998.

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1001964
Project No.:	14495.07.2010.0040-03	**Date Collected:**	03/04/10
Project Name:	Boomsnub	**Date Received:**	03/04/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: INF-030410 **Lab Code:** K1001964-001

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	03/05/10	03/08/10	64.4		

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1001964
Project No.:	14495.07.2010.0040-03	**Date Collected:**	03/04/10
Project Name:	Boomsnub	**Date Received:**	03/04/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFF-030410 **Lab Code:** K1001964-002

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	03/05/10	03/08/10	2.0	U	

% Solids: 0.0

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	EA Engineering, Science, and Tec	**Service Request:**	K1001964
Project No.:	14495.07.2010.0040-03	**Date Collected:**	03/04/10
Project Name:	Boomsnub	**Date Received:**	03/04/10
Matrix:	WATER	**Units:**	ug/L
		Basis:	N/A

Sample Name: EFFD-030410 **Lab Code:** K1001964-003

Analyte	Analysis Method	MRL	MDL	Dil. Factor	Date Extracted	Date Analyzed	Result	C	Q
Chromium	200.7	5.0	2.0	1.0	03/05/10	03/08/10	2.0	U	

% Solids: 0.0

Comments:

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

Service Request: K1001964
Date Collected: 03/04/2010
Date Received: 03/04/2010

Volatile Organic Compounds

Sample Name: INF-030410
Lab Code: K1001964-001

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	03/12/10	03/12/10	KWG1002073	
Trichlorofluoromethane	**0.70**		0.50	0.12	1	03/12/10	03/12/10	KWG1002073	
1,1-Dichloroethene	**1.0**		0.50	0.074	1	03/12/10	03/12/10	KWG1002073	
Methylene Chloride	ND	U	2.0	0.17	1	03/12/10	03/12/10	KWG1002073	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
cis-1,2-Dichloroethene	**0.39**	J	0.50	0.067	1	03/12/10	03/12/10	KWG1002073	
1,1,1-Trichloroethane (TCA)	**0.16**	J	0.50	0.075	1	03/12/10	03/12/10	KWG1002073	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/12/10	03/12/10	KWG1002073	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/12/10	03/12/10	KWG1002073	
Trichloroethene (TCE)	**21**		0.50	0.10	1	03/12/10	03/12/10	KWG1002073	
Bromodichloromethane	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
Tetrachloroethene (PCE)	**1.6**		0.50	0.066	1	03/12/10	03/12/10	KWG1002073	
Dibromochloromethane	ND	U	0.50	0.14	1	03/12/10	03/12/10	KWG1002073	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/12/10	03/12/10	KWG1002073	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/12/10	03/12/10	KWG1002073	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/12/10	03/12/10	KWG1002073	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	103	73-122	03/12/10	Acceptable
Toluene-d8	111	78-129	03/12/10	Acceptable
4-Bromofluorobenzene	86	68-117	03/12/10	Acceptable

Comments:

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

Service Request: K1001964
Date Collected: 03/04/2010
Date Received: 03/04/2010

Volatile Organic Compounds

Sample Name: EFF-030410
Lab Code: K1001964-002

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	03/12/10	03/12/10	KWG1002073	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/12/10	03/12/10	KWG1002073	
1,1-Dichloroethene	ND	U	0.50	0.074	1	03/12/10	03/12/10	KWG1002073	
Methylene Chloride	ND	U	2.0	0.17	1	03/12/10	03/12/10	KWG1002073	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/12/10	03/12/10	KWG1002073	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/12/10	03/12/10	KWG1002073	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/12/10	03/12/10	KWG1002073	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/12/10	03/12/10	KWG1002073	
Trichloroethene (TCE)	**0.51**		0.50	0.10	1	03/12/10	03/12/10	KWG1002073	
Bromodichloromethane	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	03/12/10	03/12/10	KWG1002073	
Dibromochloromethane	ND	U	0.50	0.14	1	03/12/10	03/12/10	KWG1002073	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/12/10	03/12/10	KWG1002073	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/12/10	03/12/10	KWG1002073	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/12/10	03/12/10	KWG1002073	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	104	73-122	03/12/10	Acceptable
Toluene-d8	111	78-129	03/12/10	Acceptable
4-Bromofluorobenzene	86	68-117	03/12/10	Acceptable

Comments:

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

Service Request: K1001964
Date Collected: 03/04/2010
Date Received: 03/04/2010

Volatile Organic Compounds

Sample Name: EFFD-030410
Lab Code: K1001964-003

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	03/12/10	03/12/10	KWG1002073	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/12/10	03/12/10	KWG1002073	
1,1-Dichloroethene	ND	U	0.50	0.074	1	03/12/10	03/12/10	KWG1002073	
Methylene Chloride	ND	U	2.0	0.17	1	03/12/10	03/12/10	KWG1002073	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/12/10	03/12/10	KWG1002073	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/12/10	03/12/10	KWG1002073	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/12/10	03/12/10	KWG1002073	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/12/10	03/12/10	KWG1002073	
Trichloroethene (TCE)	**0.51**		0.50	0.10	1	03/12/10	03/12/10	KWG1002073	
Bromodichloromethane	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	03/12/10	03/12/10	KWG1002073	
Dibromochloromethane	ND	U	0.50	0.14	1	03/12/10	03/12/10	KWG1002073	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/12/10	03/12/10	KWG1002073	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/12/10	03/12/10	KWG1002073	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/12/10	03/12/10	KWG1002073	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	103	73-122	03/12/10	Acceptable
Toluene-d8	111	78-129	03/12/10	Acceptable
4-Bromofluorobenzene	86	68-117	03/12/10	Acceptable

Comments:

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

Service Request: K1001964
Date Collected: 03/04/2010
Date Received: 03/04/2010

Volatile Organic Compounds

Sample Name: TB-030410
Lab Code: K1001964-004

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	03/12/10	03/12/10	KWG1002073	
Trichlorofluoromethane	ND	U	0.50	0.12	1	03/12/10	03/12/10	KWG1002073	
1,1-Dichloroethene	ND	U	0.50	0.074	1	03/12/10	03/12/10	KWG1002073	
Methylene Chloride	ND	U	2.0	0.17	1	03/12/10	03/12/10	KWG1002073	
trans-1,2-Dichloroethene	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	03/12/10	03/12/10	KWG1002073	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	03/12/10	03/12/10	KWG1002073	
Carbon Tetrachloride	ND	U	0.50	0.096	1	03/12/10	03/12/10	KWG1002073	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	03/12/10	03/12/10	KWG1002073	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	03/12/10	03/12/10	KWG1002073	
Bromodichloromethane	ND	U	0.50	0.091	1	03/12/10	03/12/10	KWG1002073	
Tetrachloroethene (PCE)	ND	U	0.50	0.066	1	03/12/10	03/12/10	KWG1002073	
Dibromochloromethane	ND	U	0.50	0.14	1	03/12/10	03/12/10	KWG1002073	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	03/12/10	03/12/10	KWG1002073	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	03/12/10	03/12/10	KWG1002073	
Hexachlorobutadiene	ND	U	2.0	0.11	1	03/12/10	03/12/10	KWG1002073	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	101	73-122	03/12/10	Acceptable
Toluene-d8	111	78-129	03/12/10	Acceptable
4-Bromofluorobenzene	88	68-117	03/12/10	Acceptable

Comments: