EA Engineering, Science, and Technology, Inc.

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26 September 2012
LN1289

Ms. Claire Hong
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Mail Code: ECL-111
Seattle, Washington 98101

RE: Results of Quarterly Monitoring Well Sampling – Summer 2012
Northern Plume Area, Hazel Dell, Washington
EA Project No. 14495.28.0005

Dear Claire:

On behalf of Linde LLC, EA Engineering, Science, and Technology, Inc. (EA) is submitting the enclosed results of the Summer 2012 quarterly groundwater monitoring event in the Northern Plume area, north of the Boomsnub/Airco Superfund Site (Superfund Site). The general site area is shown on Figure 1. Locations of the monitoring wells sampled are shown on Figure 2. Brief summaries of the tasks performed and analytical results are provided herein. Copies of the field sampling logs and laboratory analytical results are included as Attachments A and B, respectively. An electronic copy of the report and a full copy of the laboratory report are included on the enclosed CD.

FIELD SAMPLING

The Summer 2012 quarterly sampling event took place on 25 July 2012. Groundwater samples were collected from three monitoring wells within the Northern Plume; AMW-17, AMW-18, and AMW-64 (Figure 2). Sampling activities were conducted in compliance with the U.S. Environmental Protection Agency (EPA)-approved Quality Assurance and Sampling Plan (QASP) for the Superfund Site (EA 2004[1]) and the EPA-approved Monitoring Well Installation and Sampling Work Plan (EA 2012[2]). Health and safety procedures followed during field activities were in compliance with the EPA-approved Health and Safety Plan (HASP) for the Superfund Site (EA 2007[3]).

[1] EA. 2004. Quality Assurance and Sampling Plan for the Groundwater Treatment System Operation and Maintenance. Boomsnub/Airco Superfund Site, Hazel Dell, Washington. Revision 1. August.
[2] EA. 2012. Work Plan, Monitoring Well Installation and Sampling in the Northern Plume Area, Hazel Dell, Washington. Revision 1. January.
[3] EA. 2007. Health and Safety Plan for the Boomsnub/Airco Superfund Site, Hazel Dell, Washington. Revised. September.

Prior to sampling each well, the water level was measured to the nearest 0.01 foot relative to the top of the well casing using an electronic water level indicator. Groundwater samples were collected using electric submersible pumps with low-flow purging and sampling procedures. At each well, water quality parameters (pH, specific conductivity, temperature, dissolved oxygen, turbidity, and oxidation-reduction potential) were allowed to stabilize before sample collection, in accordance with the procedures outlined in the Superfund Site QASP (EA 2004). Water levels and field parameter measurements were recorded on the field sampling logs (Attachment A). A dedicated pump was used to sample well AMW-17. A non-dedicated pump was used to sample the other two wells; this pump was decontaminated prior to each use following the procedures outlined in the Superfund Site QASP.

Additional samples were collected for quality assurance/quality control, including a field duplicate (from well AMW-64), equipment rinsate blank, trip blank, and matrix spike/matrix spike duplicate. Groundwater samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260C. The analyses were performed by Columbia Analytical Services/ALS of Kelso, Washington.

SUMMARY OF RESULTS

Volatile Organic Compounds

A summary of the VOCs detected in the monitoring well groundwater samples is provided in Table 1. Trichloroethene (TCE) concentrations exceeded the Superfund Site cleanup level of 5 micrograms per liter (µg/L) in groundwater samples from all three monitoring wells. The highest concentration was detected in groundwater from well AMW-17 (210 µg/L). The VOC 1,1-dichloroethene (1,1-DCE) exceeded the Superfund Site cleanup level of 1 µg/L in wells AMW-17 (1.1 µg/L) and AMW-64 (2.7 µg/L). The remaining detected compounds were at concentrations below the respective cleanup levels (see Table 1).

Groundwater Elevation

The groundwater elevation for each well was determined by subtracting the depth-to-groundwater measurement from the surveyed top-of-casing measurement. Groundwater elevations and well construction details are presented in Table 2.

The general direction of groundwater flow throughout the Superfund Site is to the west-northwest. The groundwater flow direction is impacted by the active groundwater extraction system at the Superfund Site. Based on only the groundwater elevations in the three Northern Plume wells, as measured on 25 July 2012, the groundwater flow in this area is to the northwest.

DISCUSSION/CONCLUSIONS

The TCE concentration in groundwater samples from monitoring well AMW-17 continues to increase with the continued arrival of the Northern Plume in this area. Historical VOC results for well AMW-17 are provided in Table 3.

Increased TCE concentrations indicating the presence of the Northern Plume were observed in groundwater samples from well AMW-18 starting in 2006 and peaking in 2008. TCE concentrations in AMW-18 have since decreased, but remain at concentrations well above the cleanup level. The TCE concentration in monitoring well AMW-18 has remained essentially the same for the last three quarters. Historical VOC results for well AMW-18 are provided in Table 4.

Monitoring well AMW-64 was installed in February 2012. TCE concentrations in groundwater samples from this well have not changed significantly in the three quarters during which it has been sampled, ranging from 160 to 190 µg/L. Historical VOC results for well AMW-64 are provided in Table 5.

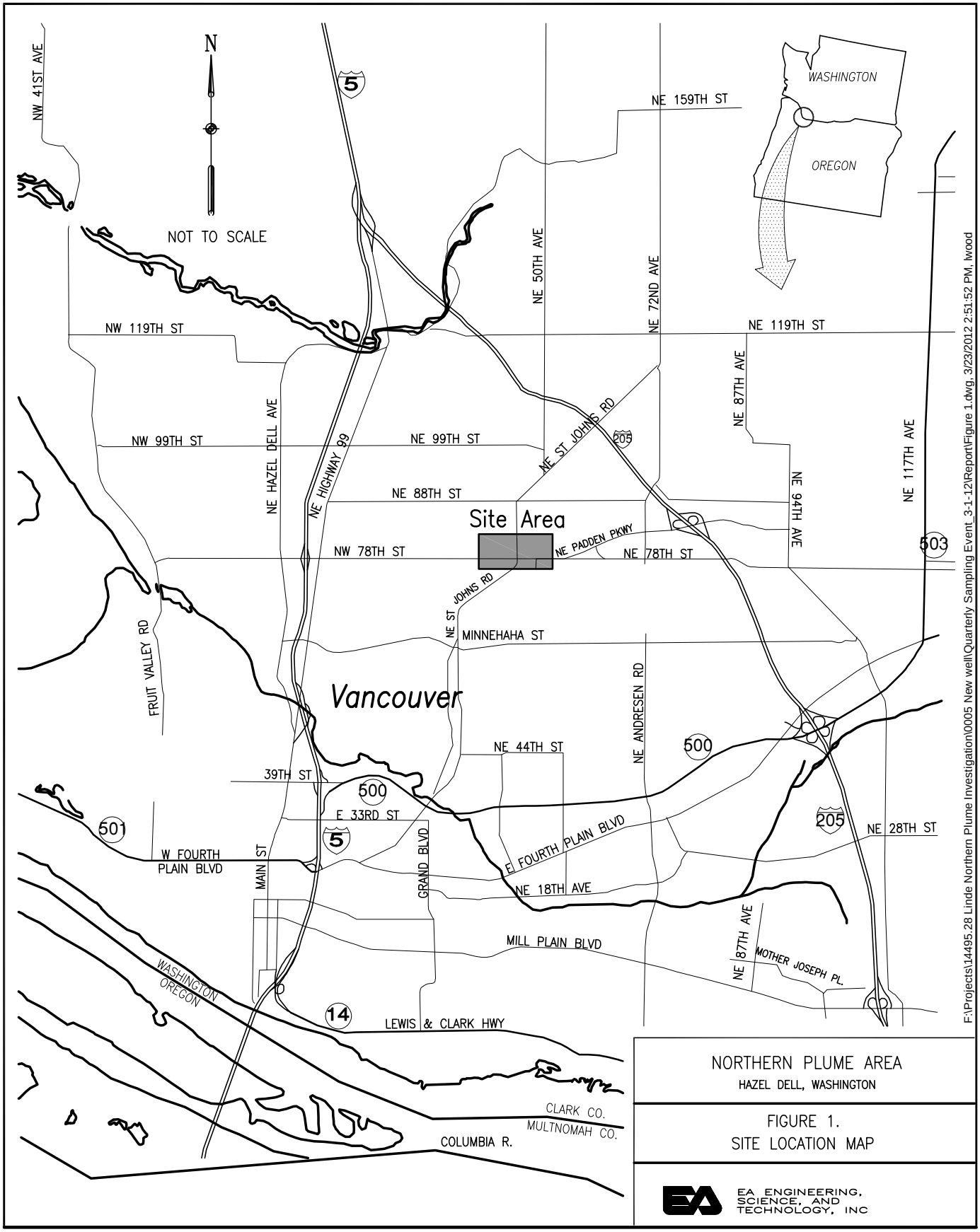
Monitoring wells AMW-17, AMW-18, and AMW-64 will be sampled next in October 2012, in conjunction with the Fall semiannual sampling event at the Superfund Site. Results for that sampling event will be included in the Fall semiannual groundwater monitoring report. If you have any questions or comments regarding this report, please call me at 425-451-7400.

Sincerely,
EA ENGINEERING, SCIENCE,
AND TECHNOLOGY, INC.

Catherine M. Böhlke, LHg
Project Coordinator

cc:
Bernie Zavala, EPA
Brian Thiesse, Linde LLC
Dave Grupp, Linde LLC
Mohsen Kourehdar, Ecology

FIGURES

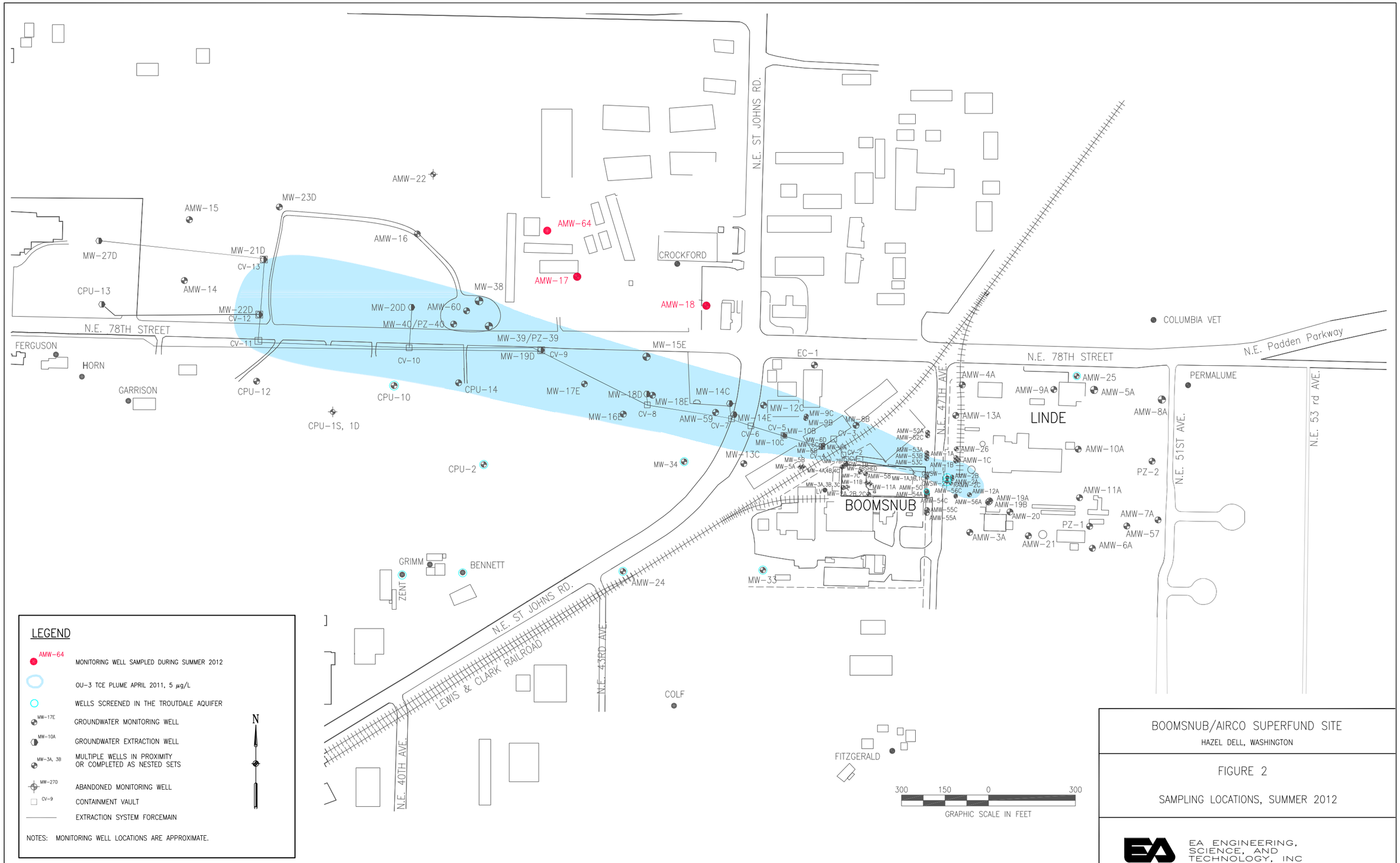


NORTHERN PLUME AREA
HAZEL DELL, WASHINGTON

FIGURE 1.
SITE LOCATION MAP

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

F:\Projects\14495.28 Linde Northern Plume Investigation\0005 New well\Quarterly Sampling Event_3-1-12\Report\Figure 1.dwg, 3/23/2012 2:51:52 PM, lwood



LEGEND

- AMW-64 — MONITORING WELL SAMPLED DURING SUMMER 2012
- OU-3 TCE PLUME APRIL 2011, 5 µg/L
- WELLS SCREENED IN THE TROUTDALE AQUIFER
- 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

N

NOTES: MONITORING WELL LOCATIONS ARE APPROXIMATE.

BOOMSNUB/AIRCO SUPERFUND SITE

HAZEL DELL, WASHINGTON

FIGURE 2

SAMPLING LOCATIONS, SUMMER 2012

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC

TABLES

Table 1. Volatile Organic Compounds Detected in Monitoring Well Groundwater Samples (in µg/L)
Summer 2012 Sampling Event

Well ID	Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	cis-1,2-DCE	CFC-11	Methylene Chloride[1]
AMW-17	7/25/2012	**210**	1	2.3	**1.1**	0.50 U	0.50 U	2.0 U
AMW-18	7/25/2012	**53**	0.22 J	0.30 J	0.50 U	0.50 U	0.60	2.0 U
AMW-64	7/25/2012	**170**	0.33 J	2.2	**2.5**	0.63	0.50 U	2.0 U
AMW-64 duplicate	7/25/2012	**160**	0.40 J	2.4	**2.7**	0.68	0.50 U	0.11 J
Cleanup Level		5	5	200	1	70	2,400	5

NOTES:
Only detected compounds are shown.
Results shown in **bold** are at or above the cleanup or guidance level for the compound.
[1] Methylene chloride was also detected in the trip blank at a concentration of 0.14 J µg/L; this is a common laboratory contaminant.
CFC-11 = Trichlorofluoromethane
cis-1,2-DCE = cis-1,2-Dichloroethene
1,1-DCE = 1,1-Dichloroethene
J = The result is an estimated concentration that is less than the Method Reporting Limit but greater than or equal to the Method Detection Limit.
PCE = Tetrachloroethene
TCE = Trichloroethene
U = Analyte was not detected above the specified reporting limit.
µg/L = Micrograms per liter

Table 2. Summary of Water Level Gauging Data and Groundwater Surface Elevations, 25 July 2012

Summer 2012 Sampling Event

Well ID	Well Type	Total Depth (ft btoc)	Top of Screen (ft btoc)	Bottom of Screen (ft btoc)	Screen Length (ft)	TOC Elevation (ft MSL)	Depth to Water (ft btoc)	Groundwater Surface Elevation (ft MSL)
AMW-17	M/D	92	81	91	10	261.87	8.78	253.09
AMW-18	M	103.27	92.6	102.6	10	278.80	24.29	254.51
AMW-64	M	98.79	88.4	98.4	10	266.13	13.59	252.54

NOTES:

btoc = Below top of casing
ft = Feet
M = Monitoring well
M/D = Monitoring well with dedicated pump
MSL = Mean sea level
TOC = Top of casing

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

Table 3. Historical VOC Concentrations in Well AMW-17 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Apr-95	**66.9**	1.0 U	5.8	**1.6 J**	21	10.6
Oct-95	**42.5**	1.0 U	36.1	**5.4**	12.7	19.2 J
May-96	**39.6**	1.0 U	52.6	**9.7**	9.2	10.1
Oct-96	**20.5**	1.0 U	169	**25.9**	3.5	19.7
May-97	**17.3**	1.0 U	89.6	**23.8**	2.1	23.3
Oct. 97	**12**	0.4 U	67	**9.0**	--	14.0
May-98	**7.0**	0.6 U	48	**9.0**	0.70 U	9.0
Sep-98	**8.0**	0.6 U	52	**9.0**	0.70 U	6.0
May-99	**5.0**	0.6 UJ	12 J	**8.0 J**	0.70 UJ	5.0 J
Oct-99	3.4	0.5 U	3	**1.2**	0.50 U	0.50
Oct-01	2.7	0.5 U	4.2	**1.8**	0.39 J	0.52
Oct-02	2.3	0.5 U	2.2	0.74	0.22 J	0.35 J
Oct-03	2.2	0.5 U	1.1	0.45 J	0.12 J	0.25 J
Oct-04	1.8	0.5 U	0.9	0.32 J	0.50 U	0.19 J
Oct-05	1.9	0.5 U	0.85	0.29 J	0.50 U	0.50 U
Oct-06	1.5	0.5 U	0.69	0.23 J	0.50 U	0.50 U
Oct-07	1.5	0.5 U	1.1	0.50 U	0.50 U	0.50 U
Oct-08	1.2	0.09 J	0.20 J	0.50 U	0.50 U	0.50 U
Jan-09	1.1	0.09 J	0.17 J	0.50 U	0.50 U	0.50 U
May-09	1.3	0.08 J	0.31 J	0.13 J	0.50 U	0.50 U
Oct-09	1.2	0.07 J	0.8	0.22 J	0.50 U	0.50 U
Apr-10	1.1	0.09 J	1.0	0.33 J	0.50 U	0.50 U
Oct-10	**28**	0.21 J	2.6	**1.4**	0.50 U	0.50 U
Apr-11	**29**	0.27 J	1.3	0.89	0.50 U	0.50 U
Oct-11	**140**	0.68	2.3	**1.0**	0.50 U	0.50 U
Mar-12	**160**	0.81	1.5	0.82	0.50 U	0.50 U
Apr-12	**160**	0.85	1.3	0.76	0.50 U	0.50 U
Jul-12	**210**	1.0	2.3	**1.1**	0.50 U	0.50 U
Cleanup Level	5	5	200	1	70	2,400

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

Table 4. Historical VOC Concentrations in Well AMW-18 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	cis-1,2-DCE	CFC-11
Apr-95	0.73 J	1.0 U	2.9	0.87 J	1.0 U	1.0 UJ
Oct-95	0.3 J	1.0 U	1.0	0.53 J	1.0 U	1.0 U
May-96	1.0 U	1.0 U	0.52 J	1.0 U	1.0 U	1.0 U
Oct-96	0.31 J	1.0 U	0.48 J	1.0 U	1.0 U	1.0 U
May-97	0.43 J	1.0 U	0.44 J	1.0 U	1.0 U	1.0 UJ
Oct. 97	0.3 U	0.4 U	0.4 U	0.4 U	--	0.50 U
May-98	0.5 U	0.6 U	2.0 U	1.0 U	0.70 U	2.0 U
Oct-01	1.1	0.15 J	0.19 J	0.12 J	0.50 U	0.50 U
Oct-02	1.1	0.26 J	0.25 J	0.5 U	0.50 U	0.50 U
Oct-03	0.95	0.29 J	0.17 J	0.5 U	0.50 U	0.50 U
Oct-04	0.64	0.28 J	0.17 J	0.5 U	0.50 U	0.50 U
Oct-05	0.62	0.24 J	0.78	0.13 J	0.50 U	0.50 U
Oct-06	**5.1**	0.43 J	2.4	0.78	0.50 U	0.50 U
Oct-07	**330**	1.6	6.5	**2.7**	0.50 U	0.50 U
Dec-07	**410**	2.1	7.5	**2.9**	0.50 U	0.50 U
Jan-08 shallow [a]	**430**	1.9	6.9	**2.6**	1.0 U	1.0 U
Jan-08 deep [a]	**460**	1.9	6.9	**2.7**	1.0 U	1.0 U
May-08	**460**	2.3	6.0	**2.4**	0.50 U	0.50 U
Jul-08	**410**	1.4	4.8	**1.7**	1.0 U	1.0 U
Oct-08 [b]	**390**	1.4	4.5	**1.4**	1.0 U	1.0 U
Jan-09	**300**	1.5	3.2	**1.3**	0.50 U	0.50 U
May-09	**320**	1.4	2.6	**1.1**	0.50 U	0.50 U
Oct-09	**210**	0.75	1.8	0.75	0.50 U	0.50 U
Apr-10	**200**	0.66	2.1	0.61	0.50 U	0.50 U
Oct-10	**130**	0.47 J	0.85	0.35 J	0.50 U	0.50 U
Apr-11	**75**	0.31 J	0.71	0.18 J	0.50 U	0.50 U
Oct-11	**68**	0.29 J	0.56	0.18 J	0.50 U	0.22 J
Mar-12	**52**	0.20 J	0.37 J	0.09 J	0.50 U	0.50
Apr-12	**52**	0.19 J	0.29 J	0.09 J	0.50 U	0.53
Jul-12	**53**	0.22 J	0.30 J	0.50 U	0.50 U	0.60
Cleanup Level	5	5	200	1	70	2,400

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

Table 5. VOC Concentrations in Well AMW-64 Groundwater Samples (in µg/L)

Date Sampled	TCE	PCE	1,1,1-TCA	1,1-DCE	Cis-1,2-DCE	CFC-11
Mar-12	**190**	0.27 J	3.5	**2.7**	0.11 J	0.50 U
Apr-12	**160**	0.31 J	1.7	**2.5**	0.43 J	0.50 U
Jul-12	**170**	0.40 J	2.4	**2.7**	0.68	0.50 U
Cleanup Level	5	5	200	1	70	2,400

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

ATTACHMENT A

GROUNDWATER PURGE AND SAMPLING FORMS

Ground Water Purge and Sampling Form

Well Identification	AMW-17
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	–
Well Total Depth (ft btoc)	92

Site Location: Boomsnub Date: 7/25/12

Project Number: 14495.28 Personnel: KB/RR

Purge Method: X Low Flow ___Conventional ___None

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

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

Weather Conditions: Sunny 66°

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

Time	1012	1017	1022	1027	1032	1037	1042	1047		
Depth to Ground water (ft btoc)	8.78	8.85	8.85	8.84	8.84	8.84	8.84	8.84		
Total Groundwater Purged (gallons (liters))		2	4	6	8	10	12	14		
Purge Rate (gpm, ft³/min (ml/min))	400	400	400	400	400	400	400	400		
pH		6.76	6.51	6.47	6.45	6.45	6.44	6.44		
Conductivity (mS/cm)		0.160	0.160	0.158	0.158	0.156	0.155	0.155		
Turbidity (NTU)		0.25	0.13	0.40	0.12	0.16	0.23	0.39		
Disssolved Oxygen (mg/L)		2.24	0.57	0.37	0.31	0.25	0.21	0.18		
Temperature (°C)		15.0	14.9	15.1	14.9	14.9	14.8	14.9		
ORP/eH (mV)		186	185	178	172	160	160	159		
Color of Purged Water (gray, brown, red, clear)		clear	clear	clear	clear	clear	clear	Clear		

Sample Identification: 123002

Time Sampled: 1050

# of bottles/analysis

3 VOCs by 8260b

– Total Chromium

Comments:

Initial DTW = 8.78'

Final DTW = 8.75'

Purge water disposed To: Boomsnub

Ground Water Purge and Sampling Form

Well Identification	AMW-18
Well Diameter (inches)	4
Well Monument Locked and Good Condition?	Y
Inside Well Head and Outside Well Casing (D=dry), (WAC=Water above Casing), WBC=Water Below Casing)	D
Well Casing Plug Locked and Good Condition?	Y
PID Reading in Well (ppm)	–
Well Total Depth (ft btoc)	103.27

Site Location: Boomsnub Date: 7/25/12

Project Number: 14495.28 Personnel: KB/RR

Purge Method: X Low Flow ___Conventional ___None

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

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

Weather Conditions: Sunny 75°

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

Time	1412	1422	1427	1432	1437	1442	1447	1452		
Depth to Ground water (ft btoc)	24.29'	24.47	24.47	24.47	24.47	24.47	24.49	24.49		
Total Groundwater Purged (gallons (liters))		4	6	8	10	12	14	16		
Purge Rate (gpm, ft^3/min, (ml/min))	400	400	400	400	400	400	400	400		
pH		6.40	6.32	6.22	6.10	6.01	5.95	5.92		
Conductivity (mS/cm)		0.152	0.154	0.157	0.162	0.162	0.163	0.161		
Turbidity (NTU)		12.1	7.88	5.99	4.67	4.33	3.93	4.07		
Disssolved Oxygen (mg/L)		0.90	0.78	0.69	0.62	0.69	0.70	0.76		
Temperature (°C)		16.5	16.4	16.3	16.2	16.2	16.1	16.2		
ORP/eH (mV)		135	129	120	124	122	121	121		
Color of Purged Water (gray, brown, red, clear)		clear	clear	clear	clear	clear	clear	clear		

Sample Identification: 1230003 (1500) # of bottles/analysis

Time Sampled: 1230003 MS (1500) 9 VOCs by 8260b

1230003 MSD (1500) – Total Chromium

Purge water disposed To: Boomsnub

Comments:

Initial DTW = 24.29'

1412: Started pumping,

Final DTW = 24.36'

TD = 101.89
1.38
103.27

Ground Water Purge and Sampling Form

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

Site Location: Boomsnub Date: 7/25/12

Project Number: 14495.28 Personnel: KB/RR

Purge Method: X Low Flow ___Conventional ___None

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

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

Weather Conditions: Sunny 82°

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

Time	1639	1649	1659	1704	1709	1714	1719	1724	1729	
Depth to Ground water (ft btoc)	13.59	13.63	14.20	14.58	15.34	—	15.79	15.96	16.05	
Total Groundwater Purged (gallons, liters)		2.5	5.0	6.25	7.5	8.75	10	11.25	12.5	
Purge Rate (gpm, ft³/min, ml/min)	250	250	250	250	250	250	250	250	250	
pH		7.18	6.97	6.90	6.81	6.74	6.68	6.65	6.65	
Conductivity (mS/cm)		0.269	0.272	0.270	0.267	0.267	0.265	0.264	0.264	
Turbidity (NTU)		4.34	0.90	4.44	2.91	2.56	2.54	2.32	2.91	
Disssolved Oxygen (mg/L)		0.32	0.31	0.19	0.10	0.09	0.09	0.11	0.12	
Temperature (°C)		18.4	19.5	19.2	17.0	17.2	17.6	18.3	19.3	
ORP/eH (mV)		-27	-65	-76	-87	-93	-95	-95	-95	
Color of Purged Water (gray, brown, red, clear)		clear	clear	clear	clear	clear	clear	clear	clear	

Sample Identification: 1230005 (1735)

Time Sampled: 1230006 (1740)

Purge water disposed To: Boomsnub

# of bottles/analysis

6 VOCs by 8260b

— Total Chromium

Comments:

Initial DTW: 13.59'

Final DTW: 17.40'

TD: 97.41 + 1.38 = 98.79'

Pump set at about 93.4'

ATTACHMENT B

LABORATORY ANALYTICAL RESULTS

Sample Cross Reference Form
Summer 2012 Quarterly Groundwater Sampling Event

Lab ID	Well/Sample ID	Sample Date	Sample Time	Comments
1230001	Trip Blank	7/25/2012	--	
1230002	AMW-17	7/25/2012	1050	
1230003	AMW-18	7/25/2012	1500	MS/MSD collected
1230004	Rinsate	7/25/2012	1550	Equipment rinsate
1230005	AMW-64	7/25/2012	1735	
1230006	AMW-64	7/25/2012	1740	Duplicate

August 14, 2012 Analytical Report for Service Request No: K1207258

Cathy Bohlke
EA Engineering, Science and Technology
720 Sixth Street South, Suite 100
Kirkland, WA 98033

RE: Boomsnub/14495.28 0005

Dear Cathy

Enclosed are the results of the samples submitted to our laboratory on July 26, 2012. For your reference, these analyses have been assigned our service request number K1207258.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at Lisa.Domenighini@alsglobal.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Lisa Domenighini
Project Chemist

LD/jw

Columbia Analytical Services

ADDRESS 1317 S. 13th Avenue, Kelso, WA 98626
PHONE +1 360 577 7222 FAX +1 360 636 1068
Columbia Analytical Services, Inc.
Part of the ALS Group A Campbell Brothers Limited Company

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

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

Columbia Analytical Services, Inc. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2286
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L12-28
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Georgia DNR	http://www.gaepd.org/Documents/techguide_pcb.html#cel	881
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
Indiana DOH	http://www.in.gov/isdh/24859.htm	C-WA-01
ISO 17025	http://www.pjlabs.com/	L12-27
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	3016
Louisiana DHH	Not available	LA110003
Maine DHS	Not available	WA0035
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-368
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA35
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
New Mexico ED	http://www.nmenv.state.nm.us/dwb/Index.htm	-
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA200001
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T704427-08-TX
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C1203
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.caslab.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.caslab.com or at the accreditation bodies web site

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS ENVIRONMENTAL

Client:	EA Engineering Science and Technology	**Service Request No.:**	K1207258
Project:	Bomsnub/14495.28.0005	**Date Received:**	07/26/12
Sample Matrix:	Water		

CASE NARRATIVE

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

Sample Receipt

Six water samples were received for analysis at ALS Environmental on 07/26/12. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Volatile Organic Compounds by EPA Method 8260

Calibration Verification Exceptions:
The following analyte was flagged as outside the upper control criterion for Continuing Calibration Verification (CCV) J:\MS27\0803F003.D: Toluene-d8. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The CAS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

The following analytes were flagged as outside the upper control criterion for Continuing Calibration Verification (CCV) J:\MS27\0806F003.D: 1,2-Dibromo-3-chloropropane and Toluene-d8. In accordance with the EPA Method, 80% or more of the CCV analytes must pass within 20% of the true value. The CAS SOP allows for 40% difference for the remaining analytes. The CCV met these criteria. The quality of the sample data was not significantly affected. No further corrective action was required.

Matrix Spike Recovery Exceptions:
The matrix spike recovery of Hexachlorobutadiene and the duplicate matrix spike recoveries of 1,1,2,2,-Tetrachloroethane, 1,2-Dibromo-3-chloropropane, and Hexachlorobutadiene for sample 1230003 was outside control criteria. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicated the analytical batch was in control. The matrix spike outlier suggested a potential high bias in this matrix. No further corrective action was appropriate.

The control criteria for matrix spike and duplicate spike recovery of Trichloroethene (TCE) for sample 1230003 were not applicable. The analyte concentration in the sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery.

Calibration Range Exceedence:
The result for Trichloroethene (TCE) was estimated in sample 1230003DMS KWG1208689-2 because the concentration exceeded the instrument calibration range due to the analyte in question being present in the sample matrix at an elevated amount.

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

Approved by Lisa A. Jamieson **Date** 8/14/12

Chain of Custody

CHAIN OF CUSTODY

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

SR#: K1207268

PAGE 1 OF 1 COC #

PROJECT NAME: Boomsnub
PROJECT NUMBER: 14495.28 0005
PROJECT MANAGER: Cathy Bohlke
COMPANY/ADDRESS: 720 6th St. South, Suite 100
CITY/STATE/ZIP: Kirkland, WA 98033
E MAIL ADDRESS: cbohlke@eaest.com
PHONE #: (425) 451-7100 FAX #: (425) 451-7800
SAMPLER'S SIGNATURE: Kristin Beaulieu

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC MS 625 ☐ 8270 ☐	Volatile Organics 624 ☐ 8260 ☐ 8270LL ☐	Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐ ☐ 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
1230001	7/25/12	-	1	water	2		X													
1230002		1050	2		3		X													
1230003		1500	3		3		X													
1230003 MS		1500			3		X													
1230003 MSD		1500			3		X													
1230004		1550	4		3		X													
1230005		1735	5		3		X													
1230006	7/25/12	1740	6	water	3		X													

REPORT REQUIREMENTS

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

INVOICE INFORMATION

P.O. #
Bill To: EA Engineering
Kirkland, WA 98033

TURNAROUND REQUIREMENTS

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

Requested Report Date

Circle which metals are to be analyzed.

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

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

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

SPECIAL INSTRUCTIONS/COMMENTS:
Temperature Blank Included.
Include PDF deliverable

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

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Kristin Beaulieu	Signature:	Signature:	Signature:
Date/Time: 7-26-12/9:05	Date/Time: 7/26/12 1320	Date/Time:	Date/Time:
Printed Name: Kristin Beaulieu	Printed Name:	Printed Name:	Printed Name:
Firm: EA	Firm: ALS	Firm:	Firm:

RCOC #1 03/10

8

PC 1158

Cooler Receipt and Preservation Form

Client / Project: EA Engineering Service Request K12 07368

Received: 7/26/12 Opened: 7/26/12 By: Steve Unloaded: 7/26/12 By: Steve

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? 2 front + side
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Cooler Temp °C	Temp Blank °C	Thermometer ID	Cooler/COC ID (NA)	Tracking Number (NA)	Filed
4.1	0.9	287			

7. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____

8. Were custody papers properly filled out (ink, signed, etc.)?	NA	Y	N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.*	NA	Y	N
10. Were all sample labels complete (i.e analysis, preservation, etc.)?	NA	Y	N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.*	NA	Y	N
12. Were appropriate bottles/containers and volumes received for the tests indicated?	NA	Y	N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below*	NA	Y	N
14. Were VOA vials received without headspace? *Indicate in the table below.*	NA	Y	N
15. Was Cl2/Res negative?	NA	Y	N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Volatile Organic Compounds

Organic Analysis:
Volatile Organic Compounds

Summary Package

Sample and QC Results

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.28 0005

Service Request: K1207258

Cover Page - Organic Analysis Data Package
Volatile Organic Compounds

Sample Name	Lab Code	Date Collected	Date Received
1230001	K1207258-001	07/25/2012	07/26/2012
1230002	K1207258-002	07/25/2012	07/26/2012
1230003	K1207258-003	07/25/2012	07/26/2012
1230004	K1207258-004	07/25/2012	07/26/2012
1230005	K1207258-005	07/25/2012	07/26/2012
1230006	K1207258-006	07/25/2012	07/26/2012
1230003MS	KWG1208689-1	07/25/2012	07/26/2012
1230003DMS	KWG1208689-2	07/25/2012	07/26/2012

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Holly Butcher
Name: Holly Butcher
Date: 08-Ø13-2012
Title: Scientist
HB 8/13/12

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Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1207258
Project:	Boomsnub/14495.28 0005	**Date Collected:**	07/25/2012
Sample Matrix:	Water	**Date Received:**	07/26/2012

Volatile Organic Compounds

Sample Name:	1230001 Trip Blank	**Units:**	ug/L
Lab Code:	K1207258-001	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/03/12	08/03/12	KWG1208689	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Methylene Chloride	0.14	J	2.0	0.10	1	08/03/12	08/03/12	KWG1208689	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/03/12	08/03/12	KWG1208689	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/03/12	08/03/12	KWG1208689	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/03/12	08/03/12	KWG1208689	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	08/03/12	08/03/12	KWG1208689	
Bromodichloromethane	ND	U	0.50	0.091	1	08/03/12	08/03/12	KWG1208689	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	08/03/12	08/03/12	KWG1208689	
Dibromochloromethane	ND	U	0.50	0.14	1	08/03/12	08/03/12	KWG1208689	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/03/12	08/03/12	KWG1208689	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/03/12	08/03/12	KWG1208689	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/03/12	08/03/12	KWG1208689	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	117	73-122	08/03/12	Acceptable
Toluene-d8	120	65-144	08/03/12	Acceptable
4-Bromofluorobenzene	107	68-117	08/03/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.28 0005
Sample Matrix: Water

Service Request: K1207258
Date Collected: 07/25/2012
Date Received: 07/26/2012

Volatile Organic Compounds

Sample Name: 1230002 AMW-17
Lab Code: K1207258-002

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/03/12	08/03/12	KWG1208689	
1,1-Dichloroethene	**1.1**		0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Methylene Chloride	ND	U	2.0	0.10	1	08/03/12	08/03/12	KWG1208689	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/03/12	08/03/12	KWG1208689	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/03/12	08/03/12	KWG1208689	
1,1,1-Trichloroethane (TCA)	**2.3**		0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/03/12	08/03/12	KWG1208689	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Trichloroethene (TCE)	**210**	D	5.0	1.0	10	08/03/12	08/03/12	KWG1208689	
Bromodichloromethane	ND	U	0.50	0.091	1	08/03/12	08/03/12	KWG1208689	
Tetrachloroethene (PCE)	**1.0**		0.50	0.099	1	08/03/12	08/03/12	KWG1208689	
Dibromochloromethane	ND	U	0.50	0.14	1	08/03/12	08/03/12	KWG1208689	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/03/12	08/03/12	KWG1208689	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/03/12	08/03/12	KWG1208689	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/03/12	08/03/12	KWG1208689	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	115	73-122	08/03/12	Acceptable
Toluene-d8	123	65-144	08/03/12	Acceptable
4-Bromofluorobenzene	107	68-117	08/03/12	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1207258
Project:	Boomsnub/14495.28 0005	**Date Collected:**	07/25/2012
Sample Matrix:	Water	**Date Received:**	07/26/2012

Volatile Organic Compounds

Sample Name:	1230003 AMW-1B	**Units:**	ug/L
Lab Code:	K1207258-003	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Trichlorofluoromethane	**0.60**		0.50	0.12	1	08/03/12	08/03/12	KWG1208689	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Methylene Chloride	ND	U	2.0	0.10	1	08/03/12	08/03/12	KWG1208689	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/03/12	08/03/12	KWG1208689	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/03/12	08/03/12	KWG1208689	
1,1,1-Trichloroethane (TCA)	**0.30**	J	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/03/12	08/03/12	KWG1208689	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Trichloroethene (TCE)	**53**		0.50	0.10	1	08/03/12	08/03/12	KWG1208689	
Bromodichloromethane	ND	U	0.50	0.091	1	08/03/12	08/03/12	KWG1208689	
Tetrachloroethene (PCE)	**0.22**	J	0.50	0.099	1	08/03/12	08/03/12	KWG1208689	
Dibromochloromethane	ND	U	0.50	0.14	1	08/03/12	08/03/12	KWG1208689	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/03/12	08/03/12	KWG1208689	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/03/12	08/03/12	KWG1208689	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/03/12	08/03/12	KWG1208689	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	116	73-122	08/03/12	Acceptable
Toluene-d8	120	65-144	08/03/12	Acceptable
4-Bromofluorobenzene	106	68-117	08/03/12	Acceptable

Comments:

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

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1207258
Project:	Boomsnub/14495.28 0005	**Date Collected:**	07/25/2012
Sample Matrix:	Water	**Date Received:**	07/26/2012

Volatile Organic Compounds

Sample Name:	1230004 Rinsate	**Units:**	ug/L
Lab Code:	K1207258-004	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/03/12	08/03/12	KWG1208689	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Methylene Chloride	ND	U	2.0	0.10	1	08/03/12	08/03/12	KWG1208689	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/03/12	08/03/12	KWG1208689	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/03/12	08/03/12	KWG1208689	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/03/12	08/03/12	KWG1208689	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	08/03/12	08/03/12	KWG1208689	
Bromodichloromethane	ND	U	0.50	0.091	1	08/03/12	08/03/12	KWG1208689	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	08/03/12	08/03/12	KWG1208689	
Dibromochloromethane	ND	U	0.50	0.14	1	08/03/12	08/03/12	KWG1208689	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/03/12	08/03/12	KWG1208689	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/03/12	08/03/12	KWG1208689	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/03/12	08/03/12	KWG1208689	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	116	73-122	08/03/12	Acceptable
Toluene-d8	118	65-144	08/03/12	Acceptable
4-Bromofluorobenzene	103	68-117	08/03/12	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1207258
Project:	Boomsnub/14495.28 0005	**Date Collected:**	07/25/2012
Sample Matrix:	Water	**Date Received:**	07/26/2012

Volatile Organic Compounds

Sample Name:	1230005 AMW-69	**Units:**	ug/L
Lab Code:	K1207258-005	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/03/12	08/03/12	KWG1208689	
1,1-Dichloroethene	**2.5**		0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Methylene Chloride	ND	U	2.0	0.10	1	08/03/12	08/03/12	KWG1208689	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/03/12	08/03/12	KWG1208689	
cis-1,2-Dichloroethene	**0.63**		0.50	0.067	1	08/03/12	08/03/12	KWG1208689	
1,1,1-Trichloroethane (TCA)	**2.2**		0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/03/12	08/03/12	KWG1208689	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Trichloroethene (TCE)	**170**	D	5.0	1.0	10	08/03/12	08/03/12	KWG1208689	
Bromodichloromethane	ND	U	0.50	0.091	1	08/03/12	08/03/12	KWG1208689	
Tetrachloroethene (PCE)	**0.33**	J	0.50	0.099	1	08/03/12	08/03/12	KWG1208689	
Dibromochloromethane	ND	U	0.50	0.14	1	08/03/12	08/03/12	KWG1208689	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/03/12	08/03/12	KWG1208689	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/03/12	08/03/12	KWG1208689	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/03/12	08/03/12	KWG1208689	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	117	73-122	08/03/12	Acceptable
Toluene-d8	122	65-144	08/03/12	Acceptable
4-Bromofluorobenzene	106	68-117	08/03/12	Acceptable

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.
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Analytical Results

Client:	EA Engineering, Science, and Technology	**Service Request:**	K1207258
Project:	Boomsnub/14495.28 0005	**Date Collected:**	07/25/2012
Sample Matrix:	Water	**Date Received:**	07/26/2012

Volatile Organic Compounds

Sample Name:	1230006 AMW-64 Dup.	**Units:**	ug/L
Lab Code:	K1207258-006	**Basis:**	NA
Extraction Method:	EPA 5030B	**Level:**	Low
Analysis Method:	8260C		

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/06/12	08/06/12	KWG1208768	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/06/12	08/06/12	KWG1208768	
1,1-Dichloroethene	**2.7**		0.50	0.080	1	08/06/12	08/06/12	KWG1208768	
Methylene Chloride	**0.11**	J	2.0	0.10	1	08/06/12	08/06/12	KWG1208768	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/06/12	08/06/12	KWG1208768	
cis-1,2-Dichloroethene	**0.68**		0.50	0.067	1	08/06/12	08/06/12	KWG1208768	
1,1,1-Trichloroethane (TCA)	**2.4**		0.50	0.075	1	08/06/12	08/06/12	KWG1208768	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/06/12	08/06/12	KWG1208768	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/06/12	08/06/12	KWG1208768	
Trichloroethene (TCE)	**160**	D	5.0	1.0	10	08/06/12	08/06/12	KWG1208768	
Bromodichloromethane	ND	U	0.50	0.091	1	08/06/12	08/06/12	KWG1208768	
Tetrachloroethene (PCE)	**0.40**	J	0.50	0.099	1	08/06/12	08/06/12	KWG1208768	
Dibromochloromethane	ND	U	0.50	0.14	1	08/06/12	08/06/12	KWG1208768	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/06/12	08/06/12	KWG1208768	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/06/12	08/06/12	KWG1208768	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/06/12	08/06/12	KWG1208768	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	120	73-122	08/06/12	Acceptable
Toluene-d8	125	65-144	08/06/12	Acceptable
4-Bromofluorobenzene	108	68-117	08/06/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.28 0005
Sample Matrix: Water

Service Request: K1207258
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG1208689-4

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/03/12	08/03/12	KWG1208689	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Methylene Chloride	ND	U	2.0	0.10	1	08/03/12	08/03/12	KWG1208689	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/03/12	08/03/12	KWG1208689	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/03/12	08/03/12	KWG1208689	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	08/03/12	08/03/12	KWG1208689	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/03/12	08/03/12	KWG1208689	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/03/12	08/03/12	KWG1208689	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	08/03/12	08/03/12	KWG1208689	
Bromodichloromethane	ND	U	0.50	0.091	1	08/03/12	08/03/12	KWG1208689	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	08/03/12	08/03/12	KWG1208689	
Dibromochloromethane	ND	U	0.50	0.14	1	08/03/12	08/03/12	KWG1208689	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/03/12	08/03/12	KWG1208689	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/03/12	08/03/12	KWG1208689	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/03/12	08/03/12	KWG1208689	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	116	73-122	08/03/12	Acceptable
Toluene-d8	120	65-144	08/03/12	Acceptable
4-Bromofluorobenzene	105	68-117	08/03/12	Acceptable

Comments:

Client: EA Engineering, Science, and Technology
Project: Boomsnub/14495.28 0005
Sample Matrix: Water

Service Request: K1207258
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG1208768-4

Extraction Method: EPA 5030B
Analysis Method: 8260C

Units: ug/L
Basis: NA
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Vinyl Chloride	ND	U	0.50	0.075	1	08/06/12	08/06/12	KWG1208768	
Trichlorofluoromethane	ND	U	0.50	0.12	1	08/06/12	08/06/12	KWG1208768	
1,1-Dichloroethene	ND	U	0.50	0.080	1	08/06/12	08/06/12	KWG1208768	
Methylene Chloride	ND	U	2.0	0.10	1	08/06/12	08/06/12	KWG1208768	
trans-1,2-Dichloroethene	ND	U	0.50	0.072	1	08/06/12	08/06/12	KWG1208768	
cis-1,2-Dichloroethene	ND	U	0.50	0.067	1	08/06/12	08/06/12	KWG1208768	
1,1,1-Trichloroethane (TCA)	ND	U	0.50	0.075	1	08/06/12	08/06/12	KWG1208768	
Carbon Tetrachloride	ND	U	0.50	0.096	1	08/06/12	08/06/12	KWG1208768	
1,2-Dichloroethane (EDC)	ND	U	0.50	0.080	1	08/06/12	08/06/12	KWG1208768	
Trichloroethene (TCE)	ND	U	0.50	0.10	1	08/06/12	08/06/12	KWG1208768	
Bromodichloromethane	ND	U	0.50	0.091	1	08/06/12	08/06/12	KWG1208768	
Tetrachloroethene (PCE)	ND	U	0.50	0.099	1	08/06/12	08/06/12	KWG1208768	
Dibromochloromethane	ND	U	0.50	0.14	1	08/06/12	08/06/12	KWG1208768	
1,1,2,2-Tetrachloroethane	ND	U	0.50	0.16	1	08/06/12	08/06/12	KWG1208768	
1,2-Dibromo-3-chloropropane	ND	U	2.0	0.20	1	08/06/12	08/06/12	KWG1208768	
Hexachlorobutadiene	ND	U	2.0	0.11	1	08/06/12	08/06/12	KWG1208768	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Dibromofluoromethane	116	73-122	08/06/12	Acceptable
Toluene-d8	120	65-144	08/06/12	Acceptable
4-Bromofluorobenzene	107	68-117	08/06/12	Acceptable

Comments: