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7 September 2012

Mr. Mark Engdahl
Assistant Manager Environmental Remediation
BNSF Railway Company
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Subject: March 2012 Groundwater Monitoring and
Remediation System Construction Report
BNSF Railway Company
Wishram, Washington, Railyard
K/J 1196010*01

Dear Mr. Engdahl:

Kennedy/Jenks Consultants has prepared this report on behalf of BNSF Railway Company (BNSF) to summarize groundwater monitoring and remediation activities at the BNSF Wishram, Washington, railyard (site). Presented herein are results of site groundwater monitoring conducted in March 2012, along with a construction summary regarding the air sparge (AS) / soil vapor extraction (SVE) groundwater remediation system installed February 2012. The site location, remediation areas, and current groundwater sampling locations are shown on Figures 1 and 2 (attached).

Background

In 2003 and 2004, Kennedy/Jenks Consultants conducted a remedial investigation at the site and presented the results to BNSF and the Washington State Department of Ecology (Ecology) in the *Site Assessment Report, Wishram Railyard,* dated August 2004. In October and November 2005, approximately 3,600 tons of petroleum-containing soil and abandoned fuel piping were excavated and removed from former fueling and oil storage areas as described in the *Remediation Documentation Report, Wishram, Washington*, provided to BNSF in March 2007.

Since completion of soil removal activities in 2005, groundwater monitoring has been performed periodically to evaluate petroleum hydrocarbon concentrations in groundwater. Groundwater sampling locations have included monitoring well WMW-7, located west of the maintenance shop building, wells WMW-3 and WMW-5, located south and southeast of a former fueling platform (removed in 2005), and well WMW-1, located near the Columbia River shoreline (see attached Figure 2).

Other site monitoring wells were either removed during the 2005 excavation (WMW-2 and WMW-6) or have been destroyed during site grading operations (WMW-4). In February 2012,

additional monitoring wells were installed along the Columbia River shoreline and in the area west of well WMW-7. Locations of the new wells (WMW-8, WMW-9, WMW-10, and WMW-11) can be viewed on Figure 2.

Light non-aqueous phase liquid (LNAPL) has been detected in WMW-7 since completion of soil removal activities in 2005. Remediation of the LNAPL zone and associated petroleum impacted groundwater in and around WMW-7 has been ongoing since system startup in June 2012 with use of a coupled AS/SVE system, currently operating in biovent mode, which was constructed in February 2012. AS and SVE well locations can be viewed on Figure 2.

Groundwater Monitoring

Groundwater monitoring for the site included the following activities: 1) groundwater elevation monitoring, 2) groundwater parameter monitoring during purging, and 3) groundwater sample collection for laboratory analyses from all existing site monitoring wells. Groundwater samples were collected using low-flow purging techniques [U.S. Environmental Protection Agency (EPA) 1996]. During the March 2012 sampling event, collected samples were submitted to Test America (formerly North Creek Analytical) of Bothell, Washington, for analysis of the following chemicals of concern (COCs):

- Northwest Total Petroleum Hydrocarbon, as Gasoline Extended (NWTPH-Gx)
- Northwest Total Petroleum Hydrocarbon, as Diesel Extended (NWTPH-Dx)
- Benzene, toluene, ethyl benzene, and xylenes (BTEX) by Method 8021B

In addition to evaluating for COC concentrations, groundwater was analyzed for selected natural attenuation potential using the following geochemical indicators:

- Nitrate/nitrite (EPA Method 353.2) and ammonia (EPA Method 350.1/.3)
- Dissolved iron (ferrous iron) (Method 200.8)
- Sulfate (EPA Method 300.0) and sulfide (EPA Method 376.2)
- Methane (Method RSK 175)

Water quality parameter measurements, including pH, temperature, specific conductivity, oxidation reduction potential (ORP), turbidity, and dissolved oxygen (DO), were recorded during the purging process using a YSI (YSI Incorporated, 2012), multi-parameter, hand-held device. Qualitative observations of groundwater color and odor were also noted. Groundwater purge and sample forms, which document these sampling activities are included in Appendix A, attached.

A groundwater sample was not collected from well WMW-7, which contained light non-aqueous phase liquid (LNAPL) during this monitoring event. Product thickness in well WMW-7 was measured at 0.14 foot and 0.18 foot on 12 and 14 March 2012, respectively.

Summary

Groundwater Elevation Measurements

Groundwater elevation measurements from the monitoring event have been tabulated (along with historical groundwater elevations) in Table 1, attached. Water levels were measured on 12 March 2012 and again on 14 March 2012. In general, the hydraulic gradient during this monitoring event is north to south. This hydraulic gradient direction is consistent with historical monitoring events. However, during periods of high water in Lake Celilo, the hydraulic gradient has changed temporarily from south to north (see 10 September 2009, Table 1).

Groundwater Analytical Results

Groundwater analytical results for historical and recent monitoring events have been tabulated in Table 2, attached. The laboratory analytical reports have been included in Appendix B: Laboratory Analytical Reports (attached).

Neither gasoline-range hydrocarbons nor BTEX compounds were detected at concentrations above the analytical method detection limits in any of the monitoring wells during this event (see Table 2). Diesel-range petroleum hydrocarbons were detected at concentrations exceeding the Ecology Model Toxics Control Act (MTCA) Method A groundwater cleanup level of 0.50 milligrams per liter (mg/L) in wells WMW-1, WMW-3, WMW-8, and WMW-11 (Table 2). Oil-range petroleum hydrocarbons were detected above MTCA Method A groundwater cleanup level of 0.50 mg/l in monitoring wells WMW-1 and WMW-11 (see Table 2).

No COCs were detected above MTCA Method A groundwater cleanup levels in wells WMW-5, WMW-9, or WMW-10. These wells currently define the extent of groundwater hydrocarbon impacts at the site.

Analytical results for geochemical indicators of natural attenuation are shown in Table 3, attached. The geochemical data indicates aerobic and anaerobic biodegradation (denitrification, iron reduction, sulfate reduction, and methanogenesis) within the dissolved diesel petroleum hydrocarbon zone (see below).

Conclusions

Groundwater Quality

Site groundwater contains levels of dissolved petroleum hydrocarbons (diesel- and/or oil-range) above MTCA Method A groundwater cleanup levels in wells WMW-1, WMW-3, WMW-8, and WMW-11. Concentrations detected in well WMW-1 and WMW-3 are comparable to those detected during past monitoring events. This is the first sampling of wells WMW-8 and WMW-11; therefore, there is no prior data at these locations. Well WMW-11 and historical well WMW-4 (destroyed) analytical results can be compared, as they would have been within approximately 10 feet of one another (see Table 2). The comparison is inconsistent, with well WMW-4 never having petroleum hydrocarbon groundwater concentration exceeding MTCA Method A cleanup levels. This may be explained by the location of wells WMW-11 and WMW-4 being near the edge of the impacted hydrocarbon zone, or it may be reflecting the variable

nature of groundwater petroleum hydrocarbon concentrations in wells near Lake Celilo (as historically measured in well WMW-1).

LNAPL was measured in well WMW-7 on 12 March 2012 at 0.18 foot (apparent thickness).

Natural Attenuation

Groundwater samples collected from well WMW-5 provide data on baseline groundwater geochemistry, as this location represents chemical conditions generally hydraulically up gradient of the petroleum hydrocarbon-containing zone. Groundwater in the vicinity of well WMW-5 is aerobic (high ORP and DO), which signifies little biological activity at this location (Harkness and Bracco 1998). Well WMW-3, down gradient of well WMW-5, and located within the dissolved petroleum hydrocarbon zone, records a large negative shift in DO (although not depletion) and ORP. This indicates aerobic biodegradation of the petroleum hydrocarbon in this area. Negative shifts in nitrate and sulfate (anaerobic oxidizers) concentrations were reported in well WMW-3, which indicates anaerobic biodegradation of the petroleum hydrocarbon by denitrification and sulfate reduction. An increase in ferrous iron concentrations in well WMW-3 indicates iron reduction as another biodegradation process occurring within the dissolved petroleum hydrocarbon zone. Methanogenesis is likely occurring in the vicinity of well WMW-3, as elevated (compared to background) methane concentrations were detected in groundwater collected from this well (see Table 3).

Remediation System Construction

Three AS and four SVE wells were installed onsite during January 2012 by Major Drilling, of Sherwood, Oregon. AS wells have been designated AS-12-1 through AS-12-3; SVE wells have been designated SVE-12-1 though SVE-12-4. Locations of the AS and SVE wells are displayed on Figure 2. AS/SVE wells were placed as such considering WMW-7 as the target remediation area. Boring and well construction logs for AS and SVE wells have been included in Appendix C: Boring and Well Construction Logs.

Construction of the operating system was performed during February 2012 by Cherokee Construction Services of Vancouver Washington. Construction included: asphalt cutting, trenching air line routes, connecting wellheads to remediation units, and unit setup. AS delivery and SVE collection lines are comprised of 2-inch Schedule 80 polyvinyl chloride (PVC). PVC lines were routed from the AS/SVE units to the wellheads as approximately outlined in Figure 3. The AS/SVE units which regulate system pressures are located on a concrete pad and have been securely fenced-in. The SVE unit onsite is operated by a Rotron EN656 regenerative blower. The specifications of this make and model are included in Appendix D: AS/SVE Unit Specifications. The AS unit onsite is operated by a GAST 2567-P132 rotary vane compressor**.** The specifications of this make and model are also included in Appendix D. Photographs of the AS/SVE remediation system can be viewed in Appendix E: Photographs

Summary/Conclusion

AS/SVE System Construction

AS/SVE treatment of site groundwater has been ongoing since system startup in June 2012. Currently, the system is running in biovent mode. Monitoring events which occurred prior to

system startup will serve as base line groundwater conditions to evaluate the effects of AS/SVE remediation efforts. Subsequent monitoring events will record groundwater quality through time as AS/SVE remediation efforts progress.

Schedule

The next sampling event is anticipated to occur in September 2012. Kennedy/Jenks Consultants appreciates the opportunity to assist BNSF with this project. If you have any questions regarding this report, please contact us at (253) 835-6400.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Joseph Sawdey
Project Hydrogeologist

Ty C. Schreiner, L.Hg
Project Manager

Attachments:
Table 1 – Groundwater Elevation Results
Table 2 – Total Petroleum Hydrocarbon and BTEX Results
Table 3 – Field and Natural Attenuation Parameters
Figure 1 – Vicinity Map
Figure 2 – Sampling Location Map
Figure 3 – AS/SVE System Outline
Appendix A – Field Forms
Appendix B – Laboratory Analytical Report
Appendix C – Boring and Well Construction Logs
Appendix D – AS/SVE Unit Specifications
Appendix E – Photographs

References

Harkness, M.R. and A.A. Bracco. 1998. Practical Issues in Field Sampling and Analysis for Natural Attenuation Assessments. In Natural Attenuation, Chlorinated and Recalcitrant Compounds. Battelle Press, Columbus, Ohio. Pages 177-182.

Kennedy/Jenks Consultants. 2004. *Site Assessment Report, Wishram Railyard.* Dated August 2004.

Kennedy/Jenks Consultants. 2007. *Remediation Documentation Report, Wishram, Washington.* Dated March 2007.

United States Environmental Protection Agency. 1996. Groundwater Issue: Low-Flow (Minimal Drawdown) Groundwater Sampling Procedures. Puls, R.W. and Barcelons, M.J.

YSI Incorporated, Yellow Springs, OH. 2011. YSI 556 Multi Probe System Operations Manual.

Tables

Table 1: Groundwater Elevation Results, Wishram, Washington

Well ID	Date	Well Elevation (TOC)	Depth to LNAPL (feet) [a]	Depth to Groundwater (feet)	LNAPL Thickness (feet) [b]	Groundwater Elevation (feet above datum)
WMW-1	9/17/03	172.51[c]	-- [d]	15.88	--	156.63
	4/15/04	172.51	--	10.46	--	162.05
	7/13/04	172.51	--	10.78	--	161.73
	11/9/06	172.51	--	9.60	--	162.91
	7/3/07	172.51	--	9.85	--	162.66
	8/16/07	172.51	--	10.55	--	161.96
	4/16/08	172.51	--	10.10	--	162.41
	8/21/08	172.51	--	10.59	--	161.92
	3/12/09	172.51	--	10.15	--	162.36
	9/10/09	172.51	--	10.44	--	162.07
	7/7/11	172.51	--	9.96	--	162.55
	3/12/12	172.48 [e]	--	10.36	--	162.12
	3/14/12	172.48	--	10.28	--	162.20
	9/10/12	172.48	--	10.27	--	162.21
WMW-2 [g]	9/18/03[f]	173.12[c]	--	--	--	--
	4/15/04	173.12	LNAPL [h]	10.81	LNAPL	162.31
	7/13/04	173.12	--	11.08	0.00 (F)	162.04
WMW-3	9/17/03	173.03[c]		16.37	--	156.66
	4/16/04	173.03	--	10.32	--	162.71
	7/13/04	173.03	10.64	10.65	0.01	162.38
	11/9/06	173.03	--	10.20	--	162.83
	7/3/07	173.03	--	10.08	--	162.95
	8/16/07	173.03	--	10.65	--	162.38
	4/16/08	173.03	--	10.14	--	162.89
	8/21/08	173.03	--	10.89	--	162.14
	3/12/12	173.03 [e]	--	10.58	--	162.45
	3/14/12	173.03	--	10.67	--	162.36
	9/10/12	173.03	--	10.85	--	162.18
WMW-4 [i]	9/18/03[i]	173.18[c]	--	--	--	--
	4/15/04	173.18	--	11.10	--	162.08
	7/13/04	173.18	--	11.40	--	161.78
WMW-5	4/16/04	172.60[c]	--	10.12	--	162.48
	7/13/04	172.60	--	10.40	--	162.20
	11/9/06	172.60	--	11.00	--	161.60
	7/3/07	172.60	--	9.79	--	162.81
	8/16/07	172.60	--	10.35	--	162.25
	4/16/08	172.60	--	9.91	--	162.69
	8/21/08	172.60	--	10.53	--	162.07
	3/12/09	172.60	--	10.09	--	162.51
	9/10/09	172.60	--	10.62	--	161.98
	7/7/11	172.60	--	9.80	--	162.80
	3/12/12	172.67 [e]	--	10.18	--	162.49
	3/14/12	172.67	--	10.24	--	162.43
	9/10/12	172.67	--	10.37	--	162.30
WMW-6 [j]	4/16/04	173.08[c]	LNAPL	10.46	LNAPL	162.62
	7/13/04	173.08	10.82	10.83	0.01	162.25

Table 1: Groundwater Elevation Results, Wishram, Washington

Well ID	Date	Well Elevation (TOC)	Depth to LNAPL (feet) [a]	Depth to Groundwater (feet)	LNAPL Thickness (feet) [b]	Groundwater Elevation (feet above datum)
WMW-7	4/16/04	174.12[c]	--	10.43	0.00 (S)	163.69
	7/13/04	174.12	10.97	11.04	0.07	163.08
	7/3/07	174.12	10.40	10.58	0.18	163.54
	8/16/07	174.12	LNAPL	11.00	LNAPL	163.12
	4/16/08	174.12	10.50	10.66	0.16	163.46
	8/21/08	174.12	11.59	12.19	0.60	161.93
	3/12/09	174.12	11.31	11.45	0.14	162.67
	9/10/09	174.12	12.10	13.60	1.50	160.52
	7/7/11	174.12	11.10	11.10	<0.01	163.02
	3/12/12	174.13 [e]	11.52	11.66	0.14	162.47
	3/14/12	174.13	11.56	11.74	0.18	162.39
	9/10/12	174.13	12.08	12.17	0.09	161.96
WMW-8	3/12/12	173.80 [e]	--	11.11	--	162.69
	3/14/12	173.80	--	11.17	--	162.63
	9/10/12	173.80	11.70	11.78	0.08	162.02
WMW-9	3/12/12	173.21[e]	--	10.83	--	162.38
	3/14/12	173.21	--	10.86	--	162.35
	9/10/12	173.21	--	11.07	--	162.14
WMW-10	3/12/12	173.07[e]	--	10.91	--	162.16
	3/14/12	173.07	--	10.82	--	162.25
	9/10/12	173.07	--	10.82	--	162.25
WMW-11	3/12/12	173.00[e]	--	10.90	--	162.10
	3/14/12	173.00	--	10.81	--	162.19
	9/10/12	173.00	--	10.78	--	162.22

Notes:

(a) LNAPL - light non-aqueous phase liquid
(b) The following symbols indicate observed conditions of groundwater:
LNAPL = presence of LNAPL (thickness not measured); (S) = sheen; (F) = film
(c) Groundwater elevations are based on a wellhead top-of-casing survey conducted in 2003.
of 100 feet, which was established at a temporary benchmark located near the Wishram Post Office.
(d) "--" indicates not applicable
(e) Groundwater elevations are based on a wellhead top-of-casing survey conducted in 2012 and tied to North American Vertical Datum-1988 (NAVD88).
(f) Monitoring well was dry.
(g) Monitoring well WMW-2 was removed during excavation in November 2005
(h) LNAPL observed in well, but no depth or thickness measurement provided.
(i) Monitoring well WMW-4 destroyed in summer 2006.
(j) Monitoring well WMW-6 was removed in 2006

Table 2: Total Petroluem Hydrocarbon and BTEX Results, Wishram, Washington

Well ID	Date	TPH (mg/L) [a]			BTEX (µg/L) [b]			
		Gasoline-Range	Diesel-Range	Oil-Range	Benzene	Toluene	Ethylbenzene	Total Xylenes
WMW-1	9/17/03	NA[c]	**0.593/0.605** [d]	<0.500/<0.500 [e]	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<1.00/1.02
	4/15/04	0.329	0.426	<0.500	<0.500	<0.500	<0.500	2.33
	7/13/04	0.306	0.411/0.424	<0.500/<0.500	<0.500	<0.500	2.33	<1.00
	11/9/06	<0.250	<0.236	<0.472	<2.50	<2.50	<2.50	<5.00
	7/3/07	0.0934	**5.96**	**0.523**	<0.500	<0.500	<0.500	<1.00
	8/16/07	0.152	0.328	<0.521	<0.500	<0.500	<0.500	<1.00
	4/16/08	0.191	<0.243	<0.485	<0.500	<0.500	<0.500	1.10
	8/21/08	0.180	**3.47**	<0.476	<0.500	<0.500	<0.500	<1.00
	3/12/09	0.206	**2.26**	<0.490	<0.500	<0.500	<0.500	<1.00
	9/10/09	0.350	**1.50**	<0.25	<1.0	<1.0	<1.0	<3.0
	7/7/11	0.217	**0.95**	<0.38	<1.0	<1.0	<1.0	<3.0
	3/13/12	0.31 B	**2.4 Y**	**2.0 Y**	<1.0	<1.0	<1.0	1.67 J
	9/11/12	**0.13 / 0.13 H**	**5.3 / 5 H**	**2.6 / 2.8 H**	<0.50/<0.50 H	<5.0/<5.0 H	<0.50/<0.50 H	<1.5/<1.5 H
WMW-2 [g]	9/18/03[f]	NA	**4.17**	**2.45**	**5.71**	23.5	5.84	11.8
	4/15/04	0.750	**0.844**	<0.500	**17.4**	3.66	17.4	37.2
	7/13/04	0.166	**1.77**	**0.518**	**10.9**	4.02	8.02	12.5
WMW-3	9/17/03	NA	0.253	<0.500	<0.500	<0.500	<0.500	<1.00
	4/16/04	NA	<0.250	<0.500	NA	NA	NA	NA
	7/13/04	0.190	0.306	<0.500	<0.500	<0.500	<0.500	<1.00
	11/9/06	0.209	**0.659**	<0.500	<0.500	<0.500	<0.500	<1.00
	7/3/07	0.203	**3.18**	<0.532	<0.500	<0.500	<0.500	<1.00
	8/16/07	0.291	**1.28**	<0.495	<0.500	<0.500	<0.500	1.43
	4/16/08	0.212	<0.248	<0.495	<0.500	<0.500	<0.500	<1.00
	8/21/08	0.199	**0.730**	<0.485	<0.500	<0.500	<0.500	<1.00
	3/14/12	0.22 B	**3.3 Y**	0.38 Y	<1.0	<1.0	<1.0	1.25 J
	9/11/12	<0.10/<0.10 H	**15/13 H**	**3.9/3.5 H**	<0.50/<0.50 H	<5.0/<5.0 H	<0.50/<0.50 H	<1.5/<1.5 H
WMW-4 [h]	9/18/03	NA	0.409	<0.500	<0.500	<0.500	<0.500	<1.00
	4/15/04	<0.0800	<0.250	<0.500	<0.500	<0.500	<0.500	<1.50
	7/13/04	0.0843	<0.250	<0.500	<0.500	<0.500	<0.500	<1.00
WMW-5	4/16/04	<0.0800/<0.0800	<0.250/<0.250	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<1.50/<1.50
	7/13/04	<0.0800/<0.0800	<0.250	<0.500	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<1.00/<1.00
	11/9/06	<0.0500/<0.0500	<0.250/<0.248	<0.500/<0.495	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<1.00/<1.00
	7/3/07	<0.0500	<0.248	<0.495	<0.500	<0.500	<0.500	<1.00
	8/16/07	<0.050	<0.250	<0.500	<0.500	<0.500	<0.500	<1.00
	4/16/08	<0.050	<0.245	<0.490	<0.500	<0.500	<0.500	<1.00
	8/21/08	<0.050	<0.240	<0.481	<0.500	<0.500	<0.500	<1.00
	3/12/09	<0.0500	<0.245	<0.490	<0.500	<0.500	<0.500	<1.00
	9/10/09	0.063	<0.12	<0.25	<1.0	<1.0	<1.0	<3.0
	7/7/11	<0.0500	<0.077	<0.38	<1.0	<1.0	<1.0	<3.0
	3/12/12	0.024 JB/<0.050	<0.12	0.051 J	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<3.0/<3.0
	9/11/12	<0.10/<0.10 H	<0.10/0.11 H	<0.25/<0.25 H	<0.50/<0.50 H	<5.0/<5.0 H	<0.50/<0.50 H	<1.5/<1.5 H
MTCA Method A GW[k]		0.8	0.5	0.5	5	1,000	700	1,000

Table 2: Total Petroluem Hydrocarbon and BTEX Results, Wishram, Washington

Well ID	Date	TPH (mg/L) [a]			BTEX (µg/L) [b]			
		Gasoline-Range	Diesel-Range	Oil-Range	Benzene	Toluene	Ethylbenzene	Total Xylenes
WMW-6 [i]	4/16/04	0.212	0.454	<0.500	<0.500	<0.500	<0.500	<1.50
	7/13/04	0.0942	<0.250	<0.500	<0.500	<0.500	<0.500	<1.00
WMW-7	4/16/04	**1.79**	**1.22**	<0.500	<5.00	<5.00	<5.00	<15.0
	7/13/04	0.316	**0.677**	<0.500	<0.500	<0.500	<0.500	<1.00
	7/3/07	0.380/0.423	**1.56/1.75**	<0.500/<0.532	<0.500/<0.500	<0.500/<0.500	0.772/0.786	<1.00/<1.00
	8/16/07	0.454	**0.548**	<0.500	<0.500	<0.500	1.04	<1.00
	4/16/08	0.415/0.454	**0.661/0.685**	<0.490/<0.495	<0.500/<0.500	<0.500/<0.500	0.713/0.731	<1.00/<1.00
	8/21/08	0.284/0.284	**0.652/0.632**	<0.476/<0.476	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<1.00/<1.00
	3/12/09	0.385/0.390	**1.90/5.29**	<0.485/<0.490	<0.500/<0.500	<0.500/<0.500	<0.500/<0.500	<1.00/<1.00
	9/10/2009[j]	NA	NA	NA	NA	NA	NA	NA
	7/7/2011[i]	NA	NA	NA	NA	NA	NA	NA
	3/12/2012[j]	NA	NA	NA	NA	NA	NA	NA
WMW-8	3/13/12	0.42 B	**0.85 Y**	0.074 J	<1.0	<1.0	<1.0	1.15 J
WMW-9	3/13/12	0.010 JB	0.23 Y / 0.071 J	0.30 Y / 0.081 J	<1.0	<1.0	<1.0	<3.0
	9/11/12	<0.10	0.49	**0.89**	<0.50	<5.0	<0.50	<1.5
WMW-10	3/13/12	0.022 JB	<0.12	0.063 J	<1.0	<1.0	<1.0	<3.0
	9/11/12	<0.10	0.38	<0.25	<0.50	<5.0	<0.50	<1.5
WMW-11	3/14/12	0.31 B	**3.7 Y**	**0.96 Y**	<1.0	<1.0	<1.0	<3.0
	9/11/12	<0.10/<0.10	**5.1/5**	**2.9/3**	<0.50/<0.50	<5.0/<5.0	<0.50/<0.50	<1.5/<1.5
MTCA Method A GW[k]		0.8	0.5	0.5	5	1,000	700	1,000

Notes:

(a) TPH - total petroleum hydrocarbons, measured as:
Gasoline-range hydrocarbons analyzed by the Northwest Total Petroleum Hydrocarbons as Gasoline (NWTPH-Gx) Method.
Diesel- and oil-range TPH analyzed by the Northwest Total Petroleum Hydrocarbons as Diesel Extended (NWTPH-Dx) Method with silica gel cleanup
(b) BTEX - benzene, toluene, ethylbenzene, and total xylenes, analyzed by EPA Method 8021B or 8260B.
(c) NA - not analyzed
(d) Where two values are displayed, the second is the analytical result for a field blind duplicate sample.
(e) "<" indicates the compound was not detected at a concentration greater than the laboratory reporting limit.
(f) Monitoring well was dry. Sample collected from purge water drum.
(g) Monitoring well WMW-2 was removed during excavation in November 2005.
(h) Monitoring well WMW-4 was destroyed in 2006.
(i) Monitoring well WMW-6 was removed in 2006.
(j) Well not sampled due to the presence of LNAPL.
(k) Washington State Department of Ecology Model Toxics Control Act (MTCA) Method A groundwater cleanup levels (WAC 173-340) dated 12 October 2007.
(l) Duplicate sample collected using HydraSleeve sampling system.

J- Laboratory note: "Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value."
Y- Laboratory note: "The chromatogram respnse resembles a typical fuel pattern."
B- Laboratory note: "Compound was found in the blank and sample."

H- Sampling note: Sampling methods were performed using the HydraSleeve ® sampling system

Concentrations above the cleanup level are shown in bold.

Table 3: Field and Natural Attentuation Parameters, Wishram, Washington

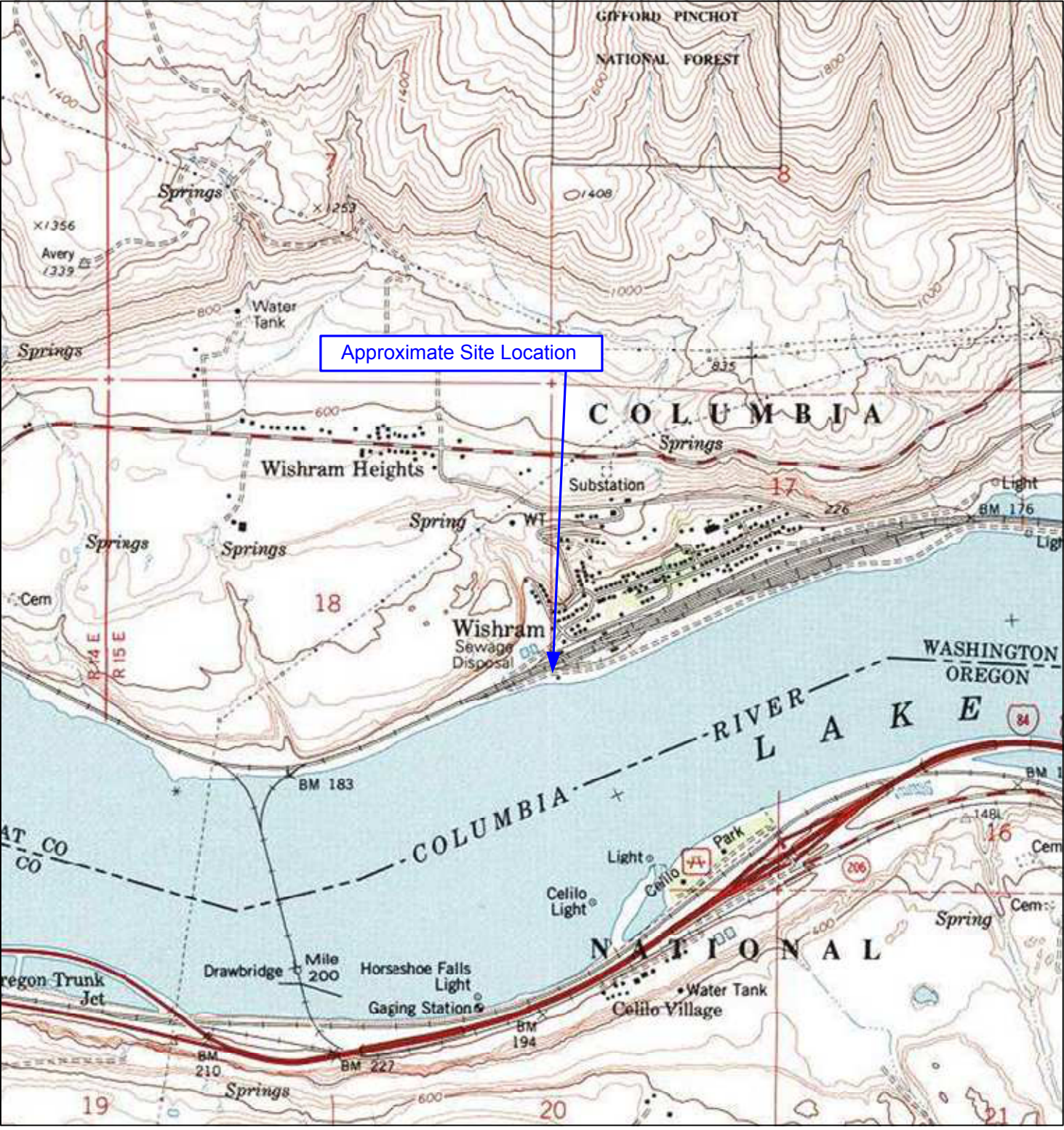
		Field Monitored Water Parameters				Field Natural Attenuation Parameters		Natural Attenuation Parameters					
Well ID	**Date**	**Temperature (°C)[a,b]**	**pH[a]**	**Conductivity (mS/cm)[a,c]**	**Turbidity (NTU)[d]**	**Dissolved Oxygen (mg/L)[a,e]**	**ORP (mV)[f,g]**	**Nitrate/Nitrite (mg/L)[h]**	**Ammonia (mg/L)[i]**	**Sulfate (mg/L)[j]**	**Sulfide (mg/L)[k]**	**Dissolved Iron (mg/L)[l]**	**Methane (µg/L)[m]**
WMW-1	3/13/12	15.26	6.81	0.599	8.7	0.49	-111	<0.010	0.48	<1.2	6.4	12	4,760
WMW-3	3/14/12	15.84	6.77	1.035	11.7	0.65	7	0.013	0.60	7.3	2.8	5.3	1,760
WMW-5	3/12/12	14.42	7.43	0.466	0.8	1.16	239	2.0 / 1.9[n]	<0.10 / <0.10[o]	20 / 20	1.5 / 1.5	<0.040 / 0.013 J	<5.00 / <5.00
WMW-7	3/12/12	NS[p]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
WMW-8	3/13/12	14.62	7.03	0.925	11.5	0.61	42	0.012	<0.10	17	2.0	0.31	126
WMW-9	3/13/12	14.56	7.14	0.617	19.8	0.50	235	4.8	<0.10	33	2.1	0.0097 J	<5.0
WMW-10	3/13/12	12.01	7.41	0.761	14.6	1.45	236	5.0	<0.10	33	6.4	<0.040	29.9
WMW-11	3/14/12	15.03	6.84	1.032	9.7	0.47	-74	0.0050 J	0.58	62	7.2	2.9	220

Notes:

(a) Measured using a YSI 556 Multiprobe.
(b) °C = Degrees Celcius.
(c) mS/cm = millisiemens per centimeter.
(d) NTU = nephalometric turbidity units
(e) mg/L = milligrams per liter
(f) mV = millivolts
(g) ORP = oxidation reduction potential. ORP was measured using an ExStik™ waterproof ORP meter.
(h) Method: EPA 353.2
(i) Method: EPA 350.1/350.3
(j) Method: EPA 300.0
(k) Method: EPA 376.2
(l) Method: EPA 200.8
(m) Method: RSK175. ug/L = micrograms per liter.
(n) Where two values are displayed, the second is the analytical result for a field blind duplicate sample.
(o) "<" indicates the compound was not detected at a concentration greater than the laboratory reporting limit.
(p) NS = not sampled due to the presence of LNAPL.

J- Laboratory note: "Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value."

Figures



Map Source: USGS 7.5 Minute Topographic Quadrangle, Wishram, WA 1994

Kennedy/Jenks Consultants

Wishram, Washington

Vicinity Map

1196010*01

Figure 1

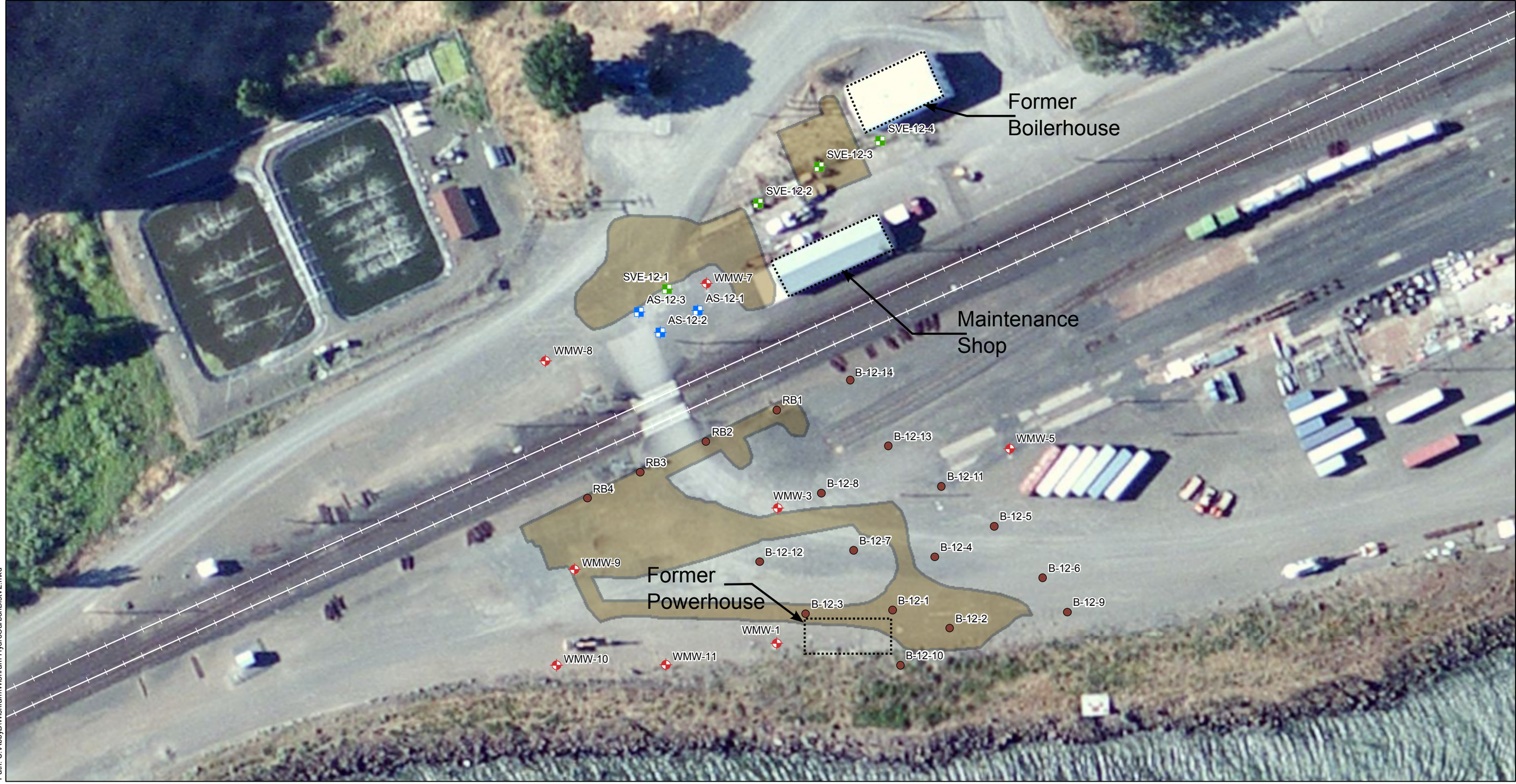
N

W E

S

0 1/2 1

Approximate Scale in Miles



Path: U:\Abby\Wishram\Wishram-HydroCarbonDistV2.mxd

Legend

- Monitoring Well
- SVE Well
- Air Sparge Well
- Approximate Previous Excavation Area

All locations are approximate.
This layer contains the Bing Maps aerial imagery with labels web mapping service, which provides worldwide orthographic aerial and satellite imagery with roads and labels overlaid.

N

0 50 100

Scale: Feet

Kennedy/Jenks Consultants

Wishram, Washington

Sampling Location Map

1196010*00

Figure 2

WELL LEGEND

- PROPOSED SVE/BIOVENTING WELL (1 | C-2 | C-3)
- PROPOSED AIR SPARGING WELL / RECONNAISSANCE BORING (1 | C-2 | C-3)
- EXISTING MONITORING WELL
- EXISTING POWER POLE (PROTECT IN PLACE)
- APPROXIMATE PREVIOUS EXCAVATION AREAS
- AIR SPARGE PIPING – 2" SCH. 80 PVC
- SVE/BIOVENTING PIPING – 2" SCH. 80 PVC
- SPARE PIPING – 2" SCH. 80 PVC

N

0 5 10
APPROXIMATE SCALE IN FEET

PROPOSED 6' HIGH CLF W/ 20' WIDE DBL GATE (2 | C-2 | C-4)

PROPOSED SPARGE UNIT (3 | C-2 | C-3)

PROPOSED NEMA 3R OR EQUAL SEE SHEET E-2

PROPOSED SVE UNIT (2 | C-2 | C-3)

EXISTING CONCRETE PAD PROTECT IN PLACE

PROPOSED SPARE PIPING 2" SCH. 80 PVC SEE NOTE 4 (1 | C-2 | C-4)

3 – PROPOSED SPARGE WELL PIPING 2" SCH. 80 PVC SEE NOTE 5 (1 | C-2 | C-4)

4 – PROPOSED SVE WELL PIPING 2" SCH. 80 PVC SEE NOTE 5 (1 | C-2 | C-4)

PROPOSED SPARE PIPING 2" SCH. 80 PVC SEE NOTE 4 (1 | C-2 | C-4)

WISHRAM FIRE STATION

MAINTENANCE BUILDING

WMW-7

APPROXIMATE 25 FT SETBACK FROM TRACK CENTERLINE

EXISTING SEPTIC TANK (ABANDONED IN PLACE)

RAILROAD TRACKS

RAILROAD TRACKS

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. ALL PROPOSED WELL/BORING LOCATIONS MAY BE MODIFIED BASED ON FIELD CONDITIONS.
3. CONTRACTOR SHALL VERIFY LOCATIONS OF POTENTIAL CONFLICTS WITH EXISTING UTILITIES, IF ANY, PRIOR TO TRENCHING.
4. SPARE PIPING SHALL BE INSTALLED FOR FUTURE USE. CONTRACTOR SHALL DOCUMENT FINAL INSTALLED LOCATION OF PIPE.
5. CONTRACTOR TO SLOPE SVE/SPARGE PIPING TO DRAIN TOWARD WELLS.

CALL BEFORE YOU DIG 811

RICHARD C. GUGLIOMO — STATE OF WASHINGTON — 11523 — REGISTERED PROFESSIONAL ENGINEER

SIGNED 8-25-2011

NO.	DATE	DESCRIPTION OF REVISIONS

ENGR: R. DUNNING / B. FUENTES
DRWN: B. FUENTES
CHKD: R. DUNNING
BNSF APPROVAL
BY: DATE:

Kennedy/Jenks Consultants
Engineers & Scientists
32001 32nd Ave S, Suite 100
Federal Way, Washington
98001

BNSF RAILWAY

REMEDIAL DESIGN – SOIL VAPOR EXTRACTION AND AIR SPARGE SYSTEM
BNSF WISHRAM, WA RAILYARD

YARD PIPING PLAN

BID ISSUE
AUGUST, 2011

DRAWING NUMBER
C-2
OF

N:\Projects\2011\1196010.02 Wishram Remediation\CAD\1196010_02-C-02.dwg Aug 25, 2011 - 8:32am

Kennedy/Jenks Consultants

Wishram, Washington

AS / SVE System Outline

1196010*01

Figure 3

Appendix A

Field Forms

Groundwater Depth Measurement Log

Kennedy/Jenks Consultants

Project Name: BNSF Wishram Rail Yard
Project Number: 1196010.01
Project Manager: Ty Schreiner

Date: 3/12/2012 / 3/14/2012
Time Start: 10:20 / 12:05
Time End: 11:40 / 13:10

sampling order	Well Number	Time	Groundwater Depth	Total Well Depth	Measuring Point Description	Comments
5	MW-1	11:02	10.36'	NM	TOC	missing 2 bolts
4	MW-3	10:55	10.59	NM	TOC	water in monument
1	MW-5	10:22	10.19'	NM	TOC	
8	MW-7	11:40	11.52 - LNAPL 11.66 - H_2O	NM	TOC	LNAPL - 0.14'
7	MW-8	11:36	11.11'	"	"	NO LNAPL
2	MW-9	10:34	10.83'	"	"	
3	MW-10	10:37	10.91'	"	"	
6	MW-11	11:15	10.90'	"	"	no LNAPL
3/14	MW-3	12:05	10.67'	NM	TOC	
	MW-5	12:29	10.24'	"	"	
	MW-1	12:31	10.28'	"	"	
	MW-10	12:37	10.92'	"	"	
	MW-9	12:42	10.86'	"	"	
	MW-8	12:55	11.17'	"	"	
	MW-7	12:59	11.56' - LNAPL 11.74 - H_2O	"	"	LNAPL - 0.18'
	MW-11	13:10	10.91'	"	"	

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-1
Field Personnel: Slack	Date: 3/13/12	Page: 1 Of 1
Purge/Sampling Method: Peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION	
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ ls $L_1 > L_2$? Yes_____ No_____	
Initial SWL*	10.36'	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.	
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2 _____ gals.	
		Annular Volume Factor (V_2)**	NA		
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.	
Purge Rate (approx. gpm)	~0.3 L/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged	_____ gals
Well Stick-up (ft)	FM	Porosity of Filter Pack (%)**	NA	No. of BV's Purged	NA

MICROPURGE

Time	Cumulative ~~Gallons~~ L Purged	Temperature °F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
15:40	0.0	14.62	0.602	6.74	1.12	-70	clear, ~~no~~ odor - metallic
15:41	0.9	14.72	0.600	6.80	0.96	-84	
15:42	1.2	15.14	0.599	6.81	0.64	-101	
15:43	1.5	15.19	0.599	6.81	0.57	-104	
15:44	1.8	15.20	0.600	6.82	0.53	-108	
15:46	2.4	15.22	0.599	6.81	0.51	-108	
15:47	2.7	15.23	0.600	6.81	0.50	-110	Turbidity: 8.7 NTU
15:48	3.0	15.26	0.599	6.81	0.49	-111	

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-1-120313	15:50	VOA	~~HCl~~ 40ml	HCl	3	BTEX	
		"	"	"	3	NWTPH-Gx	
		"	"	"	3	Methane	
		Amber	1L	"	1	NWTPH-Dx	
		Poly	250ml	—	1	Sulfate	
		"	"	NaOH	1	Sulfide	
		"	"	H_2SO_4	1	Nitrate/Nitrite + NH_4^+	
		"	"	HNO_3	1	Diss. Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-3
Field Personnel: Slack	Date: 3/14/12	Page: 1 Of 1
Purge/Sampling Method: peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION	
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ Is $L_1 > L_2$? Yes_____ No_____	
Initial SWL*	10.38	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.	
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2	
		Annular Volume Factor (V_2)**	NA	_____) = _____ gals.	
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.	
Purge Rate (approx. gpm)	~0.3 L/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged	_____ gals
Well Stick-up (ft)	Flu	Porosity of Filter Pack (%)**	NA	No. of BV's Purged	NA

MICROPURGE

Time	Cumulative ~~Gallons~~ L Purged	Temperature (C) F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
11:46	0.5	15.03	1.040	6.18	1.99	84	orange particulates
11:47	0.8	15.43	1.039	6.48	1.26	67	
11:48	1.1	15.69	1.037	6.59	0.89	58	
11:50	1.4	15.78	1.036	6.68	0.74	39	
11:51	2.0	15.83	1.035	6.72	0.68	23	
11:53	2.6	15.83	1.035	6.74	0.67	13	clear
11:55	3.2	15.84	1.035	6.76	0.66	8	Turbidity: 11.7 NTU
11:56	3.5	15.84	1.035	6.77	0.65	7	

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-3-120314	12:00	VOA	40ml	HCl	3	GX	
		"	"	"	"	BTEX	
		"	"	"	"	Methane	
		Amber	1L	"	1	DX	
		Poly	250ml	—	1	Sulfate	
		"	"	NaOH	1	Sulfide	
		"	"	H_2SO_4	1	Nitrate/Nitrite + NH4+	
		"	"	HNO_3	1	Diss. Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-5
Field Personnel: Slack	Date: 3/12/12	Page: 1 Of 1
Purge/Sampling Method: Peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION	
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ Is $L_1 > L_2$? Yes_____ No_____	
Initial SWL* DEPTH	10.18'	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.	
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2 _____ gals.	
		Annular Volume Factor (V_2)**	NA		
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.	
Purge Rate (approx. gpm)	~0.3 L/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged	_____ gals
Well Stick-up (ft)	FM	Porosity of Filter Pack (%)**	NA	No. of BV's Purged	NA

MICROPURGE

Time	Cumulative ~~Gallons~~ Purged	Temperature C / F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
13:18	0.5	13.83	0.468	6.99	1.28	252	clear/no odor
13:19	0.8	13.99	0.468	7.12	1.30	248	
13:21	1.4	14.29	0.466	7.25	1.11	243	
13:22	1.7	14.38	0.466	7.39	1.08	240	
13:23	2.0	14.41	0.467	7.42	1.13	239	
13:24	2.3	14.42	0.466	7.43	1.16	239	
							TURBIDITY: 0.80 NTU

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-5-120512	13:25	VOA	40ml	HCl	3	BTEX	
		Amber	1L	HCl	1	NWTPH-Dx	
		VOA	40ml	HCl	3	NWTPH-Gx	
		"	"	HCl	3	~~Sulfide~~ Methane	
		Poly	250ml	—	1	Sulfate	
		poly	250	NaOH, Zn acetate	1	~~Nitrate/Nitrite~~ †Ammonia Sulfide	
		poly	250	H_2SO_4	1	Nitrate/Nitrite Nitrogen	
		poly	250	HNO_3	1	Dissolved Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

* QCFD-1-120512 - SAMPLE TIME 1200

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-8
Field Personnel: Slack	Date: 3/13/12	Page: 1 Of 1
Purge/Sampling Method: Peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION	
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ Is $L_1 > L_2$? Yes_____ No_____	
Initial SWL*	11.11'	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.	
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2	
		Annular Volume Factor (V_2)**	NA	_____ = _____ gals.	
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.	
Purge Rate (approx. gpm)	~0.36 l/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged	_____ gals
Well Stick-up (ft)	Fm	Porosity of Filter Pack (%)**	NA	No. of BV's Purged	NA

MICROPURGE

Time	Cumulative ~~Gallons~~ Purged	Temperature (C) F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
16:52	0.0	13.07	0.911	6.89	1.64	104	clear/slightly cloudy, grey silt/sed.
16:53	0.9	13.76	0.912	6.90	1.16	80	
16:54	1.2	14.12	0.913	6.92	1.00	74	
16:55	1.5	14.41	0.914	6.93	0.83	66	
16:57	2.1	14.49	0.916	6.97	0.75	61	
16:58	2.4	14.53	0.921	7.01	0.65	45	
16:59	2.7	14.60	0.923	7.02	0.62	43	Turbidity: 11.5 NTU
1700	3.0	14.62	0.925	7.03	0.61	42	

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-8-120313	17:05	VOA	40ml	HCl	3	BTEX	
		"	"	"	3	CLV	
		"	"	"	1	Methane	
		Amber	1L	"	1	Dx	
		Poly	250ml	—	1	Sulfate	
		"	"	NaOH	1	Sulfide	
		"	"	H_2SO_4	1	Nitrate/Nitrite + NH_4^+	
		"	"	HNO_3	1	Diss. Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-9
Field Personnel: Slack	Date: 3/13/12	Page: 1 Of 1
Purge/Sampling Method: Peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION	
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ Is $L_1 > L_2$? Yes_____ No_____	
Initial SWL*	10.83'	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.	
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2 _____ gals.	
		Annular Volume Factor (V_2)**	NA		
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.	
Purge Rate (approx. gpm)	~0.34/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged	_____ gals
Well Stick-up (ft)	FM	Porosity of Filter Pack (%)**	NA	No. of BV's Purged	NA

MICROPURGE

Time	Cumulative ~~Gallons~~ Purged L	Temperature C / F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
10:41	0.5	13.75	0.608	7.00	0.81	235	clear / no odor
10:42	0.8	13.74	0.608	7.02	0.73	234	
10:44	1.4	14.18	0.616	7.05	0.66	233	
10:45	1.7	14.63	0.615	7.07	0.53	232	
10:46	2.0	14.58	0.616	7.10	0.51	234	
10:47	2.3	14.57	0.616	7.14	0.50	235	
10:48	2.6	14.56	0.617	7.14	0.50	235	Turbidity: 19.8 NTU

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-9-120313	10:50	VOA	40ml	HCl	3	GX	
		"	"	"	"	BTEX	
		"	"	"	"	methane	
		Amber	1L	"	1	DX	
		Poly	250ml	H_2SO_4	1	Nitrate/Nitrite + Ammonia	
		"	"	—	1	Sulfate	
		"	"	NaOH	1	Sulfide	
		"	"	HNO_3	1	Diss Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

QLFD-2-120313 - sample time @ 11:15 - NWPH-DX - 1L Amber H2O

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-10
Field Personnel: Slack	Date: 3/13/12	Page: 1 Of 1
Purge/Sampling Method: Peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ Is $L_1 > L_2$? Yes_____ No_____
Initial SWL*	10.91'	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2 _____ gals.
		Annular Volume Factor (V_2)**	NA	
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.
Purge Rate (approx. gpm)	~0.3 L/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged _____ gals
Well Stick-up (ft)	Fm	Porosity of Filter Pack (%)**	NA	No. of BV's Purged NA

MICROPURGE

Time	Cumulative Gallons Purged L	Temperature (C) F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
13:46	0.8	10.96	0.758	7.41	2.20	241	clear
13:47	1.1	10.99	0.762	7.41	1.94	239	
13:48	1.4	11.21	0.765	7.41	1.70	238	
13:49	1.8	11.50	0.765	7.41	1.47	237	
13:50	2.1	11.77	0.762	7.41	1.46	236	
13:51	2.4	11.93	0.761	7.41	1.44	236	
13:52	2.7	12.01	0.761	7.41	1.45	236	Turbidity: 14.6 NTU

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-10-120313	1355	VOA	40ml	HCl	3		
		"	"	"	"		
		"	"	"	"		
		Amber	1L	"	1		
		poly	250ml	H_2SO_4	1	Nitrate/Nitrite / NH_4^+	
		"	"	—	1	Sulfate	
		"	"	NaOH	1	Sulfide	
		"	"	HNO_3	1	Diss Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

GROUNDWATER SAMPLING DATA SHEET

Project Name: Wishram	# 1196010.01	Well # MW-11
Field Personnel: Slack	Date: 3/14/12	Page: 1 Of 1
Purge/Sampling Method: Peristaltic		Well Elev.(msl)*:
Water Containment Method: Drum		SWL*:
Field Instrument(s) Used: Geotech, YSI, Solinst		SWL Elev. (msl):

WATER LEVEL DATA*		WELL DATA		PURGE VOLUME CALCULATION	
Well Depth / Length of Casing*		Casing Diameter (in.)	NA	Calculated Borehole Volume (BV) = _____ Is $L_1 > L_2$? Yes_____ No_____	
Initial SWL*	10.81'	Borehole Diameter (in.)	NA	Yes: BV = L_1 _____ x V_1 _____ + L_2 _____ x V_2 _____ = _____ gals.	
Length of Water Column (L_1)		Casing Volume Factor (V_1)**		No: BV = L_1 _____ x (V_1 _____ + V_2	
		Annular Volume Factor (V_2)**	NA	_____ = _____ gals.	
Sample Depth / Pump Intake*		Length of Water Column (ft.) = L_1	NA	Total Purge Volume = BV _____ x no. of borehole volumes _____ = _____ gals.	
Purge Rate (approx. gpm)	~0.3 L/min	Length of Filter Pack (ft.) = L_2		Actual Gals. Purged	_____ gals
Well Stick-up (ft)	FM	Porosity of Filter Pack (%)**	NA	No. of BV's Purged	NA

MICROPURGE

Time	Cumulative Gallons Purged L	Temperature °C/F	Conductivity mS/cm	pH	Dissolved Oxygen	Redox/ORP (mV)	COMMENTS (i.e.- odor, sediment, color)
14:34	0.5	13.99	1.032	6.33	2.82	65	cloudy
14:35	0.8	14.53	1.032	6.50	1.29	6	
14:37	1.4	14.80	1.034	6.56	1.06	-19	
14:38	1.7	15.13	1.035	6.71	0.67	-56	
14:39	2.0	15.12	1.035	6.79	0.53	-69	
14:40	2.3	15.07	1.035	6.82	0.49	-73	
14:41	2.6	15.05	1.035	6.84	0.48	-73	Turbidity: 9.65 NTU
14:42	2.9	15.03	1.034	6.84	0.47	-74	

SAMPLE DATA

Sample I.D.	Time Collected	Container Type	Volume	Preservative	# Containers	Analysis Required	COMMENTS
MW-11-120314	1445	VOA	40ml	HCl	3	Gx	
		"	"	"	"	BTEX	
		"	"	"	"	methane	
		Amber	1L	"	1	DOx	
		Poly	250ml	—	1	Sulfate	
		"	"	NaOH	1	Sulfide	
		"	"	H_2SO_4	1	Nitrate/Nitrite + NH_4	
		"	"	HNO_3	1	Diss. Fe	

TOC = top of PVC casing * Measured from TOC **see Casing / Annular Volume Factors Table

Appendix B

Laboratory Analytical Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: BNSF

INVOICE TO: BNSF

REPORT TO: Kim Slack
ADDRESS: 200 SW MARKET STE 500
PORTLAND OR 97201
PHONE: 503-295-4911 FAX: 503-295-4901

P.O. NUMBER:

PROJECT NAME: BNSF - WISHRAM

PROJECT NUMBER:

SAMPLED BY:

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses: [10] STD. [7] [5] [4] [3] [2] [1] [<1]

Petroleum Hydrocarbon Analyses: [5] STD. [4] [3] [2] [1] [<1]

[OTHER] Specify:

* *Turnaround Requests less than standard may incur Rush Charges.*

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	PRESERVATIVE: HCl	HCl	HCl	H_2SO_4		—	NaOH	HCl	HNO_3					MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
			REQUESTED ANALYSES: NWTPH-GX	NWTPH-DX	BTEX - EPA 8260B	NO_3, NO_2, Ammonia 353.2/ 350.1/ 350.3		Sulfate EPA 300	Sulfide 376.2	Methane 8015-mod RSK 175	Diss. Fe 200.8								
1	MW-5-120312	3/12/12 13:25	3	1	3	1	1	1	1	3	1					W	15	Methane; EPA 8015 Mod RSK 175	
2	QCFD-1-120312	3/12/12 12:00	3	1	3	1	1	1	1	3	1					W	15		
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

RELEASED BY: Kimberly Slack	DATE: 3/12/12	RECEIVED BY:	DATE:
PRINT NAME: KIMBERLY SLACK FIRM: Kennedy/Jenks	TIME: 1645	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: BNSF

INVOICE TO: BNSF

REPORT TO: Kim Slack
ADDRESS: 200 SW Market St Ste 500 Portland, OR 97201

PHONE: 503-295-4911 FAX: 503-295-4901

P.O. NUMBER:

PROJECT NAME: BNSF- Wishram

PROJECT NUMBER: 1196010.01

SAMPLED BY: Kim Slack

TURNAROUND REQUEST

in Business Days *

Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1

Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1

OTHER Specify:

* *Turnaround Requests less than standard may incur Rush Charges.*

PRESERVATIVE: HCl | HCl | HCl | H_2SO_4 | — | — | NaOH/HCl | HNO_3

REQUESTED ANALYSES: Nutrient GEN | Nutrient DX | BTEX 8260B | NO_3/NO_2 NH_4+ 350.1 | 350.3 | Sulfate 300.0 | Sulfide 376.2 | Methane 8015 mod RSK 175 | Dissolved 200.8

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW-9-120313	3/13/12 10:50	W	5	Methane: EPA 8015 OR RSK 175	
2	QCFD-2-120313	" 11:15	W	1		
3	MW-10-120313	" 13:55	W	5		
4	MW-1-120313	" 15:50	W	5		
5	MW-8-120313	" 17:05	W	5		
6						
7						
8						
9						
10						

RELEASED BY: Kimberly A Slack	DATE: 3/14/12	RECEIVED BY:	DATE:
PRINT NAME: Kim Slack FIRM: Kennedy / Jenks	TIME: 10:40	PRINT NAME: FIRM:	TIME:
RELEASED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP:

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: KJ / BNSF

INVOICE TO: BNSF

REPORT TO: Kim Slack kimslack@kennedyjenks.com
ADDRESS: 200 SW Market St Ste 500 Portland OR 97201
PHONE: 503-295-4911 FAX: 503-295-4901

P.O. NUMBER:

PROJECT NAME: BNSF - WISHRAM
PROJECT NUMBER: 119601001
SAMPLED BY: Kim Slack

TURNAROUND REQUEST
in Business Days *

Organic & Inorganic Analyses: [10 STD.] [7] [5] [4] [3] [2] [1] [<1]
Petroleum Hydrocarbon Analyses: [5 STD.] [4] [3] [2] [1] [<1]
[OTHER] Specify:

* *Turnaround Requests less than standard may incur Rush Charges.*

PRESERVATIVE: HCl | HCl | HCl | H_2SO_4 | — | NaOH | HCl | HNO_3

REQUESTED ANALYSES: NWTPH GX | NWTPH DX | BTEX 8260B | NO_3/NO_2 NH_4+ | 350.1/350.3 | Sulfate 300.0 | Sulfide 376.2 | Methane 8015 Mod/RSK175 | Diss. Fe 200.8

#	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	GX	DX	BTEX	NO_3/NO_2 NH_4+	350.1/350.3	Sulfate	Sulfide	Methane	Diss. Fe	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW-9-120313	3/13/12 1050	3		3					3		W	9	methane: EPA 8015 or RSK 175	
2	MW-10-120313	" 1355	3		3					3		W	9		
3	MW-1-120313	" 1550	3		3					3		W	9		
4	MW-8-120313	" 1705	3		3					3		W	9		
5	MW-3-120313	3/14/12 1200	3	1	3	1		1	1	3	1	W	14		
6	MW-11-120314	" 1445	3	1	3	1		1	1	3	1	W	14		
7															
8															
9															
10															

RELEASED BY: Kim Slack DATE: 3/14/12
PRINT NAME: Kim Slack FIRM: Kennedy/Jenks TIME: 1650

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

RELEASED BY: DATE:
PRINT NAME: FIRM: TIME:

RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:

TEMP:

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-31847-1
Client Project/Site: BNSF Wishram Monitoring

For:
Kennedy/Jenks Consultants
32001-32nd Ave South, Suite 100
Federal Way, Washington 98001

Attn: Joseph Sawdey

Kristine D. Allen

Authorized for release by:
3/30/2012 5:33:22 PM

Kristine Allen
Project Manager I
kristine.allen@testamericainc.com

Table of Contents

Case Narrative

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Job ID: 580-31847-1

Laboratory: TestAmerica Seattle

Narrative

Receipt
A trip blank was received with the samples. It was not listed on the COC. It was added to the COC .

All other samples were received in good condition within temperature requirements.

GC/MS VOA - Method NWTPH-Gx
The method blank for batch 107697 contained GRO analyte above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

No other analytical or quality issues were noted.

GC Semi VOA - Method NWTPH-Dx
The continuing calibration verification (CCV 18 and 23) for the #2 Diesel (C10-C24) range associated with prep/analysis batch 107564/107899 recovered above the upper control limit. The method blank (MB) associated with this CCV was non-detect for the affected analyte range; therefore, the data have been reported. Even without the high bias, the LCS would have been well within the control limits for #2 Diesel (C10-C24), therefore these results have been reported. (CCV 580-107899/18), (CCV 580-107899/23), (LCS 580-107564/2-B), (MB 580-107564/1-B)

The results in the #2 Diesel (C10-C24) and Motor Oil (>C24-C36) ranges for samples MW-3-120314 (580-31847-5) and MW-11-120314 (580-31847-6) are due primarily to heavily weathered/degraded diesel fuel or a mineral/transformer oil range product. The Y qualifier was added to the affected sample ranges and reported.

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Subcontract non-Sister
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

Subcontract Work
Method RSK 175: This method was subcontracted to TestAmerica Nashville. The subcontract certification is different from those listed on the TestAmerica cover page of this final report.

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
Y	The chromatographic response resembles a typical fuel pattern.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC exceeds the control limits.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-9-120313
Date Collected: 03/13/12 10:50
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/22/12 01:40	1
Toluene	ND		1.0	0.15	ug/L			03/22/12 01:40	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/22/12 01:40	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/22/12 01:40	1
o-Xylene	ND		1.0	0.15	ug/L			03/22/12 01:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*104*		*80 - 120*		*03/22/12 01:40*	*1*
Toluene-d8 (Surr)	*100*		*85 - 120*		*03/22/12 01:40*	*1*
Ethylbenzene-d10	*97*		*80 - 120*		*03/22/12 01:40*	*1*
Trifluorotoluene (Surr)	*103*		*80 - 120*		*03/22/12 01:40*	*1*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*		*03/22/12 01:40*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.010	J B	0.050	0.010	mg/L			03/22/12 01:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*50 - 150*		*03/22/12 01:40*	*1*
Trifluorotoluene (Surr)	*101*		*50 - 150*		*03/22/12 01:40*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.00	2.50	ug/L		03/23/12 10:12	03/26/12 11:31	1.00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*85*		*62 - 124*	*03/23/12 10:12*	*03/26/12 11:31*	*1.00*

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-10-120313
Date Collected: 03/13/12 13:55
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/22/12 02:01	1
Toluene	ND		1.0	0.15	ug/L			03/22/12 02:01	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/22/12 02:01	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/22/12 02:01	1
o-Xylene	ND		1.0	0.15	ug/L			03/22/12 02:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/22/12 02:01*	*1*
Toluene-d8 (Surr)	*101*		*85 - 120*		*03/22/12 02:01*	*1*
Ethylbenzene-d10	*98*		*80 - 120*		*03/22/12 02:01*	*1*
Trifluorotoluene (Surr)	*106*		*80 - 120*		*03/22/12 02:01*	*1*
4-Bromofluorobenzene (Surr)	*97*		*75 - 120*		*03/22/12 02:01*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.022	J B	0.050	0.010	mg/L			03/22/12 02:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*50 - 150*		*03/22/12 02:01*	*1*
Trifluorotoluene (Surr)	*103*		*50 - 150*		*03/22/12 02:01*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	29.9		5.00	2.50	ug/L		03/23/12 10:12	03/26/12 11:34	1.00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*83*		*62 - 124*	*03/23/12 10:12*	*03/26/12 11:34*	*1.00*

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-1-120313
Date Collected: 03/13/12 15:50
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/22/12 02:23	1
Toluene	ND		1.0	0.15	ug/L			03/22/12 02:23	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/22/12 02:23	1
m-Xylene & p-Xylene	**1.4**	**J**	2.0	0.30	ug/L			03/22/12 02:23	1
o-Xylene	**0.27**	**J**	1.0	0.15	ug/L			03/22/12 02:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/22/12 02:23*	*1*
Toluene-d8 (Surr)	*100*		*85 - 120*		*03/22/12 02:23*	*1*
Ethylbenzene-d10	*97*		*80 - 120*		*03/22/12 02:23*	*1*
Trifluorotoluene (Surr)	*105*		*80 - 120*		*03/22/12 02:23*	*1*
4-Bromofluorobenzene (Surr)	*97*		*75 - 120*		*03/22/12 02:23*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**0.31**	**B**	0.050	0.010	mg/L			03/22/12 02:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*50 - 150*		*03/22/12 02:23*	*1*
Trifluorotoluene (Surr)	*103*		*50 - 150*		*03/22/12 02:23*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*78*		*62 - 124*	*03/23/12 10:12*	*03/26/12 11:36*	*1.00*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**4760**		50.0	25.0	ug/L		03/23/12 10:12	03/26/12 11:39	10.0

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-8-120313
Date Collected: 03/13/12 17:05
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/22/12 02:45	1
Toluene	ND		1.0	0.15	ug/L			03/22/12 02:45	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/22/12 02:45	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/22/12 02:45	1
o-Xylene	**0.15**	**J**	1.0	0.15	ug/L			03/22/12 02:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/22/12 02:45*	*1*
Toluene-d8 (Surr)	*100*		*85 - 120*		*03/22/12 02:45*	*1*
Ethylbenzene-d10	*98*		*80 - 120*		*03/22/12 02:45*	*1*
Trifluorotoluene (Surr)	*105*		*80 - 120*		*03/22/12 02:45*	*1*
4-Bromofluorobenzene (Surr)	*97*		*75 - 120*		*03/22/12 02:45*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**0.42**	**B**	0.050	0.010	mg/L			03/22/12 02:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*50 - 150*		*03/22/12 02:45*	*1*
Trifluorotoluene (Surr)	*103*		*50 - 150*		*03/22/12 02:45*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**126**		5.00	2.50	ug/L		03/23/12 10:12	03/26/12 11:41	1.00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*93*		*62 - 124*	*03/23/12 10:12*	*03/26/12 11:41*	*1.00*

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-3-120314
Date Collected: 03/14/12 12:00
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/22/12 03:06	1
Toluene	ND		1.0	0.15	ug/L			03/22/12 03:06	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/22/12 03:06	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/22/12 03:06	1
o-Xylene	**0.25**	**J**	1.0	0.15	ug/L			03/22/12 03:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/22/12 03:06*	*1*
Toluene-d8 (Surr)	*101*		*85 - 120*		*03/22/12 03:06*	*1*
Ethylbenzene-d10	*97*		*80 - 120*		*03/22/12 03:06*	*1*
Trifluorotoluene (Surr)	*107*		*80 - 120*		*03/22/12 03:06*	*1*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*		*03/22/12 03:06*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**0.22**	**B**	0.050	0.010	mg/L			03/22/12 03:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*50 - 150*		*03/22/12 03:06*	*1*
Trifluorotoluene (Surr)	*104*		*50 - 150*		*03/22/12 03:06*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	**3.3**	**Y**	0.12	0.070	mg/L		03/20/12 10:25	03/28/12 17:21	1
Motor Oil (>C24-C36)	**0.38**	**Y**	0.24	0.046	mg/L		03/20/12 10:25	03/26/12 18:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*104*		*50 - 150*	*03/20/12 10:25*	*03/26/12 18:15*	*1*
o-Terphenyl	*114*		*50 - 150*	*03/20/12 10:25*	*03/28/12 17:21*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*73*		*62 - 124*	*03/23/12 10:12*	*03/26/12 11:43*	*1.00*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved - RE1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1760**		25.0	12.5	ug/L		03/23/12 10:12	03/26/12 11:46	5.00

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5.3**		0.040	0.0058	mg/L		03/27/12 10:31	03/27/12 18:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**7.3**		1.2	0.40	mg/L			03/29/12 20:02	1
Nitrate Nitrite as N	**0.013**		0.010	0.0050	mg/L			03/26/12 14:29	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.60**		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1
Sulfide	**2.8**		1.0	1.0	mg/L			03/21/12 17:48	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-11-120314
Date Collected: 03/14/12 14:45
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/22/12 03:28	1
Toluene	ND		1.0	0.15	ug/L			03/22/12 03:28	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/22/12 03:28	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/22/12 03:28	1
o-Xylene	ND		1.0	0.15	ug/L			03/22/12 03:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/22/12 03:28*	*1*
Toluene-d8 (Surr)	*100*		*85 - 120*		*03/22/12 03:28*	*1*
Ethylbenzene-d10	*97*		*80 - 120*		*03/22/12 03:28*	*1*
Trifluorotoluene (Surr)	*105*		*80 - 120*		*03/22/12 03:28*	*1*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*		*03/22/12 03:28*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**0.31**	**B**	0.050	0.010	mg/L			03/22/12 03:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*50 - 150*		*03/22/12 03:28*	*1*
Trifluorotoluene (Surr)	*103*		*50 - 150*		*03/22/12 03:28*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	**3.7**	**Y**	0.12	0.070	mg/L		03/20/12 10:25	03/28/12 17:47	1
Motor Oil (>C24-C36)	**0.96**	**Y**	0.24	0.046	mg/L		03/20/12 10:25	03/26/12 18:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*98*		*50 - 150*	*03/20/12 10:25*	*03/26/12 18:40*	*1*
o-Terphenyl	*106*		*50 - 150*	*03/20/12 10:25*	*03/28/12 17:47*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**220**		5.00	2.50	ug/L		03/23/12 10:12	03/26/12 11:48	1.00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*96*		*62 - 124*	*03/23/12 10:12*	*03/26/12 11:48*	*1.00*

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**2.9**		0.040	0.0058	mg/L		03/27/12 10:31	03/27/12 19:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**62**		6.0	2.0	mg/L			03/30/12 08:44	5
Nitrate Nitrite as N	**0.0050**	**J**	0.010	0.0050	mg/L			03/26/12 14:30	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.58**		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1
Sulfide	**7.2**		1.0	1.0	mg/L			03/21/12 17:48	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: Trip Blank
Date Collected: 03/13/12 00:00
Date Received: 03/16/12 09:50

Lab Sample ID: 580-31847-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/21/12 18:49	1
Toluene	ND		1.0	0.15	ug/L			03/21/12 18:49	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/21/12 18:49	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/21/12 18:49	1
o-Xylene	ND		1.0	0.15	ug/L			03/21/12 18:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/21/12 18:49*	*1*
Toluene-d8 (Surr)	*101*		*85 - 120*		*03/21/12 18:49*	*1*
Ethylbenzene-d10	*98*		*80 - 120*		*03/21/12 18:49*	*1*
Trifluorotoluene (Surr)	*105*		*80 - 120*		*03/21/12 18:49*	*1*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*		*03/21/12 18:49*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.021	J B	0.050	0.010	mg/L			03/21/12 18:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*50 - 150*		*03/21/12 18:49*	*1*
Trifluorotoluene (Surr)	*102*		*50 - 150*		*03/21/12 18:49*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-107700/4
Matrix: Water
Analysis Batch: 107700

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/21/12 17:01	1
Toluene	ND		1.0	0.15	ug/L			03/21/12 17:01	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/21/12 17:01	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/21/12 17:01	1
o-Xylene	ND		1.0	0.15	ug/L			03/21/12 17:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*106*		*80 - 120*		*03/21/12 17:01*	*1*
Toluene-d8 (Surr)	*101*		*85 - 120*		*03/21/12 17:01*	*1*
Ethylbenzene-d10	*98*		*80 - 120*		*03/21/12 17:01*	*1*
Trifluorotoluene (Surr)	*106*		*80 - 120*		*03/21/12 17:01*	*1*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*		*03/21/12 17:01*	*1*

Lab Sample ID: LCS 580-107700/5
Matrix: Water
Analysis Batch: 107700

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			25.0	24.9		ug/L		100	80 - 120		
Toluene			25.0	25.4		ug/L		102	75 - 120		
Ethylbenzene			25.0	24.7		ug/L		99	75 - 125		
m-Xylene & p-Xylene			50.0	49.7		ug/L		99	75 - 130		
o-Xylene			25.0	25.3		ug/L		101	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Fluorobenzene (Surr)	*105*		*80 - 120*
Toluene-d8 (Surr)	*101*		*85 - 120*
Ethylbenzene-d10	*97*		*80 - 120*
Trifluorotoluene (Surr)	*101*		*80 - 120*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*

Lab Sample ID: LCSD 580-107700/6
Matrix: Water
Analysis Batch: 107700

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene			25.0	24.1		ug/L		96	80 - 120	3	30
Toluene			25.0	24.6		ug/L		98	75 - 120	3	30
Ethylbenzene			25.0	24.0		ug/L		96	75 - 125	3	30
m-Xylene & p-Xylene			50.0	48.4		ug/L		97	75 - 130	3	30
o-Xylene			25.0	24.6		ug/L		98	80 - 120	3	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Fluorobenzene (Surr)	*105*		*80 - 120*
Toluene-d8 (Surr)	*101*		*85 - 120*
Ethylbenzene-d10	*97*		*80 - 120*
Trifluorotoluene (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*96*		*75 - 120*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-107697/5
Matrix: Water
Analysis Batch: 107697

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.0115	J	0.050	0.010	mg/L			03/21/12 17:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*50 - 150*		*03/21/12 17:01*	*1*
Trifluorotoluene (Surr)	*103*		*50 - 150*		*03/21/12 17:01*	*1*

Lab Sample ID: LCS 580-107697/6
Matrix: Water
Analysis Batch: 107697

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline			1.00	0.884		mg/L		88	79 - 110		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*50 - 150*
Trifluorotoluene (Surr)	*94*		*50 - 150*

Lab Sample ID: LCSD 580-107697/7
Matrix: Water
Analysis Batch: 107697

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline			1.00	0.876		mg/L		88	79 - 110	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*101*		*50 - 150*
Trifluorotoluene (Surr)	*91*		*50 - 150*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-107564/1-B
Matrix: Water
Analysis Batch: 107899

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 107564

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND	^	0.13	0.073	mg/L		03/20/12 10:24	03/26/12 17:24	1
Motor Oil (>C24-C36)	ND		0.25	0.048	mg/L		03/20/12 10:24	03/26/12 17:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*94*		*50 - 150*	*03/20/12 10:24*	*03/26/12 17:24*	*1*

Lab Sample ID: LCS 580-107564/2-B
Matrix: Water
Analysis Batch: 107899

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 107564

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
#2 Diesel (C10-C24)			5.00	5.33	^	mg/L		107	70 - 130		
Motor Oil (>C24-C36)			5.00	5.32		mg/L		106	70 - 130		

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-107564/2-B
Matrix: Water
Analysis Batch: 107899

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 107564

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*84*		*50 - 150*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved

Lab Sample ID: 12C4560-BLK1
Matrix: Water
Analysis Batch: V004943

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 12C4560_P

Analyte	Blank Result	Blank Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.00	2.50	ug/L		03/23/12 10:12	03/26/12 10:20	1.00

Surrogate	*Blank %Recovery*	*Blank Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*107*		*62 - 124*	*03/23/12 10:12*	*03/26/12 10:20*	*1.00*

Lab Sample ID: 12C4560-BS1
Matrix: Water
Analysis Batch: V004943

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 12C4560_P

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	273	286		ug/L		105	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetylene	*91*		*62 - 124*

Lab Sample ID: 12C4560-BSD1
Matrix: Water
Analysis Batch: V004943

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved
Prep Batch: 12C4560_P

Analyte	Spike Added	LCS Dup Result	LCS Dup Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	273	279		ug/L		102	80 - 120	2	33

Surrogate	*LCS Dup %Recovery*	*LCS Dup Qualifier*	*Limits*
Acetylene	*83*		*62 - 124*

Lab Sample ID: 12C4560-MS1
Matrix: Water
Analysis Batch: V004943

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 12C4560_P

Analyte	Sample Result	Sample Qualifier	Spike Added	Matrix Spike Result	Matrix Spike Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	ND		273	247		ug/L		90	46 - 142

Surrogate	*Matrix Spike %Recovery*	*Matrix Spike Qualifier*	*Limits*
Acetylene	*79*		*62 - 124*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved (Continued)

Lab Sample ID: 12C4560-MSD1
Matrix: Water
Analysis Batch: V004943

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 12C4560_P

Analyte	Sample Result	Sample Qualifier	Spike Added	Matrix Spike Dup Result	Matrix Spike Dup Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	ND		273	245		ug/L		90	46 - 142	0.8	33

Surrogate	*Matrix Spike Dup %Recovery*	*Matrix Spike Dup Qualifier*	*Limits*
Acetylene	*76*		*62 - 124*

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 580-108015/25-A
Matrix: Water
Analysis Batch: 108061

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 108015

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.040	0.0058	mg/L		03/27/12 10:32	03/27/12 17:07	1

Lab Sample ID: LCS 580-108015/26-A
Matrix: Water
Analysis Batch: 108061

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 108015

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	10.0	9.70		mg/L		97	80 - 120

Lab Sample ID: LCSD 580-108015/27-A
Matrix: Water
Analysis Batch: 108061

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 108015

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	10.0	9.85		mg/L		98	80 - 120	2	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-108261/28
Matrix: Water
Analysis Batch: 108261

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		1.2	0.40	mg/L			03/29/12 22:13	1

Lab Sample ID: LCS 580-108261/29
Matrix: Water
Analysis Batch: 108261

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	15.0	14.3		mg/L		95	90 - 110

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 580-108284/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 108286 — **Prep Batch: 108284**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1

Lab Sample ID: LCS 580-108284/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 108286 — **Prep Batch: 108284**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	1.85		mg/L		92	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 580-107949/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107949

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.010	0.0050	mg/L			03/26/12 13:59	1

Lab Sample ID: LCS 580-107949/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107949

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	1.00	1.03		mg/L		103	90 - 110

Method: 376.1 - Sulfide

Lab Sample ID: MB 680-232118/1 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 232118

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	1.0	mg/L			03/21/12 17:48	1

Lab Sample ID: LCS 680-232118/2 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 232118

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	11.3	8.98		mg/L		79	75 - 125

Lab Sample ID: LCSD 680-232118/3 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 232118

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	11.3	9.19		mg/L		81	75 - 125	2	30

Lab Chronicle

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-9-120313
Lab Sample ID: 580-31847-1
Date Collected: 03/13/12 10:50
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/22/12 01:40	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107697	03/22/12 01:40	JMB	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004943	03/26/12 11:31	MGH	TAL NSH

Client Sample ID: MW-10-120313
Lab Sample ID: 580-31847-2
Date Collected: 03/13/12 13:55
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/22/12 02:01	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107697	03/22/12 02:01	JMB	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004943	03/26/12 11:34	MGH	TAL NSH

Client Sample ID: MW-1-120313
Lab Sample ID: 580-31847-3
Date Collected: 03/13/12 15:50
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/22/12 02:23	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107697	03/22/12 02:23	JMB	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004943	03/26/12 11:36	MGH	TAL NSH
Dissolved	Prep	RSK 175/3810	RE1	1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175	RE1	10.0	V004943	03/26/12 11:39	MGH	TAL NSH

Client Sample ID: MW-8-120313
Lab Sample ID: 580-31847-4
Date Collected: 03/13/12 17:05
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/22/12 02:45	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107697	03/22/12 02:45	JMB	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004943	03/26/12 11:41	MGH	TAL NSH

Client Sample ID: MW-3-120314
Lab Sample ID: 580-31847-5
Date Collected: 03/14/12 12:00
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/22/12 03:06	JMB	TAL SEA

Lab Chronicle

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Client Sample ID: MW-3-120314

Lab Sample ID: 580-31847-5

Date Collected: 03/14/12 12:00
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	NWTPH-Gx		1	107697	03/22/12 03:06	JMB	TAL SEA
Total/NA	Prep	3520C			107564	03/20/12 10:25	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107899	03/26/12 18:15	KKW	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	108066	03/28/12 17:21	KKW	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004943	03/26/12 11:43	MGH	TAL NSH
Dissolved	Prep	RSK 175/3810	RE1	1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175	RE1	5.00	V004943	03/26/12 11:46	MGH	TAL NSH
Dissolved	Prep	200.8			108015	03/27/12 10:31	PAB	TAL SEA
Dissolved	Analysis	200.8		1	108061	03/27/12 18:46	FCW	TAL SEA
Total/NA	Analysis	353.2		1	107949	03/26/12 14:29	AM	TAL SEA
Total/NA	Analysis	300.0		1	108261	03/29/12 20:02	AM	TAL SEA
Total/NA	Analysis	350.1		1	108286	03/30/12 16:36	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			108284	03/30/12 16:36	JP	TAL SEA
Total/NA	Analysis	376.1		1	232118	03/21/12 17:48	CN	TAL SAV

Client Sample ID: MW-11-120314

Lab Sample ID: 580-31847-6

Date Collected: 03/14/12 14:45
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/22/12 03:28	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107697	03/22/12 03:28	JMB	TAL SEA
Total/NA	Prep	3520C			107564	03/20/12 10:25	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107899	03/26/12 18:40	KKW	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	108066	03/28/12 17:47	KKW	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4560_P	03/23/12 10:12	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004943	03/26/12 11:48	MGH	TAL NSH
Dissolved	Prep	200.8			108015	03/27/12 10:31	PAB	TAL SEA
Dissolved	Analysis	200.8		1	108061	03/27/12 19:00	FCW	TAL SEA
Total/NA	Analysis	353.2		1	107949	03/26/12 14:30	AM	TAL SEA
Total/NA	Analysis	300.0		5	108261	03/30/12 08:44	AM	TAL SEA
Total/NA	Analysis	350.1		1	108286	03/30/12 16:36	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			108284	03/30/12 16:36	JP	TAL SEA
Total/NA	Analysis	376.1		1	232118	03/21/12 17:48	CN	TAL SAV

Client Sample ID: Trip Blank

Lab Sample ID: 580-31847-7

Date Collected: 03/13/12 00:00
Matrix: Water
Date Received: 03/16/12 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107700	03/21/12 18:49	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107697	03/21/12 18:49	JMB	TAL SEA

Lab Chronicle

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Road, Nashville, TN 37204, TEL 800-765-0980

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle	Alaska (UST)	State Program	10	UST-022
TestAmerica Seattle	California	NELAC	9	1115CA
TestAmerica Seattle	Florida	NELAC	4	E871074
TestAmerica Seattle	L-A-B	DoD ELAP		L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025		L2236
TestAmerica Seattle	Louisiana	NELAC	6	05016
TestAmerica Seattle	Montana (UST)	State Program	8	N/A
TestAmerica Seattle	Oregon	NELAC	10	WA100007
TestAmerica Seattle	USDA	Federal		P330-11-00222
TestAmerica Seattle	Washington	State Program	10	C553
TestAmerica Nashville		ACIL		393
TestAmerica Nashville	A2LA	ISO/IEC 17025		0453.07
TestAmerica Nashville	Alabama	State Program	4	41150
TestAmerica Nashville	Alaska (UST)	State Program	10	UST-087
TestAmerica Nashville	Arizona	State Program	9	AZ0473
TestAmerica Nashville	Arkansas DEQ	State Program	6	88-0737
TestAmerica Nashville	California	NELAC	9	1168CA
TestAmerica Nashville	Canadian Assoc Lab Accred (CALA)	Canada		3744
TestAmerica Nashville	Colorado	State Program	8	N/A
TestAmerica Nashville	Connecticut	State Program	1	PH-0220
TestAmerica Nashville	Florida	NELAC	4	E87358
TestAmerica Nashville	Illinois	NELAC	5	200010
TestAmerica Nashville	Iowa	State Program	7	131
TestAmerica Nashville	Kansas	NELAC	7	E-10229
TestAmerica Nashville	Kentucky	State Program	4	90038
TestAmerica Nashville	Kentucky (UST)	State Program	4	19
TestAmerica Nashville	Louisiana	NELAC	6	30613
TestAmerica Nashville	Louisiana	NELAC	6	LA110014
TestAmerica Nashville	Maryland	State Program	3	316
TestAmerica Nashville	Massachusetts	State Program	1	M-TN032
TestAmerica Nashville	Mississippi	State Program	4	N/A
TestAmerica Nashville	Montana (UST)	State Program	8	NA
TestAmerica Nashville	New Hampshire	NELAC	1	2963
TestAmerica Nashville	New Jersey	NELAC	2	TN965
TestAmerica Nashville	New York	NELAC	2	11342
TestAmerica Nashville	North Carolina DENR	State Program	4	387
TestAmerica Nashville	North Dakota	State Program	8	R-146
TestAmerica Nashville	Ohio VAP	State Program	5	CL0033
TestAmerica Nashville	Oklahoma	State Program	6	9412
TestAmerica Nashville	Oregon	NELAC	10	TN200001
TestAmerica Nashville	Pennsylvania	NELAC	3	68-00585
TestAmerica Nashville	Rhode Island	State Program	1	LAO00268
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	Tennessee	State Program	4	2008
TestAmerica Nashville	Texas	NELAC	6	T104704077-09-TX
TestAmerica Nashville	USDA	Federal		S-48469
TestAmerica Nashville	Utah	NELAC	8	TAN
TestAmerica Nashville	Virginia	NELAC Secondary AB	3	460152
TestAmerica Nashville	Virginia	State Program	3	00323
TestAmerica Nashville	Washington	State Program	10	C789
TestAmerica Nashville	West Virginia DEP	State Program	3	219
TestAmerica Nashville	Wisconsin	State Program	5	998020430

Certification Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Nashville	Wyoming (UST)	A2LA	8	453.07
TestAmerica Savannah	A2LA	DoD ELAP		0399-01
TestAmerica Savannah	A2LA	ISO/IEC 17025		399.01
TestAmerica Savannah	Alabama	State Program	4	41450
TestAmerica Savannah	Arkansas	State Program	6	N/A
TestAmerica Savannah	Arkansas DEQ	State Program	6	88-0692
TestAmerica Savannah	California	NELAC	9	3217CA
TestAmerica Savannah	Colorado	State Program	8	N/A
TestAmerica Savannah	Connecticut	State Program	1	PH-0161
TestAmerica Savannah	Florida	NELAC	4	E87052
TestAmerica Savannah	GA Dept. of Agriculture	State Program	4	N/A
TestAmerica Savannah	Georgia	State Program	4	803
TestAmerica Savannah	Georgia	State Program	4	N/A
TestAmerica Savannah	Guam	State Program	9	09-005r
TestAmerica Savannah	Hawaii	State Program	9	N/A
TestAmerica Savannah	Illinois	NELAC	5	200022
TestAmerica Savannah	Indiana	State Program	5	N/A
TestAmerica Savannah	Iowa	State Program	7	353
TestAmerica Savannah	Kentucky	State Program	4	90084
TestAmerica Savannah	Kentucky (UST)	State Program	4	18
TestAmerica Savannah	Louisiana	NELAC	6	30690
TestAmerica Savannah	Louisiana	NELAC	6	LA100015
TestAmerica Savannah	Maine	State Program	1	GA00006
TestAmerica Savannah	Maryland	State Program	3	250
TestAmerica Savannah	Massachusetts	State Program	1	M-GA006
TestAmerica Savannah	Michigan	State Program	5	9925
TestAmerica Savannah	Mississippi	State Program	4	N/A
TestAmerica Savannah	Montana	State Program	8	CERT0081
TestAmerica Savannah	Nebraska	State Program	7	TestAmerica-Savannah
TestAmerica Savannah	New Jersey	NELAC	2	GA769
TestAmerica Savannah	New Mexico	State Program	6	N/A
TestAmerica Savannah	New York	NELAC	2	10842
TestAmerica Savannah	North Carolina DENR	State Program	4	269
TestAmerica Savannah	North Carolina DHHS	State Program	4	13701
TestAmerica Savannah	Oklahoma	State Program	6	9984
TestAmerica Savannah	Pennsylvania	NELAC	3	68-00474
TestAmerica Savannah	Puerto Rico	State Program	2	GA00006
TestAmerica Savannah	Rhode Island	State Program	1	LAO00244
TestAmerica Savannah	South Carolina	State Program	4	98001
TestAmerica Savannah	Tennessee	State Program	4	TN02961
TestAmerica Savannah	Texas	NELAC	6	T104704185-08-TX
TestAmerica Savannah	USDA	Federal		SAV 3-04
TestAmerica Savannah	Vermont	State Program	1	87052
TestAmerica Savannah	Virginia	NELAC	3	460161
TestAmerica Savannah	Washington	State Program	10	C1794
TestAmerica Savannah	West Virginia	State Program	3	9950C
TestAmerica Savannah	West Virginia DEP	State Program	3	94
TestAmerica Savannah	Wisconsin	State Program	5	999819810
TestAmerica Savannah	Wyoming	State Program	8	8TMS-Q

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31847-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-31847-1	MW-9-120313	Water	03/13/12 10:50	03/16/12 09:50
580-31847-2	MW-10-120313	Water	03/13/12 13:55	03/16/12 09:50
580-31847-3	MW-1-120313	Water	03/13/12 15:50	03/16/12 09:50
580-31847-4	MW-8-120313	Water	03/13/12 17:05	03/16/12 09:50
580-31847-5	MW-3-120314	Water	03/14/12 12:00	03/16/12 09:50
580-31847-6	MW-11-120314	Water	03/14/12 14:45	03/16/12 09:50
580-31847-7	Trip Blank	Water	03/13/12 00:00	03/16/12 09:50

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave, Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #: 31847

CLIENT: KJ / BNSF
REPORT TO: Kim Slack kimslack@kennedyjenks.com
ADDRESS: 200 SW Market St Ste 500, Portland OR 97201
PHONE: 503-295-4911 FAX: 503-295-4901
INVOICE TO: BNSF
P.O. NUMBER:
PROJECT NAME: BNSF- Wishram
PROJECT NUMBER: 1196010.01
SAMPLED BY: Kim Slack

TURNAROUND REQUEST in Business Days *
Organic & Inorganic Analyses: [X] 10 STD. / 7 / 5 / 4 / 3 / 2 / 1 / <1
Petroleum Hydrocarbon Analyses: [X] 5 STD. / 4 / 3 / 2 / 1 / <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NWTPH Gx	NWTPH Dx	BTEX 8260B	NO3/NO2, NH4+	350.1/350.5	Sulfate 300.0	Sulfide 376.2	Methane 8015 mod or RSK175	Diss. Fe 200.8				MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
PRESERVATIVE			HCl	HCl	HCl	H2SO4		—	NaOH	HCl	HNO3							
1	MW-9-120313	3/13/12 1050	3		3					3					W	9	Methane: EPA 8015 or RSK 175	-1
2	MW-10-120313	" 1355	3		3					3					W	9		-2
3	MW-1-120313	" 1550	3		3					3					W	9		-3
4	MW-8-120313	" 1705	3		3					3					W	9		-4
5	MW-3-120314	3/14/12 1200	3	1	3	1		1	1	3	1				W	14		-5
6	MW-11-120314	" 1445	3	1	3	1		1	1	3	1				W	14		-6
7																		
8																		
9																		
10																		

Cooler/TB Dig/IR cor 0.5 unc 0.9
Cooler Dsc Lg Blu/Wh @ Lab
Wet/Packs Packing bubble
Lg FedPO w/cs

RELEASED BY: Kim Slack
PRINT NAME: Kimberly Slack FIRM: Kennedy/Jenks DATE: 3/14/12 TIME: 1050
RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:
RELEASED BY: PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:
ADDITIONAL REMARKS:
TEMP:
PAGE OF

Rcvd by Tom Blant 3/16/12 0950

TAL-1000(0408)

Login Sample Receipt Checklist

Client: Kennedy/Jenks Consultants

Job Number: 580-31847-1

Login Number: 31847

List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Kennedy/Jenks Consultants

Job Number: 580-31847-1

Login Number: 31847
List Number: 1
Creator: Howard, Brandon L

List Source: TestAmerica Savannah
List Creation: 03/21/12 03:30 PM

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-31821-1
Client Project/Site: BNSF Wishram Monitoring

For:
Kennedy/Jenks Consultants
32001-32nd Ave South, Suite 100
Federal Way, Washington 98001

Attn: Joseph Sawdey

Kristine D. Allen

Authorized for release by:
3/30/2012 5:27:16 PM

Kristine Allen
Project Manager I
kristine.allen@testamericainc.com

Table of Contents

Job ID: 580-31821-1

Laboratory: TestAmerica Seattle

Narrative

Receipt
All samples were received in good condition within temperature requirements.

GC Semi VOA - Method NWTPH-Dx
The instrument blank for prep/analytical batch 107744 contained Motor Oil greater than the method detection limit (MDL), but below the reporting limit (RL). The data have been qualified and reported. (CCB 580-107744/34)

The results in the #2 Diesel (C10-C24) and Motor Oil (>C24-C36) ranges for sample MW-9-120313 (580-31821-1) are due primarily to a mineral/transformer oil range product.

The results in the #2 Diesel (C10-C24) and Motor Oil (>C24-C36) ranges for sample MW-1-120313 (580-31821-4) are due primarily to a complex mixture of a gasoline/kerosene range product, heavily weathered/degraded diesel fuel, a mineral/transformer oil range product, and motor oil.

The results in the #2 Diesel (C10-C24) range for sample MW-8-120313 (580-31821-5) are due primarily to a mixture of a gasoline/kerosene range product and weathered diesel.

The Y qualifier was added to the affected sample ranges and reported.

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Organic Prep
No analytical or quality issues were noted.

Definitions/Glossary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
Y	The chromatographic response resembles a typical fuel pattern.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Client Sample ID: MW-9-120313
Date Collected: 03/13/12 10:50
Date Received: 03/15/12 09:10

Lab Sample ID: 580-31821-1
Matrix: Water

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.23	Y	0.12	0.070	mg/L		03/19/12 09:43	03/22/12 19:49	1
Motor Oil (>C24-C36)	0.30	Y	0.24	0.046	mg/L		03/19/12 09:43	03/22/12 19:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*101*		*50 - 150*	*03/19/12 09:43*	*03/22/12 19:49*	*1*

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.0097	J	0.040	0.0058	mg/L		03/26/12 11:48	03/26/12 19:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	33		1.2	0.40	mg/L			03/29/12 17:51	1
Nitrate Nitrite as N	4.8		0.050	0.025	mg/L			03/26/12 14:35	5

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1
Sulfide	2.1		1.0	1.0	mg/L			03/19/12 17:54	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Client Sample ID: QCFD-2-120313
Date Collected: 03/13/12 11:15
Date Received: 03/15/12 09:10

Lab Sample ID: 580-31821-2
Matrix: Water

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.071	J	0.12	0.070	mg/L		03/19/12 09:43	03/22/12 20:11	1
Motor Oil (>C24-C36)	0.081	J	0.24	0.046	mg/L		03/19/12 09:43	03/22/12 20:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*98*		*50 - 150*	*03/19/12 09:43*	*03/22/12 20:11*	*1*

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Client Sample ID: MW-10-120313
Date Collected: 03/13/12 13:55
Date Received: 03/15/12 09:10

Lab Sample ID: 580-31821-3
Matrix: Water

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12	0.070	mg/L		03/19/12 09:43	03/22/12 20:32	1
Motor Oil (>C24-C36)	**0.063**	**J**	0.24	0.046	mg/L		03/19/12 09:43	03/22/12 20:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*105*		*50 - 150*	*03/19/12 09:43*	*03/22/12 20:32*	*1*

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.040	0.0058	mg/L		03/26/12 11:48	03/26/12 20:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**33**		1.2	0.40	mg/L			03/29/12 19:13	1
Nitrate Nitrite as N	**5.0**		0.050	0.025	mg/L			03/26/12 14:39	5

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1
Sulfide	**6.4**		1.0	1.0	mg/L			03/19/12 17:54	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Client Sample ID: MW-1-120313
Date Collected: 03/13/12 15:50
Date Received: 03/15/12 09:10

Lab Sample ID: 580-31821-4
Matrix: Water

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	2.4	Y	0.12	0.070	mg/L		03/19/12 09:43	03/22/12 20:53	1
Motor Oil (>C24-C36)	2.0	Y	0.24	0.046	mg/L		03/19/12 09:43	03/22/12 20:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*92*		*50 - 150*	*03/19/12 09:43*	*03/22/12 20:53*	*1*

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	12		0.040	0.0058	mg/L		03/26/12 11:48	03/26/12 20:05	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		1.2	0.40	mg/L			03/29/12 19:29	1
Nitrate Nitrite as N	ND		0.010	0.0050	mg/L			03/26/12 14:44	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	0.48		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1
Sulfide	6.4		1.0	1.0	mg/L			03/19/12 17:54	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Client Sample ID: MW-8-120313
Date Collected: 03/13/12 17:05
Date Received: 03/15/12 09:10

Lab Sample ID: 580-31821-5
Matrix: Water

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.85	Y	0.12	0.070	mg/L		03/19/12 09:43	03/22/12 21:57	1
Motor Oil (>C24-C36)	0.074	J	0.24	0.046	mg/L		03/19/12 09:43	03/22/12 21:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*101*		*50 - 150*	*03/19/12 09:43*	*03/22/12 21:57*	*1*

Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.31		0.040	0.0058	mg/L		03/26/12 11:48	03/26/12 20:09	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	17		1.2	0.40	mg/L			03/29/12 19:45	1
Nitrate Nitrite as N	0.012		0.010	0.0050	mg/L			03/26/12 14:28	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1
Sulfide	2.0		1.0	1.0	mg/L			03/19/12 17:57	1

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-107448/1-B — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107744 — **Prep Batch: 107448**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.13	0.073	mg/L		03/19/12 09:41	03/22/12 17:41	1
Motor Oil (>C24-C36)	ND		0.25	0.048	mg/L		03/19/12 09:41	03/22/12 17:41	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*104*		*50 - 150*	*03/19/12 09:41*	*03/22/12 17:41*	*1*

Lab Sample ID: LCS 580-107448/2-B — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107744 — **Prep Batch: 107448**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
#2 Diesel (C10-C24)	5.00	4.97		mg/L		99	70 - 130
Motor Oil (>C24-C36)	5.00	5.47		mg/L		109	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*85*		*50 - 150*

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 580-107927/14-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107980 — **Prep Batch: 107927**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.040	0.0058	mg/L		03/26/12 11:48	03/26/12 18:45	1

Lab Sample ID: LCS 580-107927/15-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107980 — **Prep Batch: 107927**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	10.0	8.87		mg/L		89	80 - 120

Lab Sample ID: LCSD 580-107927/16-A — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107980 — **Prep Batch: 107927**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	10.0	8.98		mg/L		90	80 - 120	1	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-108261/28 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 108261

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		1.2	0.40	mg/L			03/29/12 22:13	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 580-108261/29
Matrix: Water
Analysis Batch: 108261

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate			15.0	14.3		mg/L		95	90 - 110		

Lab Sample ID: 580-31821-1 MS
Matrix: Water
Analysis Batch: 108261

Client Sample ID: MW-9-120313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate	33		40.0	73.0		mg/L		100	90 - 110		

Lab Sample ID: 580-31821-1 DU
Matrix: Water
Analysis Batch: 108261

Client Sample ID: MW-9-120313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Sulfate	33			33.2		mg/L				1	10

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 580-108284/1-A
Matrix: Water
Analysis Batch: 108286

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 108284

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/30/12 16:36	03/30/12 16:36	1

Lab Sample ID: LCS 580-108284/2-A
Matrix: Water
Analysis Batch: 108286

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 108284

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia			2.00	1.85		mg/L		92	90 - 110		

Lab Sample ID: 580-31821-5 MS
Matrix: Water
Analysis Batch: 108286

Client Sample ID: MW-8-120313
Prep Type: Total/NA
Prep Batch: 108284

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia	ND		2.00	2.02		mg/L		101	90 - 110		

Lab Sample ID: 580-31821-5 DU
Matrix: Water
Analysis Batch: 108286

Client Sample ID: MW-8-120313
Prep Type: Total/NA
Prep Batch: 108284

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Ammonia	ND			ND		mg/L				NC	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 580-107949/3
Matrix: Water
Analysis Batch: 107949

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.010	0.0050	mg/L			03/26/12 13:59	1

Lab Sample ID: LCS 580-107949/4
Matrix: Water
Analysis Batch: 107949

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate Nitrite as N			1.00	1.03		mg/L		103	90 - 110		

Lab Sample ID: 580-31821-1 MS
Matrix: Water
Analysis Batch: 107949

Client Sample ID: MW-9-120313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate Nitrite as N	4.8		1.00	5.60	4	mg/L		76	60 - 130		

Lab Sample ID: 580-31821-1 DU
Matrix: Water
Analysis Batch: 107949

Client Sample ID: MW-9-120313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Nitrate Nitrite as N	4.8			5.00		mg/L				3	20

Method: 376.1 - Sulfide

Lab Sample ID: MB 680-231890/1
Matrix: Water
Analysis Batch: 231890

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	1.0	mg/L			03/19/12 17:54	1

Lab Sample ID: LCS 680-231890/2
Matrix: Water
Analysis Batch: 231890

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			11.3	9.57		mg/L		85	75 - 125		

Client Sample ID: MW-9-120313

Lab Sample ID: 580-31821-1

Date Collected: 03/13/12 10:50

Matrix: Water

Date Received: 03/15/12 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			107448	03/19/12 09:43	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107744	03/22/12 19:49	KKW	TAL SEA
Dissolved	Prep	200.8			107927	03/26/12 11:48	PAB	TAL SEA
Dissolved	Analysis	200.8		1	107980	03/26/12 19:56	FCW	TAL SEA
Total/NA	Analysis	353.2		5	107949	03/26/12 14:35	AM	TAL SEA
Total/NA	Analysis	300.0		1	108261	03/29/12 17:51	AM	TAL SEA
Total/NA	Analysis	350.1		1	108286	03/30/12 16:36	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			108284	03/30/12 16:36	JP	TAL SEA
Total/NA	Analysis	376.1		1	231890	03/19/12 17:54	CN	TAL SAV

Client Sample ID: QCFD-2-120313

Lab Sample ID: 580-31821-2

Date Collected: 03/13/12 11:15

Matrix: Water

Date Received: 03/15/12 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			107448	03/19/12 09:43	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107744	03/22/12 20:11	KKW	TAL SEA

Client Sample ID: MW-10-120313

Lab Sample ID: 580-31821-3

Date Collected: 03/13/12 13:55

Matrix: Water

Date Received: 03/15/12 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			107448	03/19/12 09:43	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107744	03/22/12 20:32	KKW	TAL SEA
Dissolved	Prep	200.8			107927	03/26/12 11:48	PAB	TAL SEA
Dissolved	Analysis	200.8		1	107980	03/26/12 20:00	FCW	TAL SEA
Total/NA	Analysis	353.2		5	107949	03/26/12 14:39	AM	TAL SEA
Total/NA	Analysis	300.0		1	108261	03/29/12 19:13	AM	TAL SEA
Total/NA	Analysis	350.1		1	108286	03/30/12 16:36	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			108284	03/30/12 16:36	JP	TAL SEA
Total/NA	Analysis	376.1		1	231890	03/19/12 17:54	CN	TAL SAV

Client Sample ID: MW-1-120313

Lab Sample ID: 580-31821-4

Date Collected: 03/13/12 15:50

Matrix: Water

Date Received: 03/15/12 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			107448	03/19/12 09:43	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107744	03/22/12 20:53	KKW	TAL SEA
Dissolved	Prep	200.8			107927	03/26/12 11:48	PAB	TAL SEA
Dissolved	Analysis	200.8		1	107980	03/26/12 20:05	FCW	TAL SEA
Total/NA	Analysis	353.2		1	107949	03/26/12 14:44	AM	TAL SEA

Lab Chronicle

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Client Sample ID: MW-1-120313

Lab Sample ID: 580-31821-4

Date Collected: 03/13/12 15:50
Matrix: Water
Date Received: 03/15/12 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	108261	03/29/12 19:29	AM	TAL SEA
Total/NA	Analysis	350.1		1	108286	03/30/12 16:36	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			108284	03/30/12 16:36	JP	TAL SEA
Total/NA	Analysis	376.1		1	231890	03/19/12 17:54	CN	TAL SAV

Client Sample ID: MW-8-120313

Lab Sample ID: 580-31821-5

Date Collected: 03/13/12 17:05
Matrix: Water
Date Received: 03/15/12 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			107448	03/19/12 09:43	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107744	03/22/12 21:57	KKW	TAL SEA
Dissolved	Prep	200.8			107927	03/26/12 11:48	PAB	TAL SEA
Dissolved	Analysis	200.8		1	107980	03/26/12 20:09	FCW	TAL SEA
Total/NA	Analysis	353.2		1	107949	03/26/12 14:28	AM	TAL SEA
Total/NA	Analysis	300.0		1	108261	03/29/12 19:45	AM	TAL SEA
Total/NA	Analysis	350.1		1	108286	03/30/12 16:36	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			108284	03/30/12 16:36	JP	TAL SEA
Total/NA	Analysis	376.1		1	231890	03/19/12 17:57	CN	TAL SAV

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle	Alaska (UST)	State Program	10	UST-022
TestAmerica Seattle	California	NELAC	9	1115CA
TestAmerica Seattle	Florida	NELAC	4	E871074
TestAmerica Seattle	L-A-B	DoD ELAP		L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025		L2236
TestAmerica Seattle	Louisiana	NELAC	6	05016
TestAmerica Seattle	Montana (UST)	State Program	8	N/A
TestAmerica Seattle	Oregon	NELAC	10	WA100007
TestAmerica Seattle	USDA	Federal		P330-11-00222
TestAmerica Seattle	Washington	State Program	10	C553
TestAmerica Savannah	A2LA	DoD ELAP		0399-01
TestAmerica Savannah	A2LA	ISO/IEC 17025		399.01
TestAmerica Savannah	Alabama	State Program	4	41450
TestAmerica Savannah	Arkansas	State Program	6	N/A
TestAmerica Savannah	Arkansas DEQ	State Program	6	88-0692
TestAmerica Savannah	California	NELAC	9	3217CA
TestAmerica Savannah	Colorado	State Program	8	N/A
TestAmerica Savannah	Connecticut	State Program	1	PH-0161
TestAmerica Savannah	Florida	NELAC	4	E87052
TestAmerica Savannah	GA Dept. of Agriculture	State Program	4	N/A
TestAmerica Savannah	Georgia	State Program	4	803
TestAmerica Savannah	Georgia	State Program	4	N/A
TestAmerica Savannah	Guam	State Program	9	09-005r
TestAmerica Savannah	Hawaii	State Program	9	N/A
TestAmerica Savannah	Illinois	NELAC	5	200022
TestAmerica Savannah	Indiana	State Program	5	N/A
TestAmerica Savannah	Iowa	State Program	7	353
TestAmerica Savannah	Kentucky	State Program	4	90084
TestAmerica Savannah	Kentucky (UST)	State Program	4	18
TestAmerica Savannah	Louisiana	NELAC	6	30690
TestAmerica Savannah	Louisiana	NELAC	6	LA100015
TestAmerica Savannah	Maine	State Program	1	GA00006
TestAmerica Savannah	Maryland	State Program	3	250
TestAmerica Savannah	Massachusetts	State Program	1	M-GA006
TestAmerica Savannah	Michigan	State Program	5	9925
TestAmerica Savannah	Mississippi	State Program	4	N/A
TestAmerica Savannah	Montana	State Program	8	CERT0081
TestAmerica Savannah	Nebraska	State Program	7	TestAmerica-Savannah
TestAmerica Savannah	New Jersey	NELAC	2	GA769
TestAmerica Savannah	New Mexico	State Program	6	N/A
TestAmerica Savannah	New York	NELAC	2	10842
TestAmerica Savannah	North Carolina DENR	State Program	4	269
TestAmerica Savannah	North Carolina DHHS	State Program	4	13701
TestAmerica Savannah	Oklahoma	State Program	6	9984
TestAmerica Savannah	Pennsylvania	NELAC	3	68-00474
TestAmerica Savannah	Puerto Rico	State Program	2	GA00006
TestAmerica Savannah	Rhode Island	State Program	1	LAO00244
TestAmerica Savannah	South Carolina	State Program	4	98001
TestAmerica Savannah	Tennessee	State Program	4	TN02961
TestAmerica Savannah	Texas	NELAC	6	T104704185-08-TX
TestAmerica Savannah	USDA	Federal		SAV 3-04
TestAmerica Savannah	Vermont	State Program	1	87052
TestAmerica Savannah	Virginia	NELAC	3	460161

Certification Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Savannah	Washington	State Program	10	C1794
TestAmerica Savannah	West Virginia	State Program	3	9950C
TestAmerica Savannah	West Virginia DEP	State Program	3	94
TestAmerica Savannah	Wisconsin	State Program	5	999819810
TestAmerica Savannah	Wyoming	State Program	8	8TMS-Q

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31821-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-31821-1	MW-9-120313	Water	03/13/12 10:50	03/15/12 09:10
580-31821-2	QCFD-2-120313	Water	03/13/12 11:15	03/15/12 09:10
580-31821-3	MW-10-120313	Water	03/13/12 13:55	03/15/12 09:10
580-31821-4	MW-1-120313	Water	03/13/12 15:50	03/15/12 09:10
580-31821-5	MW-8-120313	Water	03/13/12 17:05	03/15/12 09:10

3/30/2012

3/821

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: BNSF

INVOICE TO: BNSF

REPORT TO: Kim Slack
ADDRESS: 200 SW Market St Ste 500 Portland, OR 97201
PHONE: 503-295-4911 FAX: 503-295-4901

P.O. NUMBER:

PROJECT NAME: BNSF- Wishram
PROJECT NUMBER: 11960010.01
SAMPLED BY: Kim Slack

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: HCl | HCl | HCl | H_2SO_4 | — | NaOH/HCl | HNO_3

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NWTPH-Gx	NWTPH-Dx	BTEX 8260B	Nitrate/Nitrite N+N 353.1	350.3	Sulfate 300.0	Sulfide 376.2	Methane SOP RSK 175	Dissolved Fe 200.8	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 MW-9-120313	3/13/12 10:50		1		1		1	1		1	W	5	Methane: EPA RSK 175	
2 QCFD-2-120313	" 11:15		1								W	1		
3 MW-10-120313	" 13:55		1		1		1	1		1	W	5		
4 MW-1-120313	" 15:50		1		1		1	1		1	W	5		
5 MW-8-120313	" 17:05		1		1		1	1		1	W	5		
6														
7														
8														
9														
10														

RELEASED BY: Kimberly A Slack
PRINT NAME: Kim Slack FIRM: Kennedy/Jenks DATE: 3/14/12 TIME: 10:40

RECEIVED BY: Tom Blankinship FIRM: TA-Sea DATE: 3/15/12 TIME: 0910

RELEASED BY: PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY: PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE OF

TAL-1000(0408)

Ly Green/blue wet/bubble IR = 0.6/0.8 w/cs Fed Ex

Login Sample Receipt Checklist

Client: Kennedy/Jenks Consultants

Job Number: 580-31821-1

Login Number: 31821

List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Kennedy/Jenks Consultants

Job Number: 580-31821-1

Login Number: 31821
List Number: 1
Creator: Howard, Brandon L

List Source: TestAmerica Savannah
List Creation: 03/17/12 11:16 AM

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-31780-1
Client Project/Site: BNSF Wishram Monitoring

For:
Kennedy/Jenks Consultants
32001-32nd Ave South, Suite 100
Federal Way, Washington 98001

Attn: Joseph Sawdey

Kristine D. Allen

Authorized for release by:
3/28/2012 4:48:17 PM

Kristine Allen
Project Manager I
kristine.allen@testamericainc.com

Table of Contents

Case Narrative

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Job ID: 580-31780-1

Laboratory: TestAmerica Seattle

Narrative

Receipt
The Chain of Custody (COC) lists 15 sample containers per sample. Only 14 containers were received for MW-5-120312 and 13 containers for QCFD-1-120312.

A Trip Blank was received that was not listed on the COC. It was logged-in without analyses.

There is an HCl Amber missing for QCFD-1-120312 for the NWPTH-DX analysis. Client was notified and analysis cancelled for this sample.

All other samples were received in good condition within temperature requirements.

GC/MS VOA - Method NWTPH-Gx
The method blank for batch 107378 contained GRO analyte above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

No other analytical or quality issues were noted.

GC Semi VOA
No analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

General Chemistry
No analytical or quality issues were noted.

Subcontract Work
Method RSK 175: This method was subcontracted to TestAmerica Nashville. The subcontract certification is different from those listed on the TestAmerica cover page of this final report.

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Qualifiers

GC VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Client Sample ID: MW-5-120312
Date Collected: 03/12/12 13:25
Date Received: 03/14/12 10:10

Lab Sample ID: 580-31780-1
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/16/12 21:29	1
Toluene	ND		1.0	0.15	ug/L			03/16/12 21:29	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/16/12 21:29	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/16/12 21:29	1
o-Xylene	ND		1.0	0.15	ug/L			03/16/12 21:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/16/12 21:29*	*1*
Toluene-d8 (Surr)	*100*		*85 - 120*		*03/16/12 21:29*	*1*
Ethylbenzene-d10	*96*		*80 - 120*		*03/16/12 21:29*	*1*
Trifluorotoluene (Surr)	*103*		*80 - 120*		*03/16/12 21:29*	*1*
4-Bromofluorobenzene (Surr)	*95*		*75 - 120*		*03/16/12 21:29*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	**0.024**	**J B**	0.050	0.010	mg/L			03/16/12 21:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*50 - 150*		*03/16/12 21:29*	*1*
Trifluorotoluene (Surr)	*102*		*50 - 150*		*03/16/12 21:29*	*1*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.12	0.071	mg/L		03/19/12 09:43	03/22/12 18:24	1
Motor Oil (>C24-C36)	**0.051**	**J**	0.24	0.047	mg/L		03/19/12 09:43	03/22/12 18:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*99*		*50 - 150*	*03/19/12 09:43*	*03/22/12 18:24*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.00		ug/L		03/21/12 10:43	03/21/12 14:22	1.00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*93*		*62 - 124*	*03/21/12 10:43*	*03/21/12 14:22*	*1.00*

Method: 200.8 - Dissolved Metals by ICPMS - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.040	0.0058	mg/L		03/22/12 15:44	03/23/12 11:11	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**20**		1.2	0.40	mg/L			03/27/12 17:15	1
Nitrate Nitrite as N	**2.0**		0.010	0.0050	mg/L			03/26/12 14:17	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/21/12 15:14	03/21/12 15:14	1
Sulfide	**1.5**		1.0	1.0	mg/L			03/19/12 17:54	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Client Sample ID: QCFD-1-120312
Date Collected: 03/12/12 12:00
Date Received: 03/14/12 10:10

Lab Sample ID: 580-31780-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/16/12 21:51	1
Toluene	ND		1.0	0.15	ug/L			03/16/12 21:51	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/16/12 21:51	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/16/12 21:51	1
o-Xylene	ND		1.0	0.15	ug/L			03/16/12 21:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*105*		*80 - 120*		*03/16/12 21:51*	*1*
Toluene-d8 (Surr)	*99*		*85 - 120*		*03/16/12 21:51*	*1*
Ethylbenzene-d10	*96*		*80 - 120*		*03/16/12 21:51*	*1*
Trifluorotoluene (Surr)	*101*		*80 - 120*		*03/16/12 21:51*	*1*
4-Bromofluorobenzene (Surr)	*94*		*75 - 120*		*03/16/12 21:51*	*1*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050	0.010	mg/L			03/16/12 21:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*50 - 150*		*03/16/12 21:51*	*1*
Trifluorotoluene (Surr)	*101*		*50 - 150*		*03/16/12 21:51*	*1*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.00		ug/L		03/21/12 10:43	03/21/12 14:24	1.00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*94*		*62 - 124*	*03/21/12 10:43*	*03/21/12 14:24*	*1.00*

Method: 200.8 - Dissolved Metals by ICPMS - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.013**	**J**	0.040	0.0058	mg/L		03/22/12 15:44	03/23/12 11:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**20**		1.2	0.40	mg/L			03/27/12 17:31	1
Nitrate Nitrite as N	**1.9**		0.010	0.0050	mg/L			03/26/12 14:18	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/20/12 14:00	03/20/12 14:00	1
Sulfide	**1.5**		1.0	1.0	mg/L			03/19/12 17:54	1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-107377/4
Matrix: Water
Analysis Batch: 107377

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.15	ug/L			03/16/12 13:12	1
Toluene	ND		1.0	0.15	ug/L			03/16/12 13:12	1
Ethylbenzene	ND		1.0	0.15	ug/L			03/16/12 13:12	1
m-Xylene & p-Xylene	ND		2.0	0.30	ug/L			03/16/12 13:12	1
o-Xylene	ND		1.0	0.15	ug/L			03/16/12 13:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluorobenzene (Surr)	*104*		*80 - 120*		*03/16/12 13:12*	*1*
Toluene-d8 (Surr)	*99*		*85 - 120*		*03/16/12 13:12*	*1*
Ethylbenzene-d10	*95*		*80 - 120*		*03/16/12 13:12*	*1*
Trifluorotoluene (Surr)	*102*		*80 - 120*		*03/16/12 13:12*	*1*
4-Bromofluorobenzene (Surr)	*93*		*75 - 120*		*03/16/12 13:12*	*1*

Lab Sample ID: LCS 580-107377/5
Matrix: Water
Analysis Batch: 107377

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			25.0	24.4		ug/L		98	80 - 120		
Toluene			25.0	24.9		ug/L		100	75 - 120		
Ethylbenzene			25.0	24.0		ug/L		96	75 - 125		
m-Xylene & p-Xylene			50.0	48.9		ug/L		98	75 - 130		
o-Xylene			25.0	24.6		ug/L		98	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Fluorobenzene (Surr)	*105*		*80 - 120*
Toluene-d8 (Surr)	*99*		*85 - 120*
Ethylbenzene-d10	*96*		*80 - 120*
Trifluorotoluene (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*93*		*75 - 120*

Lab Sample ID: LCSD 580-107377/6
Matrix: Water
Analysis Batch: 107377

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene			25.0	24.2		ug/L		97	80 - 120	1	30
Toluene			25.0	24.2		ug/L		97	75 - 120	3	30
Ethylbenzene			25.0	23.5		ug/L		94	75 - 125	2	30
m-Xylene & p-Xylene			50.0	48.0		ug/L		96	75 - 130	2	30
o-Xylene			25.0	24.2		ug/L		97	80 - 120	2	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Fluorobenzene (Surr)	*105*		*80 - 120*
Toluene-d8 (Surr)	*99*		*85 - 120*
Ethylbenzene-d10	*96*		*80 - 120*
Trifluorotoluene (Surr)	*94*		*80 - 120*
4-Bromofluorobenzene (Surr)	*94*		*75 - 120*

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-107378/5
Matrix: Water
Analysis Batch: 107378

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.0126	J	0.050	0.010	mg/L			03/16/12 13:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*50 - 150*		*03/16/12 13:12*	*1*
Trifluorotoluene (Surr)	*100*		*50 - 150*		*03/16/12 13:12*	*1*

Lab Sample ID: LCS 580-107378/6
Matrix: Water
Analysis Batch: 107378

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Gasoline			1.00	0.883		mg/L		88	79 - 110		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*50 - 150*
Trifluorotoluene (Surr)	*94*		*50 - 150*

Lab Sample ID: LCSD 580-107378/7
Matrix: Water
Analysis Batch: 107378

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline			1.00	0.874		mg/L		87	79 - 110	1	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*100*		*50 - 150*
Trifluorotoluene (Surr)	*93*		*50 - 150*

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-107448/1-B
Matrix: Water
Analysis Batch: 107744

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 107448

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.13	0.073	mg/L		03/19/12 09:41	03/22/12 17:41	1
Motor Oil (>C24-C36)	ND		0.25	0.048	mg/L		03/19/12 09:41	03/22/12 17:41	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*104*		*50 - 150*	*03/19/12 09:41*	*03/22/12 17:41*	*1*

Lab Sample ID: LCS 580-107448/2-B
Matrix: Water
Analysis Batch: 107744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 107448

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
#2 Diesel (C10-C24)			5.00	4.97		mg/L		99	70 - 130		
Motor Oil (>C24-C36)			5.00	5.47		mg/L		109	70 - 130		

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-107448/2-B
Matrix: Water
Analysis Batch: 107744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 107448

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*85*		*50 - 150*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved

Lab Sample ID: 12C4100-BLK1
Matrix: Water
Analysis Batch: V004662

Client Sample ID: Method Blank
Prep Type: Dissolved
Prep Batch: 12C4100_P

Analyte	Blank Result	Blank Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.00		ug/L		03/21/12 10:43	03/21/12 13:16	1.00

Surrogate	*Blank %Recovery*	*Blank Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Acetylene	*93*		*62 - 124*	*03/21/12 10:43*	*03/21/12 13:16*	*1.00*

Lab Sample ID: 12C4100-BS1
Matrix: Water
Analysis Batch: V004662

Client Sample ID: Lab Control Sample
Prep Type: Dissolved
Prep Batch: 12C4100_P

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			273	258		ug/L		94	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Acetylene	*92*		*62 - 124*

Lab Sample ID: 12C4100-BSD1
Matrix: Water
Analysis Batch: V004662

Client Sample ID: Lab Control Sample Dup
Prep Type: Dissolved
Prep Batch: 12C4100_P

Analyte			Spike Added	LCS Dup Result	LCS Dup Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane			273	257		ug/L		94	80 - 120	0.3	33

Surrogate	*LCS Dup %Recovery*	*LCS Dup Qualifier*	*Limits*
Acetylene	*89*		*62 - 124*

Lab Sample ID: 12C4100-MS1
Matrix: Water
Analysis Batch: V004662

Client Sample ID: Matrix Spike
Prep Type: Dissolved
Prep Batch: 12C4100_P

Analyte	Sample Result	Sample Qualifier	Spike Added	Matrix Spike Result	Matrix Spike Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane	ND		273	211		ug/L		77	46 - 142		

Surrogate	*Matrix Spike %Recovery*	*Matrix Spike Qualifier*	*Limits*
Acetylene	*76*		*62 - 124*

Method: RSK 175 - Methane, Ethane, and Ethene by GC - dissolved (Continued)

Lab Sample ID: 12C4100-MSD1
Matrix: Water
Analysis Batch: V004662

Client Sample ID: Matrix Spike Duplicate
Prep Type: Dissolved
Prep Batch: 12C4100_P

Analyte	Sample Result	Sample Qualifier	Spike Added	Matrix Spike Dup Result	Matrix Spike Dup Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	ND		273	211		ug/L		77	46 - 142	0.3	33

Surrogate	*Matrix Spike Dup %Recovery*	*Matrix Spike Dup Qualifier*	*Limits*
Acetylene	*73*		*62 - 124*

Method: 200.8 - Dissolved Metals by ICPMS

Lab Sample ID: MB 580-107804/24-A
Matrix: Water
Analysis Batch: 107859

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 107804

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.040	0.0058	mg/L		03/22/12 15:44	03/23/12 09:19	1

Lab Sample ID: LCS 580-107804/25-A
Matrix: Water
Analysis Batch: 107859

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 107804

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	10.0	10.2		mg/L		102	80 - 120

Lab Sample ID: LCSD 580-107804/26-A
Matrix: Water
Analysis Batch: 107859

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 107804

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	10.0	10.5		mg/L		105	80 - 120	3	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-108048/3
Matrix: Water
Analysis Batch: 108048

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		1.2	0.40	mg/L			03/27/12 09:22	1

Lab Sample ID: LCS 580-108048/4
Matrix: Water
Analysis Batch: 108048

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	15.0	14.3		mg/L		95	90 - 110

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 580-107627/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107628 — **Prep Batch: 107627**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/20/12 14:00	03/20/12 14:00	1

Lab Sample ID: LCS 580-107627/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107628 — **Prep Batch: 107627**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	1.93		mg/L		96	90 - 110

Lab Sample ID: MB 580-107703/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107705 — **Prep Batch: 107703**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		03/21/12 15:14	03/21/12 15:14	1

Lab Sample ID: LCS 580-107703/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107705 — **Prep Batch: 107703**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	2.00	2.02		mg/L		101	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 580-107949/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107949

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	ND		0.010	0.0050	mg/L			03/26/12 13:59	1

Lab Sample ID: LCS 580-107949/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 107949

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate Nitrite as N	1.00	1.03		mg/L		103	90 - 110

Method: 376.1 - Sulfide

Lab Sample ID: MB 680-231890/1 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 231890

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	1.0	mg/L			03/19/12 17:54	1

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Method: 376.1 - Sulfide (Continued)

Lab Sample ID: LCS 680-231890/2
Matrix: Water
Analysis Batch: 231890

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			11.3	9.57		mg/L		85	75 - 125		

Lab Chronicle

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Client Sample ID: MW-5-120312

Lab Sample ID: 580-31780-1

Date Collected: 03/12/12 13:25

Matrix: Water

Date Received: 03/14/12 10:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107377	03/16/12 21:29	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107378	03/16/12 21:29	JMB	TAL SEA
Total/NA	Prep	3520C			107448	03/19/12 09:43	RD	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	107744	03/22/12 18:24	KKW	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4100_P	03/21/12 10:43	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004662	03/21/12 14:22	JLS2	TAL NSH
Dissolved	Prep	200.8			107804	03/22/12 15:44	PAB	TAL SEA
Dissolved	Analysis	200.8		1	107859	03/23/12 11:11	FCW	TAL SEA
Total/NA	Analysis	350.1		1	107705	03/21/12 15:14	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			107703	03/21/12 15:14	JP	TAL SEA
Total/NA	Analysis	353.2		1	107949	03/26/12 14:17	AM	TAL SEA
Total/NA	Analysis	300.0		1	108048	03/27/12 17:15	AM	TAL SEA
Total/NA	Analysis	376.1		1	231890	03/19/12 17:54	CN	TAL SAV

Client Sample ID: QCFD-1-120312

Lab Sample ID: 580-31780-2

Date Collected: 03/12/12 12:00

Matrix: Water

Date Received: 03/14/12 10:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	107377	03/16/12 21:51	JMB	TAL SEA
Total/NA	Analysis	NWTPH-Gx		1	107378	03/16/12 21:51	JMB	TAL SEA
Dissolved	Prep	RSK 175/3810		1.00	12C4100_P	03/21/12 10:43	MGH	TAL NSH
Dissolved	Analysis	RSK 175		1.00	V004662	03/21/12 14:24	JLS2	TAL NSH
Dissolved	Prep	200.8			107804	03/22/12 15:44	PAB	TAL SEA
Dissolved	Analysis	200.8		1	107859	03/23/12 11:15	FCW	TAL SEA
Total/NA	Analysis	350.1		1	107628	03/20/12 14:00	JP	TAL SEA
Total/NA	Prep	Distill/Ammonia			107627	03/20/12 14:00	JP	TAL SEA
Total/NA	Analysis	353.2		1	107949	03/26/12 14:18	AM	TAL SEA
Total/NA	Analysis	300.0		1	108048	03/27/12 17:31	AM	TAL SEA
Total/NA	Analysis	376.1		1	231890	03/19/12 17:54	CN	TAL SAV

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Road, Nashville, TN 37204, TEL 800-765-0980

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Certification Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle	Alaska (UST)	State Program	10	UST-022
TestAmerica Seattle	California	NELAC	9	1115CA
TestAmerica Seattle	Florida	NELAC	4	E871074
TestAmerica Seattle	L-A-B	DoD ELAP		L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025		L2236
TestAmerica Seattle	Louisiana	NELAC	6	05016
TestAmerica Seattle	Montana (UST)	State Program	8	N/A
TestAmerica Seattle	Oregon	NELAC	10	WA100007
TestAmerica Seattle	USDA	Federal		P330-11-00222
TestAmerica Seattle	Washington	State Program	10	C553
TestAmerica Nashville		ACIL		393
TestAmerica Nashville	A2LA	ISO/IEC 17025		0453.07
TestAmerica Nashville	Alabama	State Program	4	41150
TestAmerica Nashville	Alaska (UST)	State Program	10	UST-087
TestAmerica Nashville	Arizona	State Program	9	AZ0473
TestAmerica Nashville	Arkansas DEQ	State Program	6	88-0737
TestAmerica Nashville	California	NELAC	9	1168CA
TestAmerica Nashville	Canadian Assoc Lab Accred (CALA)	Canada		3744
TestAmerica Nashville	Colorado	State Program	8	N/A
TestAmerica Nashville	Connecticut	State Program	1	PH-0220
TestAmerica Nashville	Florida	NELAC	4	E87358
TestAmerica Nashville	Illinois	NELAC	5	200010
TestAmerica Nashville	Iowa	State Program	7	131
TestAmerica Nashville	Kansas	NELAC	7	E-10229
TestAmerica Nashville	Kentucky	State Program	4	90038
TestAmerica Nashville	Kentucky (UST)	State Program	4	19
TestAmerica Nashville	Louisiana	NELAC	6	30613
TestAmerica Nashville	Louisiana	NELAC	6	LA110014
TestAmerica Nashville	Maryland	State Program	3	316
TestAmerica Nashville	Massachusetts	State Program	1	M-TN032
TestAmerica Nashville	Mississippi	State Program	4	N/A
TestAmerica Nashville	Montana (UST)	State Program	8	NA
TestAmerica Nashville	New Hampshire	NELAC	1	2963
TestAmerica Nashville	New Jersey	NELAC	2	TN965
TestAmerica Nashville	New York	NELAC	2	11342
TestAmerica Nashville	North Carolina DENR	State Program	4	387
TestAmerica Nashville	North Dakota	State Program	8	R-146
TestAmerica Nashville	Ohio VAP	State Program	5	CL0033
TestAmerica Nashville	Oklahoma	State Program	6	9412
TestAmerica Nashville	Oregon	NELAC	10	TN200001
TestAmerica Nashville	Pennsylvania	NELAC	3	68-00585
TestAmerica Nashville	Rhode Island	State Program	1	LAO00268
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	South Carolina	State Program	4	84009
TestAmerica Nashville	Tennessee	State Program	4	2008
TestAmerica Nashville	Texas	NELAC	6	T104704077-09-TX
TestAmerica Nashville	USDA	Federal		S-48469
TestAmerica Nashville	Utah	NELAC	8	TAN
TestAmerica Nashville	Virginia	NELAC Secondary AB	3	460152
TestAmerica Nashville	Virginia	State Program	3	00323
TestAmerica Nashville	Washington	State Program	10	C789
TestAmerica Nashville	West Virginia DEP	State Program	3	219
TestAmerica Nashville	Wisconsin	State Program	5	998020430

Certification Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Nashville	Wyoming (UST)	A2LA	8	453.07
TestAmerica Savannah	A2LA	DoD ELAP		0399-01
TestAmerica Savannah	A2LA	ISO/IEC 17025		399.01
TestAmerica Savannah	Alabama	State Program	4	41450
TestAmerica Savannah	Arkansas	State Program	6	N/A
TestAmerica Savannah	Arkansas DEQ	State Program	6	88-0692
TestAmerica Savannah	California	NELAC	9	3217CA
TestAmerica Savannah	Colorado	State Program	8	N/A
TestAmerica Savannah	Connecticut	State Program	1	PH-0161
TestAmerica Savannah	Florida	NELAC	4	E87052
TestAmerica Savannah	GA Dept. of Agriculture	State Program	4	N/A
TestAmerica Savannah	Georgia	State Program	4	803
TestAmerica Savannah	Georgia	State Program	4	N/A
TestAmerica Savannah	Guam	State Program	9	09-005r
TestAmerica Savannah	Hawaii	State Program	9	N/A
TestAmerica Savannah	Illinois	NELAC	5	200022
TestAmerica Savannah	Indiana	State Program	5	N/A
TestAmerica Savannah	Iowa	State Program	7	353
TestAmerica Savannah	Kentucky	State Program	4	90084
TestAmerica Savannah	Kentucky (UST)	State Program	4	18
TestAmerica Savannah	Louisiana	NELAC	6	30690
TestAmerica Savannah	Louisiana	NELAC	6	LA100015
TestAmerica Savannah	Maine	State Program	1	GA00006
TestAmerica Savannah	Maryland	State Program	3	250
TestAmerica Savannah	Massachusetts	State Program	1	M-GA006
TestAmerica Savannah	Michigan	State Program	5	9925
TestAmerica Savannah	Mississippi	State Program	4	N/A
TestAmerica Savannah	Montana	State Program	8	CERT0081
TestAmerica Savannah	Nebraska	State Program	7	TestAmerica-Savannah
TestAmerica Savannah	New Jersey	NELAC	2	GA769
TestAmerica Savannah	New Mexico	State Program	6	N/A
TestAmerica Savannah	New York	NELAC	2	10842
TestAmerica Savannah	North Carolina DENR	State Program	4	269
TestAmerica Savannah	North Carolina DHHS	State Program	4	13701
TestAmerica Savannah	Oklahoma	State Program	6	9984
TestAmerica Savannah	Pennsylvania	NELAC	3	68-00474
TestAmerica Savannah	Puerto Rico	State Program	2	GA00006
TestAmerica Savannah	Rhode Island	State Program	1	LAO00244
TestAmerica Savannah	South Carolina	State Program	4	98001
TestAmerica Savannah	Tennessee	State Program	4	TN02961
TestAmerica Savannah	Texas	NELAC	6	T104704185-08-TX
TestAmerica Savannah	USDA	Federal		SAV 3-04
TestAmerica Savannah	Vermont	State Program	1	87052
TestAmerica Savannah	Virginia	NELAC	3	460161
TestAmerica Savannah	Washington	State Program	10	C1794
TestAmerica Savannah	West Virginia	State Program	3	9950C
TestAmerica Savannah	West Virginia DEP	State Program	3	94
TestAmerica Savannah	Wisconsin	State Program	5	999819810
TestAmerica Savannah	Wyoming	State Program	8	8TMS-Q

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Sample Summary

Client: Kennedy/Jenks Consultants
Project/Site: BNSF Wishram Monitoring

TestAmerica Job ID: 580-31780-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-31780-1	MW-5-120312	Water	03/12/12 13:25	03/14/12 10:10
580-31780-2	QCFD-1-120312	Water	03/12/12 12:00	03/14/12 10:10

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11720 North Creek Pkwy N Suite 400, Bothell, WA 98011-8244 425-420-9200 FAX 420-9210
11922 E. First Ave, Spokane, WA 99206-5302 509-924-9200 FAX 924-9290
9405 SW Nimbus Ave,Beaverton, OR 97008-7145 503-906-9200 FAX 906-9210
2000 W International Airport Rd Ste A10, Anchorage, AK 99502-1119 907-563-9200 FAX 563-9210

3/28/2012

CHAIN OF CUSTODY REPORT

Work Order #: 31780

CLIENT: BNSF

REPORT TO: Kim Slack
ADDRESS: 200 SW MARKET STE500
PORTLAND OR 97201
PHONE: 503-295-4911 FAX: 503-295-4901

INVOICE TO: BNSF

P.O. NUMBER:

PROJECT NAME: BNSF - WISHRAM

PROJECT NUMBER:

SAMPLED BY:

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: [X] 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: [X] 5 STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges.

PRESERVATIVE: HCl | HCl | HCl | H_2SO_4 | — | NaOH | HCl | HNO_3

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	NWTPH-GX	NWTPH-DX	BTEX - EPA 8260B	NO_3 NO_2 Ammonia 353.2/350.1/SO_4 300.0	Sulfate EPA 300.0	Sulfide 376.2	Methane GC/MS-mod RSK 175	Diss. Fe 200.8	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1 MW-5-120312	3/12/12 13:25	3	1	3	1	1	1	1	3	1	W	15	Methane: EPA 8015 OR RSK 175	
2 QCFD-1-120312	3/12/12 12:00	3	1	3	1	1	1	1	3	1	W	15		
3 Trip Blank #329	12/27/11													
4														
5														
6														
7														
8														
9														
10														

F.L. 3/14/12

RELEASED BY: Kimberly A Slack
PRINT NAME: KIMBERLY SLACK FIRM: Kennedy/Jenks DATE: 3/12/12 TIME: 1645

RECEIVED BY: Tom Blankinship FIRM: TA-Sea DATE: 3/14/12 TIME: 1010

RELEASED BY:
PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY:
PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

TEMP:

PAGE OF

TAL-1000(0408)

Lg Blue/wh wet/other

IR = 2.6/2.7 w/cs
FedEx

Login Sample Receipt Checklist

Client: Kennedy/Jenks Consultants

Job Number: 580-31780-1

Login Number: 31780

List Source: TestAmerica Seattle

List Number: 1

Creator: Blankinship, Tom

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Kennedy/Jenks Consultants

Job Number: 580-31780-1

Login Number: 31780
List Number: 1
Creator: Howard, Brandon L

List Source: TestAmerica Savannah
List Creation: 03/16/12 02:55 PM

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix C

Boring and Well Construction Logs

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: W of Maintenance Facility		**Well Name**	AS-12-1
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard	**Project Name**	BNSF Wishram
DRILLING METHOD(S): Direct-Push	DRILL BIT(S) SIZE: 3.5"	**Project Number**	1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 19.3 ft. bgs
BLANK CASING: 2" Schedule 40 PVC	FROM 0 TO 16.75 FT.	DATE STARTED: 1/12/12	DATE COMPLETED: 1/12/12
SLOTTED CASING: 2" 0.010 slot	FROM 16.75 TO 19.3 FT.	INITIAL WATER DEPTH (FT): N/A	STATIC WATER DEPTH (FT): 12.43
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 14.5 TO 19.3 FT.	LOGGED BY: J.Sawdey	
SEAL: Granular Bent. - Hydrated	FROM 1 TO 14.5 FT.	SAMPLING METHODS: Macro Core Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement	FROM 0 TO 1 FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3.5								Sand, silt, and gravel fill material
SS	5		5			0.1 / NO/NS		SP	**Poorly graded SAND** Brown, Tan, fine sand, some very fine sand, poorly graded, soft, dry - wet
SS	5		10			10.2 / SO/SS			Iridescent sheen on samples with petroleum-like odor Wet.
SS	4.3		15	AS-12-1		0.3 / NO/NS		SP	**Poorly graded SAND** gray, gray brown, fine and medium sand, poorly graded, soft, wet

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. Direct-Push with 2.25" diameter push rod for soil sample. Install AS-12-1 with 3.25" direct push rod after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: W of Maintenance Facility		**Well Name**	AS-12-2
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard	**Project Name**	BNSF Wishram
DRILLING METHOD(S): Direct-Push	DRILL BIT(S) SIZE: 3.5"	**Project Number**	1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 19.3 ft. bgs
BLANK CASING: 2" Schedule 40 PVC	FROM 0 TO 16.75 FT.	DATE STARTED: 1/13/12	DATE COMPLETED: 1/13/12
SLOTTED CASING: 2" 0.010 slot	FROM 16.75 TO 19.25 FT.	INITIAL WATER DEPTH (FT): N/A	STATIC WATER DEPTH (FT): 12.49
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 15.5 TO 19.25 FT.	LOGGED BY: J.Sawdey	
SEAL: Granular Bent. - Hydrated	FROM 2 TO 15.5 FT.	SAMPLING METHODS: Macro Core Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement	FROM 0 TO 2 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Sand, silt, and gravel fill material
SS	4					0.0 / NO/NS		SM	**Silty SAND with gravel** Brown, silty sand, with abundant large gravels, well graded, dry
SS	5		5						
SS	5		10			41.2 / SO/SS		SP	**Poorly graded SAND** Light brow, tan, very fine and fine sand, poorly graded, subrounded to rounded grains, red-brown staining in part, soft, damp Iridescent sheen with strong petroleum-like odor
SS	4.3		15	AS-12-2		0.3 / WO/WS		SP	**Poorly graded SAND** light gray, gray, fine sand, poorly graded, subrounded to rounded grains, very soft, wet

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. Direct-Push with 2.25" diameter push rod for soil sample. Install AS-12-2 with 3.25" direct push rod after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: W of Maintenance Facility	**Well Name:** AS-12-3
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard — **Project Name:** BNSF Wishram
DRILLING METHOD(S): Direct-Push	DRILL BIT(S) SIZE: 3.5" — **Project Number:** 1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2" Schedule 40 PVC	FROM 0 TO 17.0 FT.
SLOTTED CASING: 2" 0.010 slot	FROM 17.0 TO 19.5 FT.
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 15.0 TO 19.5 FT.
SEAL: Granular Bent. - Hydrated	FROM 2 TO 15 FT.
GROUT: Cement	FROM 0 TO 2 FT.

ELEVATION AND DATUM: bgs	TOTAL DEPTH: 19.5 ft. bgs
DATE STARTED: 1/16/12	DATE COMPLETED: 1/16/12
INITIAL WATER DEPTH (FT): N/A	STATIC WATER DEPTH (FT): 12.44
LOGGED BY: J.Sawdey	
SAMPLING METHODS: Macro Core Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Silty sand and gravels, road fill material
SS	2.5		5			0.5 / NO/NS		SP/ SM	**Poorly graded SAND with silt** Brown, dark brown, tan, fine sand, some very fine and some silt, poor to moderate grading, subrounded grains, soft, damp
SS	5		10			51.7 / SO/SS		SP/ SM	**Poorly graded SAND with silt** Gray, light gray, fine sand, some very fine sand and some silt, poor to moderate grading, subrounded grains, soft, damp-wet
SS	5								Iridescent sheen with strong petroleum-like odor
			15			71.1 / WO/SS			Wet
SS	4.5			AS-12-3		/ NO/NS		SP	**Poorly graded SAND** Mottled gray and brown, Coarse grained sand zone, subangular to subrounded, wet
						4.5 / NO/NS		SP	**Poorly graded SAND** Brown, dark brown, fine to medium sand, moderate to poorly graded, rounded grains, soft, wet

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. Direct-Push with 2.25" diameter push rod for soil sample. Install AS-12-3 with 3.25" direct push rod after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: W of Maintenance Facility		**Well Name**	SVE-12-1
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard	**Project Name**	BNSF Wishram
DRILLING METHOD(S): Hollow Stem Auger	DRILL BIT(S) SIZE: 10"	**Project Number**	1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 22.0 ft. bgs
BLANK CASING: 4" Schedule 40 PVC	FROM 0 TO 5.5 FT.	DATE STARTED: 1/16/12	DATE COMPLETED: 1/16/12
SLOTTED CASING: 4" 0.020 slot	FROM 5.5 TO 8.5 FT.	INITIAL WATER DEPTH (FT): N/A	STATIC WATER DEPTH (FT): 12.38
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 5 TO 8.5 FT.	LOGGED BY: J.Sawdey	
SEAL: 3/8" Bent. Chips - Hydrated	FROM 2 TO 5 FT.	SAMPLING METHODS: Macro Core Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement	FROM 0 TO 2 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3								Silty sand and coarse to fine gravel
SS	5		5			0.4 / NO/NS		SP/ SM	**Poorly graded SAND with silt** Light brown, tan, fine sand, some silt, poorly graded, subrounded grains, moderately soft, dry
SS	4		10			0.4 / NO/NS 99.4 / SO/SS		SP/ SM	**Poorly graded SAND with silt** Light gray, gray, fine sand, some silt, poorly graded, subrounded grains, very soft, wet Iridescent sheen, petroleum-like odor
SS	5		15			0.7 / NO/NS		SP/ SM	**Poorly graded SAND with silt** Brown, dark brown, fine and medium sand, some coarse, some silt, poor to moderate grading, rounded grains, soft, wet
SS	2		20			1.4 / NO/NS			@ 22' refusal, bedrock, basalt, weathered, Columbia River Basalt Group

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. Direct-Push with 2.25" diameter push rod for soil sample. Bore out SVE-12-1 with 10" hollow stem augers after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: NW of Maintenance Facility		**Well Name**	SVE-12-2
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard	**Project Name**	BNSF Wishram
DRILLING METHOD(S): Hollwo Stem Auger	DRILL BIT(S) SIZE: 10"	**Project Number**	1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 16.0 ft. bgs
BLANK CASING: 4" Schedule 40 PVC	FROM 0 TO 6.0 FT.	DATE STARTED: 1/15/12	DATE COMPLETED: 1/15/12
SLOTTED CASING: 4" 0.020 slot	FROM 6.0 TO 9 FT.	INITIAL WATER DEPTH (FT): N/A	STATIC WATER DEPTH (FT): 12.16
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 5 TO 9 FT.	LOGGED BY: J.Sawdey	
SEAL: 3/8" Bent. Chips - Hydrated	FROM 2 TO 5 FT.	SAMPLING METHODS: Macro Core Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement	FROM 0 TO 2 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	2								silty sand, gravel, fill material, dry
						0.0 / NO/NS			**Poorly graded SAND with silt**
			5					SP/ SM	Brown, light dark brown, fine sand with some very fine sand, some silt, poorly graded, subrounded to rounded grains, moderately soft, damp
SS	5					/ NO/NS			
			10						**Poorly graded SAND with silt**
SS	5					45.7 / SO/SS		SP/ SM	Gray, light gray, fine sand with some very fine sand, some silt, poorly graded, subrounded to rounded grains, soft, wet Iridescent sheen, petroleum-like odor
			15						**Poorly graded SAND**
SS	1					0.3 / NO/NS		SP	Brown, dark brown, medium sand with some coarse grains, moderately graded, moderately soft, wet @ 16' refusal, bedrock, basalt, dark gray, moderately weathered, Columbia River Basalt Group

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. Direct-Push with 2.25" diameter push rod for soil sample. Bore out SVE-12-2 with 10" hollow stem augers after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: N of Maintenance Facility		**Well Name**	SVE-12-3
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard	**Project Name**	BNSF Wishram
DRILLING METHOD(S): Hollow Stem Auger	DRILL BIT(S) SIZE: 10"	**Project Number**	1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 12.0 ft. bgs
BLANK CASING: 4" Schedule 40 PVC	FROM 0 TO 6.4 FT.	DATE STARTED: 1/13/12	DATE COMPLETED: 1/13/12
SLOTTED CASING: 4" 0.020 slot	FROM 6.4 TO 10.4 FT.	INITIAL WATER DEPTH (FT): N/A	
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 5.0 TO 10.4 FT.	LOGGED BY: J.Sawdey	
SEAL: 3/8" Bent. Chips - Hydrated	FROM 2 TO 5 FT.	SAMPLING METHODS: Macro Core Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement	FROM 0 TO 2 FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3					0.0 / NO/NS			Silty sand and gravel, well graded fill material, dry
			5						
SS	5					0.0 / NO/NS			Brown, dark red brown, fine sand, small amounts of very fine sand, rounded grains, moderately soft, damp - dry - wet
			10						@11' Saturated soil samples
SS	2								@12' geoprobe refusal, not interpreted as bedrock

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. No petroleum-like odor or sheen in this boring
6. Direct-Push with 2.25" diameter push rod for soil sample. Bore out SVE-12-3 with 10" hollow stem augers after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: N of Maintenance Facility		**Well Name**	SVE-12-4
DRILLING COMPANY: Major Drilling	DRILLER: Jerry Richard	**Project Name**	BNSF Wishram
DRILLING METHOD(S): Hollow Stem Auger	DRILL BIT(S) SIZE: 10"	**Project Number**	1196010.02
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 10.1 ft. bgs
BLANK CASING: 4" Schedule 40 PVC	FROM 0 TO 6.1 FT.	DATE STARTED: 1/13/12	DATE COMPLETED: 1/13/12
SLOTTED CASING: 4" 0.020 slot	FROM 6.1 TO 10.1 FT.	INITIAL WATER DEPTH (FT): N/A	
SIZE AND TYPE OF FILTER PACK: 10-20 Silica Sand	FROM 5.0 TO 10.1 FT.	LOGGED BY: J. Sawdey	
SEAL: 3/8" Bent. Chips - Hydrated	FROM 2 TO 5 FT.	SAMPLING METHODS: Logging Cuttings	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement	FROM 0 TO 2 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID PPM + O&S T	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	4								sandy silty gravel, large gravel cobbles (up to 6" diameter)
			5			0.1 / NO/NS			**Poorly graded SAND** Brown, dark brown, fine sand, with some very fine sand and silts, poorly graded, soft, dry
SS	5							SP	
SS	0.1		10			0.0 / NO/NS			

NOTES

1. O&S T = Odor and sheen test; PID = photoionization detector
2. NO,WO,MO,SO =No odor, Weak odor, Moderate odor, Strong odor
3. NS,WS, MS, SS = No sheen, Weak sheen, Moderate Sheen, Strong Sheen
4. bgs = below ground surface
5. No petroleum-like odor or sheen in this boring
6. Direct-Push with 2.25" diameter push rod for soil sample. Bore out SVE-12-4 with 10" hollow stem augers after appropriate depth determined from temp wells/soil samples

KJ PNW WK DRAFT AS_SVEWELLS2.GPJ KJ PNW.GDT 9/6/12

Appendix D

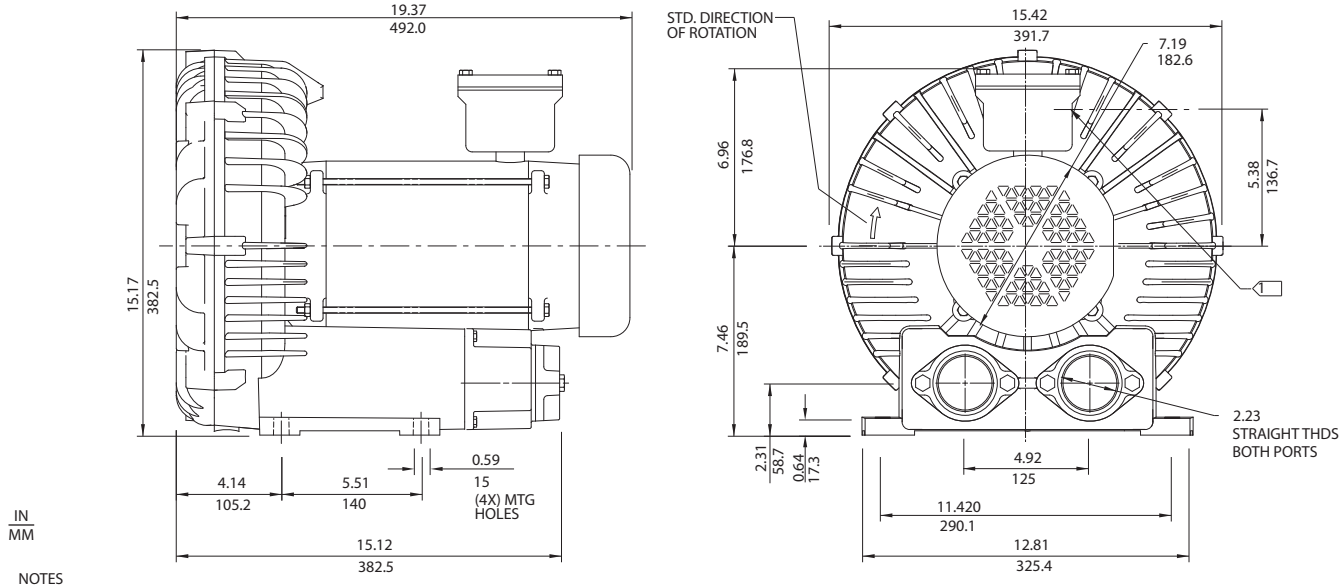
AS / SVE Unit Specifications

Environmental / Chemical Processing Blowers

ROTRON®

EN 656 & CP 656

3.0 HP Sealed Regenerative w/Explosion-Proof Motor



NOTES
1. TERMINAL BOX CONNECTOR HOLE 3/4" NPT.
2. DRAWING NOT TO SCALE, CONTACT FACTORY FOR SCALE CAD DRAWING.
3. CONTACT FACTORY FOR BLOWER MODEL LENGTHS NOT SHOWN.

		Part/ Model Number			
		EN656M5XL	EN656M72XL	EN656M86XL	CP656FU72XLR
Specification	Units	080060	080059	080058	080142
Motor Enclosure - Shaft Mtl.	-	Explosion-proof-CS	Explosion-proof-CS	Explosion-proof-CS	Chem XP-SS
Horsepower	-	3	3	3	3
Phase - Frequency	-	Single-60 hz	Three-60 hz	Three-60 hz	Three-60 hz
Voltage	AC	208-230	208-230/460	575	208-230/460
Motor Nameplate Amps	Amps (A)	15.5-14.5	7.4/3.7	3.0	7.4/3.7
Max. Blower Amps	Amps (A)	17	10/5	4.1	10/5
Inrush Amps	Amps (A)	95-86	54/27	21.6	54/27
Service Factor	-	1.0	1.0	1.0	1.0
Starter Size	-	1	0/0	0	0/0
Thermal Protection	-	Class B - Pilot Duty	Class B - Pilot Duty	Class B - Pilot Duty	Class B - Pilot Duty
XP Motor Class - Group	-	I-D, II-F&G	I-D, II-F&G	I-D, II-F&G	I-D, II-F&G
Shipping Weight	Lbs	142	117	117	117
	Kg	64.4	53.1	53.1	53.1

Voltage - ROTRON motors are designed to handle a broad range of world voltages and power supply variations. Our dual voltage 3 phase motors are factory tested and certified to operate on both: **208-230/415-460 VAC-3 ph-60 Hz** and **190-208/380-415 VAC-3 ph-50 Hz**. Our dual voltage 1 phase motors are factory tested and certified to operate on both: **104-115/208-230 VAC-1 ph-60 Hz** and **100-110/200-220 VAC-1 ph-50 Hz**. All voltages above can handle a ±10% voltage fluctuation. Special wound motors can be ordered for voltages outside our certified range.

Operating Temperatures - Maximum operating temperature: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F rated motors or 120°C for Class B rated motors. Blower outlet air temperature should not exceed 140°C (air temperature rise plus inlet temperature). Performance curve maximum pressure and suction points are based on a 40°C inlet and ambient temperature. Consult factory for inlet or ambient temperatures above 40°C.

Maximum Blower Amps - Corresponds to the performance point at which the motor or blower temperature rise with a 40°C inlet and/or ambient temperature reaches the maximum operating temperature.

XP Motor Class - Group - See Explosive Atmosphere Classification Chart in Section I

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AMETEK® TECHNICAL & INDUSTRIAL PRODUCTS

Environmental / Chemical Processing Blowers

EN 656 & CP 656

ROTRON®

3.0 HP Sealed Regenerative w/Explosion-Proof Motor

FEATURES

- Manufactured in the USA - ISO 9001 and NAFTA compliant
- Maximum flow: 212 SCFM
- Maximum pressure: 75 IWG
- Maximum vacuum: 73 IWG
- Standard motor: 3.0 HP, explosion-proof
- Cast aluminum blower housing, impeller , cover & manifold; cast iron flanges (threaded); teflon® lip seal
- UL & CSA approved motor with permanently sealed ball bearings for explosive gas atmospheres Class I Group D minimum
- Sealed blower assembly
- Quiet operation within OSHA standards

MOTOR OPTIONS

- International voltage & frequency (Hz)
- Chemical duty, high efficiency, inverter duty or industry-specific designs
- Various horsepowers for application-specific needs

BLOWER OPTIONS

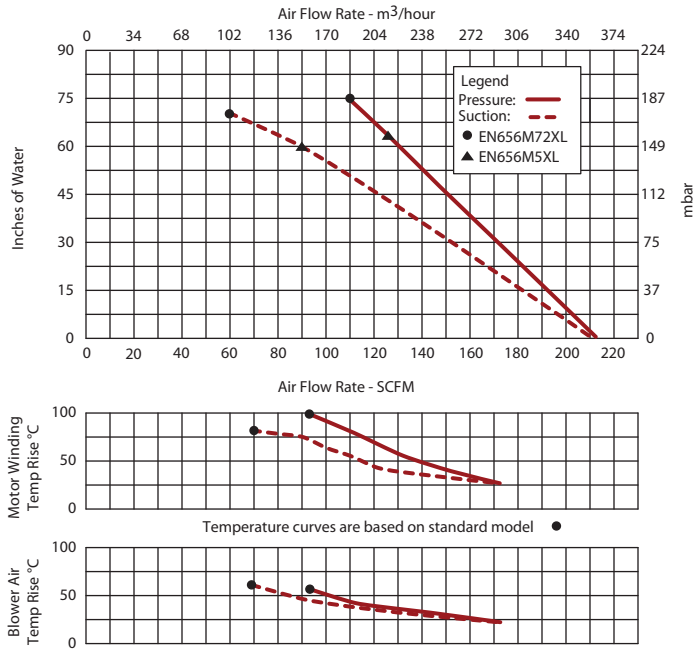
- Corrosion resistant surface treatments & sealing options
- Remote drive (motorless) models
- Slip-on or face flanges for application-specific needs

ACCESSORIES

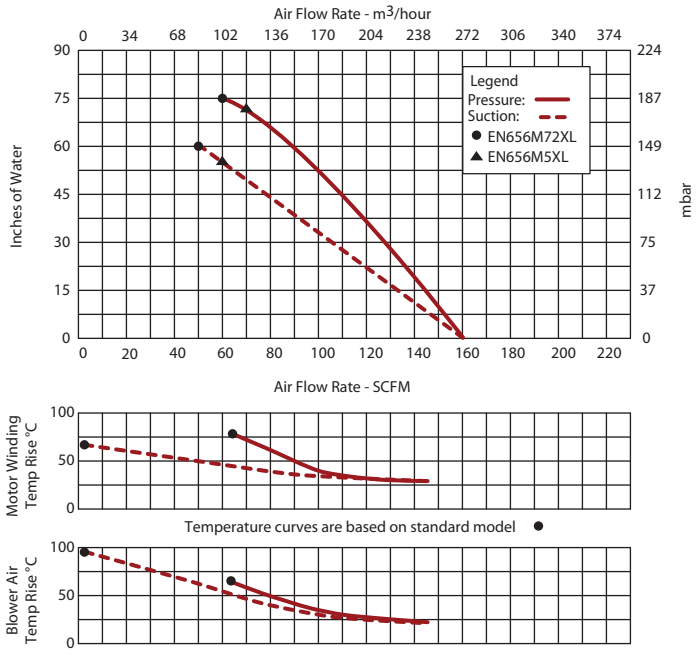
- Flowmeters reading in SCFM
- Filters & moisture separators
- Pressure gauges, vacuum gauges, & relief valves
- Switches - air flow, pressure, vacuum, or temperature
- External mufflers for additional silencing
- Air knives (used on blow-off applications)
- Variable frequency drive package

Blower Performance at Standard Conditions

60 Hz



50 Hz



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Appendix E

Photographs

Photograph 1: Fenced-in AS/SVE System, Wishram, Washington

Photograph 2: Air Sparge unit, Wishram, Washington

Photograph 3: Main components of SVE unit, Wishram, Washington