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January 20, 2015

Mr. Thomas Middleton
Washington Department of Ecology
SWRO Toxics Cleanup Program
PO Box 47775
Olympia, Washington 98504

**Re: Submittal of Annual 2014 Groundwater Monitoring
and Supplemental Subsurface Investigation Report**
BNSF - Former Cummings Oil Lease Site
908 Northwest Kerron Avenue, Winlock, Washington
Facility/Site No.: 3151688
Cleanup Site ID No.: 2247
VCP Project No.: SW0775

Dear Mr. Middleton:

On behalf of BNSF and Farallon Consulting, LLC (Farallon), TRC is submitting the *Annual 2014 Groundwater Monitoring and Supplemental Subsurface Investigation Report*, dated January 19, 2015 for the Former Cummings Oil Lease Site located in Winlock, Washington.

This report includes a summary of field activities and results from the August 2014 supplemental subsurface investigation, the scope of which was outlined in the June 27, 2014 work plan.

If you have any questions regarding this submittal, please contact me at (925) 688-2488.

Sincerely,

Keith Woodburne, L.G.
Senior Project Manager

cc: Scott MacDonald, BNSF
Stacy Patterson, Farallon

Attachment: *Annual 2014 Groundwater Monitoring and Supplemental Subsurface Investigation Report*

2014 ANNUAL GROUNDWATER MONITORING AND SUPPLEMENTAL SUBSURFACE INVESTIGATION REPORT

**FORMER CUMMINGS OIL LEASE SITE
908 NORTHWEST KERRON AVENUE
WINLOCK, WASHINGTON**

**Submitted by:
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Farallon PN: 283-005**

**For:
TRC Environmental Corporation
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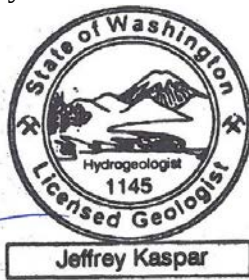
January 19, 2015

Prepared by:



Stacy Patterson
Senior Environmental Scientist

Reviewed by:



Jeffrey Kaspar, L.G., L.H.G.
Principal Geologist



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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BNSF	BNSF Railway Company
BTEX	benzene, toluene, ethylbenzene, and xylenes
COCs	constituents of concern
DRO	total petroleum hydrocarbons as diesel-range organics
EDB	ethylene dibromide
EDC	1,2-dichloroethane
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
Farallon	Farallon Consulting, L.L.C.
GRO	total petroleum hydrocarbons as gasoline-range organics
µg/l	micrograms per liter
MTBE	methyl tertiary-butyl ether
MTCA	Washington State Model Toxics Control Act Cleanup Regulation
ORO	total petroleum hydrocarbons as oil-range organics
PID	photoionization detector
PQL	practical quantitation limit
Site	Former Cummings Oil Lease Site at 908 Northwest Kerron Avenue in Winlock, Lewis County, Washington
VCP	Voluntary Cleanup Program
Work Plan	<i>Cleanup Action Work Plan, Former Cummings Oil Lease Site, 908 Northwest Kerron Avenue, Winlock, Washington</i> dated December 18, 2008, prepared by Farallon Consulting, L.L.C.



1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this annual groundwater monitoring and supplemental subsurface investigation report for the BNSF Railway Company (BNSF) property known as the Former Cumming Oil Lease Site at 908 Northwest Kerron Avenue, in Winlock, Washington (herein referred to as the Site) (Figure 1) to summarize the results of the annual groundwater monitoring and supplemental subsurface investigation conducted from August 7 through August 14, 2014. The objective of the annual groundwater monitoring and supplemental subsurface investigation was to continue to document natural attenuation processes and further define the extent of constituents of concern (COCs) detected in groundwater at the Site at concentrations exceeding applicable Washington State Department of Ecology (Ecology) Model Toxics Control Act Cleanup Regulation (MTCA) Chapter 173-140 cleanup levels.



2.0 BACKGROUND

The Site is located at 908 Northwest Kerron Avenue in Winlock, Lewis County, Washington and is currently unoccupied. The Site has been used as a bulk fuel storage plant from approximately 1925 through 1976. Shell Oil Company leased the Site from BNSF for use as a bulk fuel storage facility in 1925 when the Site was first developed. Cummings Oil Company operated the bulk fuel storage facility from 1970 until approximately 1976.

Prior site investigations and a tank removal and soil excavation cleanup action have confirmed that concentrations of total petroleum hydrocarbons as gasoline-range organics (GRO), as diesel-range organics (DRO), and as oil-range organics (ORO); and benzene, toluene, ethylbenzene, and xylenes (BTEX) were released to the subsurface as a result of historical activities at the Site. The tank removal and cleanup action included removal of two underground storage tanks and four aboveground storage tanks, excavation and off-Site disposal of soil with petroleum hydrocarbon constituents at concentrations exceeding MTCA cleanup levels, and installation of monitoring wells to delineate the nature and extent of petroleum hydrocarbon constituents in groundwater and to assess the progress of groundwater cleanup by natural attenuation processes. The results of the tank removal and cleanup action are summarized in the *Tank Closure Report, Former Cummings Oil Lease Site, 908 Northwest Kerron Avenue, Winlock, Washington* dated March 11, 2010, prepared by Farallon.

The groundwater monitoring and sampling was performed to:

- Monitor petroleum hydrocarbon constituents previously detected in groundwater at concentrations exceeding MTCA Method A cleanup levels;
- Assess the effectiveness of the cleanup action; and
- Determine whether natural attenuation of residual petroleum hydrocarbon constituents is occurring.

An assessment of the potential for natural attenuation via biodegradation processes to reduce concentrations of residual petroleum hydrocarbon constituents in groundwater was conducted by Farallon during the December 27, 2010 groundwater monitoring and sampling event using geochemical indicators and the criteria set forth in the Ecology Guidance on Remediation of Petroleum Contaminated Groundwater by Natural Attenuation dated 2005. The assessment concluded that natural attenuation was occurring.

Groundwater monitoring conducted after 2010 continued to confirm that natural attenuation was occurring in Site groundwater, although some petroleum hydrocarbon compounds were not attenuating as rapidly as predicted in the assessment. DRO and/or ORO were still detected in monitoring wells MW-2 and MW-3 and benzene in monitoring well MW-2 at concentrations exceeding MTCA Method A cleanup levels in groundwater samples collected on August 1, 2013. The 2013 groundwater samples were collected in the area west of the former underground storage tank excavation on the western portion of the Site, and at the aboveground storage tank



excavation area on the central portion of the Site. The models used in the assessment predicted that concentrations of DRO would attenuate to below Method A cleanup levels by 2013 and that concentrations of ORO would attenuate to below Method A cleanup levels by 2011. The timeframe in which concentrations of benzene would attenuate below Method A cleanup levels could not be determined by the models, but one of the models confirmed that the concentration of benzene was decreasing.

In August 2013, Ecology issued an Opinion Letter (herein referred to as the Opinion Letter) stating that further remedial action would be necessary to clean up contamination at the Site. Ecology determined the previous Site characterization was inadequate to support selection of monitored natural attenuation as the cleanup alternative for residual petroleum hydrocarbons or meet the full requirements of a cleanup action under MTCA.

In response to the Opinion Letter, Farallon performed a supplemental subsurface investigation in August 2014 in addition to annual groundwater monitoring. The purpose of the subsurface investigation was to assess the western extent of the plume and the potential for the sanitary sewer conveyance line or the stormwater conveyance line backfill materials to act as preferential pathways for transport of COCs via groundwater flow diversion. These utilities are located down-gradient from monitoring wells MW-2 and MW-3 (Figure 2). The supplemental subsurface investigation is described in the following sections.



3.0 SUPPLEMENTAL SUBSURFACE INVESTIGATION

Farallon performed the field work for the supplemental subsurface investigation on August 7, 2014 in accordance with the *Supplemental Subsurface Investigation Work Plan* dated June 26, 2014, prepared by Farallon. The scope of work for the supplemental subsurface investigation included the following:

- Evaluating the construction of both the stormwater conveyance line along the western edge of the Site and the sanitary sewer line west of the Site in Northwest Kerron Avenue to assess the potential for preferential transport of COCs via groundwater entering the utility corridor backfill;
- Drilling two soil borings and installing two monitoring wells to assess the extent of COCs in groundwater; and
- Analyzing groundwater samples from all monitoring wells for constituents listed in Table 830-1 of WAC 173-140, Required Testing for Petroleum Releases.

The following sections present the details of each component of the supplemental subsurface investigation. Results of the investigation are presented in Section 4.0.

3.1 STORMWATER AND SANITARY SEWER CONVEYANCE LINES

Farallon contacted Winlock Public Works for information regarding the elevations of the stormwater conveyance line along the western edge of the Site and the sanitary sewer line west of the Site in Northwest Kerron Avenue. Farallon also was present at the Site to observe the inspection of the lines with Winlock Public Works. The information obtained regarding the depths of piping and the utility corridors was used to evaluate the potential for groundwater to enter the utility corridors and preferentially transport COCs in a direction other than the natural flow of groundwater.

3.2 MONITORING WELL INSTALLATION

Prior to conducting field work, Farallon acquired a Public Works Permit for installation of two boring/monitoring wells within the right-of-way of Northwest Kerron Avenue (Appendix A), notified the One-Call Utility Notification Center, and conducted a private utility locate. When boring/monitoring well locations had been cleared, Farallon proceeded with field work, including drilling the borings and evaluating subsurface conditions. Monitoring wells were installed at depths of 9 to 10 feet below ground surface (bgs) following completion of the borings. Details of the monitoring well installation follow.

3.2.1 Monitoring Well Borings

Farallon subcontracted ESN Northwest of Olympia, Washington to mobilize a combination direct-push/auger truck-mounted drilling rig to provide drilling services. The combination drilling rig was used to hydraulically advance direct-push borings MW-6 and MW-7 to depths of



9 to 10 feet bgs. The borings were advanced at locations west of existing monitoring wells MW-2 and MW-3 (Figure 2).

Soil sampling was continuous to a maximum depth of 10 feet bgs using a 5-foot macrocore sampler driven by a percussion auto-hammer. The soil cores were logged by a Farallon Geologist in accordance with ASTM Designation D 2488-06, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) and the Unified Soil Classification System. Field-screening included noting indications of visual and olfactory evidence of contamination and conducting headspace analysis for the presence of volatile organic vapors using a photoionization detector (PID). Headspace analysis was conducted by placing a portion of soil from each sample interval into a resealable plastic bag and allowing the sample to warm for several minutes. The probe of the PID was then inserted into the bag, and the highest PID reading obtained over an approximately 30-second interval was recorded. The Unified Soil Classification System classification, visual and olfactory notations regarding the samples, and PID readings were recorded on boring log forms (Appendix A).

The general stratigraphy encountered at the boring for MW-6 was silt and silty sand to a depth of 3.8 feet bgs. No soil was recovered from 3.8 feet bgs to the maximum boring depth of 10 feet bgs. The general stratigraphy encountered at the boring for MW-7 was silt and silty sand to a depth of 3.8 feet bgs. Soil at both borings included some gravel and cobbles from 4 to 10 feet bgs. Groundwater was encountered between 6 and 7 feet bgs.

Soil sample MW6-3.5-080714 was collected from the boring for MW-6 at a depth of 3.5 feet bgs based on field screening observations that included a blue/gray discoloration and a slight hydrocarbon odor. The soil sample was placed into laboratory-prepared glass sample containers fitted with Teflon lid, placed on ice in a cooler, and transported under chain-of-custody protocols to TestAmerica, Inc. in Tacoma, Washington (TestAmerica) for laboratory analysis for GRO, DRO, ORO, and BTEX. The samples for analysis for GRO and BTEX were collected using U.S. Environmental Protection Agency (EPA) Method 5035 protocols.

Two drums of investigation-derived waste soil and one partial drum of decontamination water and well development wastewater generated during the monitoring well installation were temporarily stored on the Site in labeled 55-gallon steel drums. One composite sample from each soil drum (Samples Drum1-080714 and Drum2-080714) and one wastewater sample (Drum3-Water) were collected from each drum. The analytical results of investigation-derived waste samples will be used to develop a waste profile for disposal of the investigation-derived waste at an approved transport, storage, and disposal facility.

3.2.2 Monitoring Well Installation

Monitoring wells MW-6 and MW-7 were installed after completing each boring using hollow-stem auger drilling methods to increase the borehole diameter. The drilling contractor installed the two monitoring wells in accordance with Chapter 173-160 of the Washington Administrative Code, Minimum Standards for Construction and Maintenance of Wells. Monitoring well design and construction was determined under the direction of a Farallon licensed



geologist/hydrogeologist and considerations were made for ASTM Designation D5092-04, Standard Practice for Design and Installation of Groundwater Monitoring Wells. The monitoring well construction details are presented on the boring logs in Appendix A.

Each monitoring well was developed following installation using a surge block and pump until the turbidity of the extracted groundwater was minimized. Approximately 10 gallons of groundwater was extracted from monitoring well MW-6, which was noted to have a petroleum hydrocarbon odor but no sheen. Approximately 10 gallons of groundwater was extracted from monitoring well MW-7, which had no indications of petroleum hydrocarbon odor or sheen.

3.2.3 Survey

Farallon contracted Bluham & Associates Land Surveyors, Inc. (Bluham & Associates) to survey all monitoring wells on August 14, 2014. The Washington State Plan Coordinate System for the South Zone North American Datum (NAD) 83, and North American Vertical Datum (NAVD) 88 elevations were used by Bluham & Associates. The survey performed provided a northing, easting, and elevation of the ground surface at the northern rim of each monitoring well monument and the northern edge on each well casing. The updated well casing elevation data are presented in Table 1.

3.3 GROUNDWATER MONITORING ACTIVITIES

The monitoring and sampling activities conducted at the Site by Farallon on August 14, 2014 included the following elements:

- Measuring the depth to groundwater in monitoring wells MW-1 through MW-7;
- Purging and sampling monitoring wells MW-1 through MW-7 using EPA low-flow sampling methods;
- Measuring water quality parameters during monitoring well purging to assess groundwater stabilization; and
- Submitting the groundwater samples to TestAmerica for laboratory analysis.

Farallon opened monitoring wells MW-1 through MW-7 to allow the water levels to equilibrate with atmospheric pressure for a minimum of 15 minutes prior to obtaining groundwater level measurements. Groundwater levels in the monitoring wells were measured to an accuracy of 0.01 foot using an electronic water-level meter.

Purging and sampling of monitoring wells MW-1 through MW-7 was conducted using a peristaltic pump and polyethylene tubing. The purging was conducted at flow rates between 100 and 300 milliliters per minute, with the intake tubing placed a maximum of 3 feet below the measured water level in each monitoring well. During purging, water quality was monitored using a Horiba U-50 water quality meter equipped with a flow-through cell. Water quality parameters monitored and recorded during purging and sampling included temperature, pH, specific conductance, dissolved oxygen, turbidity, and oxidation-reduction potential. The



monitoring wells were purged until the water quality parameters stabilized in accordance with EPA guidelines for low-flow sampling.

The groundwater samples were transferred directly from the tubing into laboratory-prepared containers. The containers from each sampling event were placed on ice in a cooler and transported under standard chain-of-custody protocols to TestAmerica. The groundwater samples were analyzed for DRO and ORO by Northwest Method NWTPH-Dx; GRO by Northwest Method NWTPH-Gx; 1,2-dibromoethane by EPA Method 8011; 1-methyl-naphthalene and 2-methyl-naphthalene by EPA Method 8270C; and BTEX, naphthalene, methyl-tert butyl ether, and 1,2-dichloroethane by EPA Method 8260B.

Purge water, decontamination water, and other wastewater generated during the monitoring well installation and groundwater monitoring and sampling event were temporarily stored on the Site in a labeled 55-gallon steel drum. The analytical results of groundwater samples will be used to develop a waste profile for disposal of the investigation-derived waste at an approved transport, storage, and disposal facility.



4.0 RESULTS

This section includes the results of the supplemental subsurface investigation conducted on August 7, 2014 and the groundwater monitoring and sampling conducted on August 14, 2014.

4.1 EVALUATION OF STORMWATER CONVEYANCE AND SANITARY SEWER LINES

According to Winlock Public Works, there are no utility maps available that depict the configuration of the stormwater or sanitary sewer piping in the area proximate to the Site. The construction of these utilities were evaluated by opening catch basins and the sanitary sewer manhole in Northwest Kerron Avenue and inspecting the visible elements of the systems, including piping ingresses/egresses and depths of the catch basins/manhole. Figures 2 and 3 include the revised locations and flow directions of the stormwater and sanitary sewer components.

The stormwater conveyance lines run north to south on the western edge of the Site and consist of 12-inch-diameter concrete pipes located approximately 2 feet bgs and two catch basins. The direction of stormwater flow within the 12-inch-diameter stormwater conveyance line is to the south. The northernmost catch basin receives water from the open ditch on the north portion of the Site and from a 12-inch-diameter conveyance line entering the catch basin from the north. A 12-inch-diameter conveyance line exits the northern catch basins to the south and enters the base of west-central catch basin. A 12-inch diameter conveyance line exits the west-central catch basin to the south and continues toward the south. The west-central catch basin also receives stormwater from the catch basin on the west side of the Northwest Kerron Avenue via a 12-inch-diameter concrete pipe. The conveyance lines and catch basin bottoms are potentially in contact with groundwater during seasonally high groundwater conditions. Subsurface piping was not surveyed for cracks or breaks.

The sanitary sewer line was originally depicted in previous reports as exiting the bathroom in the former Site building and extending west-southwest to the sanitary sewer in Northwest Kerron Avenue. The results of the field inspection at the manhole location in Northwest Kerron Avenue noted no evidence of ingress at the east end of the manhole where the sanitary sewer line was expected to enter the manhole. An estimated 6-inch-diameter polyvinyl chloride ingress pipe was observed entering the north side of the manhole, with a top-of-pipe depth of approximately 3 feet bgs. The origin of this ingress is unknown but may be associated with either the Site or property on the west side of Northwest Kerron Avenue. Due to the uncertainty regarding the connection of the Site former sanitary sewer to the manhole, Figures 2 and 3 no longer depict a connection to the manhole.

The sanitary sewer manhole is of brick construction and appears to have a concrete ingress on the north side and egress on the south side at an approximate depth of 7 feet bgs, coinciding with the bottom of the manhole. The bottom of the manhole appeared to be concrete. The flow direction is to the south and some wastewater was observed flowing south at the bottom of the



basin at the time of the inspection. The absence of standing water in the manhole at depths equivalent to the average depth to water of 4 to 5 feet bgs or water entering through the brick sides of the manhole indicate that groundwater is not entering the manhole. Subsurface piping was not surveyed for cracks or breaks.

4.2 MONITORING WELL INSTALLATION

The two borings were completed as groundwater monitoring wells MW-6 and MW-7. Static water levels in both wells were observed to rise above the depth of encountered groundwater during drilling, which is consistent with the other monitoring wells at the Site, which suggests a likely upward vertical gradient. Prior investigations indicated that soil conditions at 10 feet become moist, suggesting a possible semi-confining condition in the area. The Site is topographically relatively flat and is located near the base of a hillside to the east. Groundwater flow is southwest, consistent with what would be expected from the local topography.

Soil sample 3.5-080714 was collected from boring MW-6 at a depth of 3.5 feet bgs based on field screening observations of a blue/gray discoloration characteristic of petroleum hydrocarbon staining with a slight petroleum hydrocarbon odor, and analyzed for the presence of GRO, DRO, ORO, and BTEX. GRO, DRO, ORO, and BTEX were not detected at concentrations exceeding laboratory reporting limits. The laboratory data for this sample are presented in Attachment B.

4.3 GROUNDWATER MONITORING AND SAMPLING RESULTS

Groundwater level measurements and calculated elevations are summarized in Table 1. Figure 2 provides a groundwater elevation contour map illustrating the estimated groundwater flow direction and gradient for the groundwater monitoring and sampling event conducted on August 14, 2014. The groundwater analytical results are presented in Table 2 and on Figure 2. Laboratory analytical reports are presented in Attachment B.

Groundwater level measurements for the August 14, 2014 groundwater monitoring and sampling event indicate a groundwater flow direction of west-southwest and an average hydraulic gradient at the Site of approximately 0.036 foot per foot. The groundwater flow direction and gradient are generally consistent with previous monitoring events.

The laboratory analytical results for the August 14, 2014 groundwater monitoring and sampling event are summarized as follows:

- DRO was detected at a concentration of 520 micrograms per liter ($\mu\text{g/l}$), exceeding the MTCA Method A cleanup level of 500 $\mu\text{g/l}$, in the groundwater sample collected from monitoring well MW-6. DRO was not detected at concentrations exceeding the MTCA Method A cleanup level in the groundwater samples collected from the remaining monitoring wells.



- ORO was not detected at concentrations exceeding the MTCA Method A cleanup level of 500 µg/l in the groundwater samples collected from monitoring wells MW-1 through MW-7.
- GRO was not detected at concentrations exceeding the MTCA Method A cleanup level of 800 µg/l in the groundwater samples collected from monitoring wells MW-1 through MW-7.
- Benzene was the only BTEX constituent detected at a concentration exceeding the MTCA Method A cleanup level. The groundwater sample collected from monitoring well MW-2 contained benzene at a concentration of 7.8 µg/l, exceeding the MTCA Method A cleanup level of 5.0 µg/l. Benzene was not detected at concentrations exceeding the laboratory reporting limits at the remaining monitoring wells.
- The gasoline additives methyl tert-butyl ether (MTBE), 1,2-dichloroethane (EDC), and 1,2-dibromoethane (EDB) were detected at concentrations less than their respective laboratory reporting limits at all monitoring well locations, which were all less than the MTCA Method A cleanup levels for these potential COCs.
- Naphthalene was not detected at concentrations exceeding either the laboratory reporting limits or the MTCA Method A cleanup level at all monitoring wells.
- 1-methyl-naphthalene was detected at a concentration of 1.8 µg/l in monitoring well MW-2, which exceeds the MTCA Method B cleanup level of 1.51 µg/l; and at a concentration less than the MTCA Method B cleanup level in monitoring well MW-6.
- 2-methyl-naphthalene was not detected at concentrations exceeding the MTCA Method B cleanup level at any of the monitoring wells.

4.4 INVESTIGATION-DERIVED WASTE RESULTS

The soil and groundwater analytical data in Attachment B will be used to profile the investigation-derived waste materials for disposal. The two 55-gallon drums of soil are nonhazardous waste soil. Soil Drum 1 contained soil with DRO and ORO at low concentrations less than MTCA Method A cleanup levels. Soil Drum 2 contained soil with GRO, DRO, and ORO at concentrations less than the laboratory reporting limits. Wastewater Drum 3 contained low concentrations of GRO and DRO following testing of the wastewater generated during drilling and monitoring well development. However, wastewater from the groundwater sampling event of all monitoring wells was combined in the wastewater drum. Therefore, analytical results presented in Table 2 for the monitoring wells will also be used to profile Drum 3 for disposal.



5.0 CONCLUSIONS

Evaluation of the location of the stormwater conveyance line along the western edge of the Site and the sanitary sewer line west of the Site in Northwest Kerron Avenue indicates the stormwater and sanitary sewer system backfill materials may be in contact with groundwater during seasonal high groundwater conditions. The nature and depth of backfill materials in these utility corridors could not be confirmed through the City of Winlock, which had no as-built plans for the area of the Site. However, the subsurface geology consists of more transmissive gravelly materials at depths of approximately 4 to 10 feet bgs, which is likely as conducive to groundwater transport as typical structural fill material used for utility corridors. Farallon believes that although the potential exists for preferential transport of groundwater through the utility corridor backfill, it is not a process that would result in significant diversion of groundwater due to the local geology. No further investigation of the stormwater or sanitary sewer systems is planned.

The groundwater flow direction for the August 14, 2014 groundwater monitoring event was southwest at an average estimated hydraulic gradient of approximately 0.036 foot per foot, which was consistent with previous sampling events.

DRO was detected at a concentration exceeding the MTCA Method A cleanup level in the groundwater sample collected from monitoring well MW-6 in the area west of the former underground storage tank excavation (Figure 2). The results are generally consistent with recent historical groundwater data from monitoring wells MW-1 and MW-2 located up-gradient of newly installed monitoring well MW-6. The addition of monitoring well MW-6 indicates that groundwater contamination may exist beneath Northwest Kerron Avenue but likely is limited in extent and is biodegrading, as supported by previous evaluation of the potential for natural attenuation following completion of the source removal action.

In addition, the similar concentrations of GRO, DRO, and ORO in monitoring wells MW-2 and MW-6 indicate that the stormwater conveyance line between the two wells is not preferentially directing groundwater to the south away from MW-6 along the stormwater conveyance corridor. The groundwater analytical results for MW-1, MW-2, and MW-3 continue to indicate biodegradation is occurring, and down-gradient monitoring well MW-5 continues to indicate that COCs are likely not being transported west of Northwest Kerron Avenue.

The analytical results for groundwater at monitoring well MW-3 and newly installed down-gradient monitoring well MW-7 were all less than MTCA Method A cleanup levels (Figure 2; Table 2). However, concentrations of DRO and ORO were compared to evaluate fate and transport characteristics of the COCs detected. Ongoing attenuation of DRO and ORO at monitoring well MW-3 appears related to ongoing biodegradation. Concentrations of DRO and ORO are lower at monitoring well MW-7 than at up-gradient monitoring well MW-3. This pattern indicates natural attenuation is occurring along the groundwater flowpath. COC concentrations at the newly installed monitoring well MW-7 show that the stormwater



conveyance line directly up-gradient of the well, between monitoring wells MW-3 and MW-7, is not preferentially directing groundwater to the south along the utility corridor. Elevated concentrations of COCs, including benzene, would be expected in groundwater samples from monitoring well MW-7 rather than the lower concentrations if the utility corridor was acting as a preferential pathway. Ongoing groundwater monitoring and sampling data will be used to confirm the stormwater utility corridor is not a preferential pathway for transport of COCs.

Benzene was detected at a concentration exceeding the MTCA Method A cleanup level at monitoring well MW-2 only, which is consistent with historical groundwater data. Benzene was not detected at a concentration exceeding the laboratory reporting limits at newly installed monitoring wells MW-6 or MW-7 or down-gradient monitoring well MW-5 on the west side of Northwest Kerron Avenue (Figure 2). These data continue to support that natural attenuation via biodegradation likely is occurring and that the stormwater utility corridor is not likely preferentially transporting COCs.

GRO, DRO, ORO, and BTEX constituents were not detected at concentrations exceeding the MTCA Method A cleanup levels at monitoring wells MW-1, MW-3, MW-4, MW-5, and MW-7. Because monitoring well MW-4 is up-gradient of the former source areas of the Site and historically has had no detections of the COCs, sampling of this monitoring well for COCs will be discontinued. Sampling for natural attenuation parameters to support continued evaluation of ongoing biodegradation will be performed as necessary because this monitoring well location provides data on local groundwater geochemistry unaffected by COCs.

In the Opinion Letter, Ecology requested analysis of the additional potential COCs in Table 830-1 of MTCA that had not been previously evaluated, including MTBE, EDB, EDC, naphthalene, 1-methyl-naphthalene, and 2-methyl-naphthalene. MTBE, EDB, EDC, and naphthalene were not detected at any monitoring well location. 1-methyl-naphthalene was detected at a concentration of 1.8 µg/l at monitoring well MW-2, which exceeds the MTCA Method B cleanup level for 1-methyl-naphthalene of 1.51 µg/l. However, in accordance with Table 830-1, naphthalene, 1-methyl-naphthalene, and 2-methyl-naphthalene are not required for analysis at sites where MTCA Method A cleanup levels are being used because they are factored into Method A cleanup levels for total petroleum hydrocarbon fractions. Ecology will be consulted regarding the detection of naphthalene in groundwater at the Site to confirm that naphthalene and the other gasoline additives noted above may be removed as COCs for the Site because MTCA Method A cleanup levels have been the cleanup levels considered applicable to this cleanup action.



6.0 PLANNED WORK

Continued annual groundwater monitoring for DRO, ORO, and BTEX will be conducted in August 2015 to assess the progress of natural attenuation of these constituents and to estimate a restoration time frame for all monitoring well locations at the Site. The sampling locations will include monitoring wells MW-1 through MW-3, and MW-5 through MW-7 for COCs. Farallon will discontinue analysis of monitoring well MW-4 for COCs.

At this time Farallon proposes to discontinue analysis for MTBE, EDB, EDC, naphthalene, 1-methyl-naphthalene, and 2-methyl-naphthalene in accordance with the conclusions above. Further, GRO has not been detected at concentrations exceeding the laboratory reporting limit at any monitoring well location except monitoring well MW-2. The absence of MTBE, EDB, and EDC at monitoring well MW-2 or down-gradient monitoring wells MW-6 and MW-5 support elimination of these COCs from further sampling. As previously stated, naphthalenes should not have been included in Ecology's request for testing because Method A cleanup levels are applicable to the Site cleanup action in accordance with Table 830-1 of MTCA as noted above. Discontinuation of analysis of naphthalenes is appropriate for groundwater.

Investigation-derived waste will be removed from the Site.



7.0 LIMITATIONS

The conclusions and recommendations contained in this report/assessment are based on professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location and are subject to the following inherent limitations:

- **Accuracy of Information.** Certain information utilized by Farallon in this report/assessment has been obtained, reviewed, and evaluated from various sources believed to be reliable, including the local health districts, fire departments, and the previously discussed interviews. Although Farallon's conclusions, opinions, and recommendations are based in part on such information, Farallon's services did not include the verification of its accuracy or authenticity. Should such information prove to be inaccurate or unreliable, Farallon reserves the right to amend or revise its conclusions, opinions, and/or recommendations.
- **Reconnaissance.** Farallon performed a reconnaissance of the site that is the subject of this report/assessment to document current conditions. Farallon focused on areas deemed more likely to exhibit hazardous materials conditions, while other areas received limited attention or were inaccessible at the time of our reconnaissance.

FIGURES

2014 ANNUAL GROUNDWATER MONITORING AND SUPPLEMENTAL SUBSURFACE INVESTIGATION REPORT

**Former Cummings Oil Lease Site
908 Northwest Kerron Avenue
Winlock, Washington**

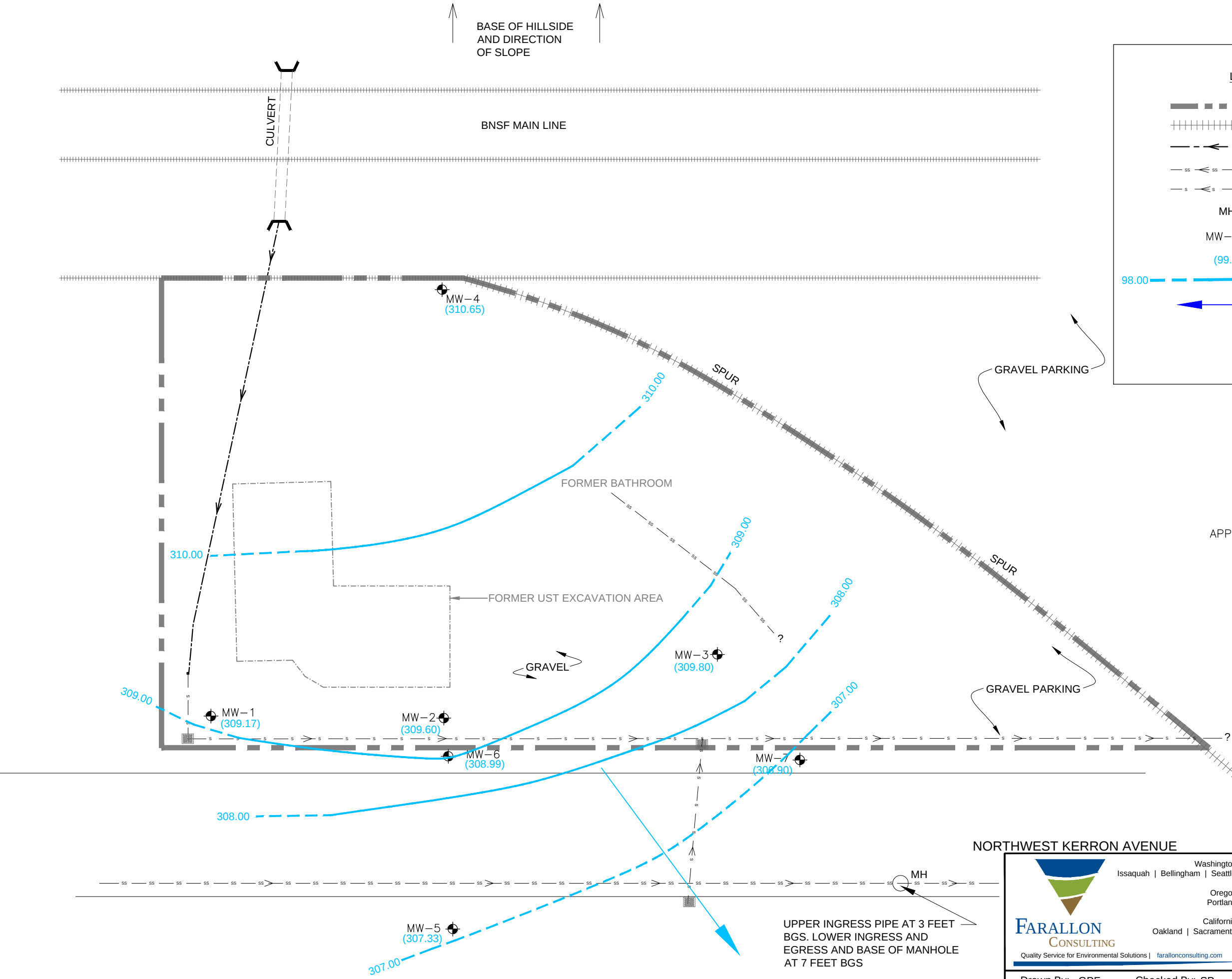
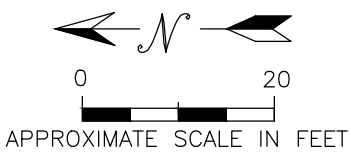
Farallon PN: 283-005

Date: 11/19/2014 Disk Reference: 283005

BASE OF HILLSIDE
AND DIRECTION
OF SLOPE

LEGEND

- PROPERTY BOUNDARY
- RAILROAD TRACKS
- DRAINAGE DITCH AND DIRECTION OF FLOW
- SANITARY SEWER LINE AND DIRECTION OF FLOW
- STORM SEWER AND DIRECTION OF FLOW
- MH ○ MANHOLE
- MW-3 ● MONITORING WELL (FARALLON 2006)
- (99.14) GROUNDWATER ELEVATION (AUGUST 14, 2014)
- 98.00 GROUNDWATER ELEVATION CONTOUR
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- CATCH BASIN
- BGS BELOW GROUND SURFACE



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Washington
Issaquah | Bellingham | Seattle

Oregon
Portland

California
Oakland | Sacramento

FIGURE 2

GROUNDWATER CONTOUR MAP
FOR AUGUST 14, 2014
FORMER CUMMINGS OIL LEASE SITE
908 NORTHWEST KERRON AVENUE
WINLOCK, WASHINGTON

FARALLON PN: 283-005

Drawn By: GPF Checked By: SP Date: 12/1/2014 Disk Reference: 283-005b

TABLES

2014 ANNUAL GROUNDWATER MONITORING AND SUPPLEMENTAL SUBSURFACE INVESTIGATION REPORT

**Former Cummings Oil Lease Site
908 Northwest Kerron Avenue
Winlock, Washington**

Farallon PN: 283-005

Table 1
Summary of Groundwater Elevation Data
Former Cummings Oil Lease Site
Winlock, Washington
Farallon PN: 283-005

Well Identification	Monitoring Date	Depth of Monitoring Well (feet)	Monitoring Well Screened Interval (feet bgs)	Wellhead Elevation ¹ (feet)	Depth to Water (feet bgs)	Groundwater Elevation (feet)
MW-1	12/23/2005	12	5-12	313.00	2.13	310.87
	8/18/2008				4.50	308.50
	3/11/2010				3.00	310.00
	6/8/2010				4.20	308.80
	10/20/2010				3.00	310.00
	12/27/2010				1.95	311.05
	3/22/2011				2.59	310.41
	8/17/2012				3.01	309.99
	8/1/2013				2.86	310.14
	8/14/2014				3.83	309.17
MW-2	12/23/2005	11	5-11	312.98	2.50	310.48
	8/18/2008				4.67	308.31
	3/11/2010				1.88	311.10
	6/8/2010				2.28	310.70
	10/20/2010				2.65	310.33
	12/27/2010				1.52	311.46
	3/22/2011				2.09	310.89
	8/17/2012				3.01	309.97
	8/1/2013				2.94	310.04
	8/14/2014				3.38	309.60
MW-3	12/23/2005	10	5-10	312.75	2.21	310.54
	8/18/2008				4.40	308.35
	3/11/2010				--	--
	6/8/2010				2.26	310.49
	10/20/2010				2.68	310.07
	12/27/2010				1.98	310.77
	3/22/2011				2.16	310.59
	8/29/2012				3.02	309.73
	8/1/2013				2.91	309.84
	8/14/2014				2.95	309.80
MW-4	12/23/2005	12	5-12	314.89	0.50	314.39
	8/18/2008				5.02	309.87
	3/11/2010				1.9	312.99
	6/8/2010				1.45	313.44
	10/20/2010				2.40	312.49
	12/27/2010				0.48	314.41
	3/22/2011				1.33	313.56
	8/29/2012				3.48	311.41
	8/1/2013				3.31	311.58
	8/14/2014				4.24	310.65
MW-5	8/18/2008	10	5-10	312.45	5.54	306.91
	3/11/2010				3.29	309.16
	6/8/2010				4.00	308.45
	10/20/2010				5.25	307.20
	12/27/2010				3.17	309.28
	3/22/2011				4.51	307.94
	8/17/2012				5.47	306.98
	8/1/2013				5.52	306.93
	8/14/2014				5.12	307.33
MW-6	8/14/2014	10	5-10	312.35	3.36	308.99
MW-7	8/14/2014	9	5-9	312.41	5.51	306.90

NOTES:

-- denotes depth not measured

bgs = below ground surface

¹Elevations based on survey completed 8/14/14 Blum & Associates Land Surveyors, Inc. to Washington State Plane Coordinate System South Zone NAD 83, NAVD 88 elevations.

Table 2 Groundwater Analytical Results for Petroleum Hydrocarbon Constituents Former Cummings Oil Lease Site Winlock, Washington Farallon PN: 283-005															
Sample Identification	Well Identification	Sample Date	Analytical Results (micrograms per liter)												
			GRO ¹	DRO ²	ORO ²	Benzene ³	Toluene ³	Ethylbenzene ³	Total Xylenes ³	Naphthalene ³	1-Methyl-naphthalene ⁴	2-Methyl-naphthalene ⁴	Methyl tert-butyl ether ³	1,2-Dichloroethane ³	1,2 Dibromoethane ⁵
MW1-122305	MW-1	12/23/2005	<50.0	<238	<476	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
MW1-081808		8/18/2008	<50.0	1,480	836	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
MW1-031110		3/11/2010	<50.0	590	540	<1.0	<1.0	<1.0	<6.0	--	--	--	--	--	--
MW1-060910		6/9/2010	<50.0	720	<460	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW1-102010		10/20/2010	<50.0	670	<430	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW1-122710		12/27/2010	<50.0	520	<380	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW1-032211		3/22/2011	<50.0	630	<410	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW1-081712		8/17/2012	<50.0	470	<380	<1.0	<1.0	3.1	4.2	--	--	--	--	--	--
MW-1-080113		8/1/2013	<50.0	490	500	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-1-081414		8/14/2014	<50.0	440	410	<5.0	<5.0	<5.0	<15.0	<15.0	<0.094	<0.094	<5.0	<5.0	<0.010
MW2-122305	MW-2	12/23/2005	465	<238	<476	55.2	2.84	3.46	35.6	--	--	--	--	--	--
MW2-081808		8/18/2008	606	876	<500	30.6	1.12	2.56	30.9	--	--	--	--	--	--
MW2-031110		3/11/2010	150	660	470	27.7	<1.0	<1.0	<6.0	--	--	--	--	--	--
MW2-060910		6/9/2010	116	690	440	22.4	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW2-102010		10/20/2010	95.2	810	590	10.6	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW2-122710		12/27/2010	130	400	<380	18.6	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW2-032211		3/22/2011	196	660	<430	47.8	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW2-081712		8/17/2012	158	500	<380	12.6	<1.0	5.2	9.6	--	--	--	--	--	--
MW-2-080113		8/1/2013	260	700	590	8.5	<1.0	<1.0	4.1	--	--	--	--	--	--
MW-2-081414		8/14/2014	220	460	300	7.8	<5.0	<5.0	<15.0	<15.0	1.8	0.81	<5.0	<5.0	<0.010
MW3-122305	MW-3	12/23/2005	<50.0	<238	<476	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
MW3-081808		8/18/2008	<50.0	1,660	887	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
Not Sampled		3/11/2010	--	--	--	--	--	--	--	--	--	--	--	--	--
MW3-060910		6/9/2010	<50.0	830	<400	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW3-102010		10/20/2010	<50.0	900	460	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW3-122710		12/27/2010	<50.0	630	<410	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW3-032211		3/22/2011	<50.0	780	<380	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW3-082912		8/29/2012	<50.0	660	<400	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-3-080113		8/1/2013	<50.0	550	500	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-3-081414		8/14/2014	<50.0	440	330	<5.0	<5.0	<5.0	<15.0	<15.0	<0.094	<0.094	<5.0	<5.0	<0.010
MW4-122305	MW-4	12/23/2005	<50.0	<238	<476	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
MW4-081808		8/18/2008	<50.0	<243	<485	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
MW4-031110		3/11/2010	<50.0	<78	<390	<1.0	<1.0	<1.0	<6.0	--	--	--	--	--	--
MW4-060910		6/9/2010	<50.0	<82	<410	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW4-102010		10/20/2010	<50.0	<86	<430	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW4-122710		12/27/2010	<50.0	<83	<420	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW4-032211		3/22/2011	<50.0	<85	<430	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW4-082912		8/29/2012	<50.0	<78	<390	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-4-080113		8/1/2013	<50.0	<120	<240	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-4-081414		8/14/2014	<50.0	<120	<240	<1.0	<1.0	<1.0	<3.0	<3.0	<0.094	<0.094	<1.0	<1.0	<0.010

Table 2
Groundwater Analytical Results for Petroleum Hydrocarbon Constituents
Former Cummings Oil Lease Site
Winlock, Washington
Farallon PN: 283-005

Sample Identification	Well Identification	Sample Date	Analytical Results (micrograms per liter)												
			GRO ¹	DRO ²	ORO ²	Benzene ³	Toluene ³	Ethylbenzene ³	Total Xylenes ³	Naphthalene ³	1-Methyl-naphthalene ⁴	2-Methyl-naphthalene ⁴	Methyl tert-butyl ether ³	1,2-Dichloroethane ³	1,2 Dibromoethane ⁵
MW5-081808	MW-5	8/18/2008	<50.0	433	<481	<0.500	<0.500	<0.500	<1.00	--	--	--	--	--	--
MW5-031110		3/11/2010	<50.0	<82	<410	<1.0	<1.0	<1.0	<6.0	--	--	--	--	--	--
MW5-060910		6/9/2010	<50.0	<84	<420	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW5-102010		10/20/2010	<50.0	<85	<430	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW5-122710		12/27/2010	<50.0	<87	<430	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW5-032211		3/22/2011	<50.0	<75	<380	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW5-081712		8/17/2012	<50.0	<76	<380	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-5-080113		8/1/2013	<50.0	<120	<240	<1.0	<1.0	<1.0	<3.0	--	--	--	--	--	--
MW-5-081414		8/14/2014	<50.0	<120	<240	<1.0	<1.0	<1.0	<3.0	<3.0	<0.094	<0.094	<1.0	<1.0	<0.010
MW-6-081414	MW-6	8/14/2014	110	520	280	<5.0	<5.0	<5.0	<15.0	<15.0	0.13	<0.094	<5.0	<5.0	<0.010
MW-7-081414	MW-7	8/14/2014	<50.0	260	260	<1.0	<1.0	<1.0	<3.0	<3.0	<0.094	<0.094	<1.0	<1.0	<0.010
MTCA Method A Cleanup Levels ⁶			800	500	500	5	1,000	700	1,000	160	--	--	20	5	0.01
MTCA Method B Cleanup Levels ⁷			--	--	--	--	--	--	--	--	1.51	32	--	--	--

NOTES:

Results in **bold** denote concentrations exceeding applicable cleanup levels.

< denotes analyte not detected at or exceeding the reporting limit listed.

-- denotes sample not analyzed.

¹ Analyzed by Northwest Method NWTPH-Gx.

² Analyzed by Northwest Method NWTPH-Dx.

³ Analyzed by U.S. Environmental Protection Agency (EPA) Method 8260B.

⁴ Analyzed by EPA Method 8270C SIM

⁵ Analyzed by EPA Method 8011

⁶ Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Cleanup Levels for Groundwater, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, as revised 2013.

⁷ Washington State Model Toxics Control Act Cleanup Regulation Cleanup Levels and Risk Calculations, Standard Method B Values for Groundwater, <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>

DRO = total petroleum hydrocarbons (TPH) as diesel-range organics

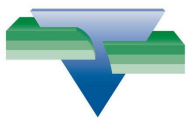
GRO = TPH as gasoline-range organics

ORO = TPH as oil-range organics

APPENDIX A
MONITORING WELL BORING LOGS

2014 ANNUAL GROUNDWATER MONITORING AND SUPPLEMENTAL
SUBSURFACE INVESTIGATION REPORT
Former Cummings Oil Lease Site
908 Northwest Kerron Avenue
Winlock, Washington

Farallon PN: 283-005



Log of Boring: MW-6

Page 1 of 1

Client: BNSF Railway

Project: Former Cummings Oil

Location: Winlock, WA

Farallon PN: 283-005

Logged By: Dincer K. & Jared K.

Date/Time Started: 8/7/14 0958

Date/Time Completed: 8/7/14 1110

Equipment: GeoProbe 9630

Drilling Company: ESN

Drilling Foreman: Brian Bowes

Drilling Method: DP/Hollowstem

Sampler Type: 5' Macro Core

Drive Hammer (lbs.): NA

Depth of Water ATD (ft bgs): 6.0

Total Boring Depth (ft bgs): 10.0

Total Well Depth (ft bgs): 10.0

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0.0-0.8 Asphalt	AC							
		0.8-1.9 SILT (90% silt, 10% gravel) fine gravel, black, dry, no odor.	ML				2.9			Cement
		1.9-3.8 SILT (100% silt) blue/gray, moist, slight hydrocarbon odor.	ML		76					Bentonite
		3.8-5.0 No Recovery	NR				2.0	MW6-3.5-080714	X	
5		5.0-10.0 No Recovery	NR							Water Level
		Refusal at 10.0' bgs. Large cobbles were observed in tailings during augering. 8.0' bgs soil tailings were wet, poorly graded sand with silt and gravel			0					Sand Pack
10										

Monument Type: Flush Mount

Casing Diameter (inches): 2"

Screen Slot Size (inches): 0.010"

Screened Interval (ft bgs): 5.0-10.0

Well Construction Information

Filter Pack: 10/20 Sand

Surface Seal: Cement

Annular Seal: Bentonite

Boring Abandonment: NA

Ground Surface Elevation (ft): 312.93

Top of Casing Elevation (ft): 312.35

Surveyed Location: X: 1026497.62

Y: 433503.34

Log of Boring: MW-7

Page 1 of 1

Client: BNSF Railway	Date/Time Started: 8/7/14 1130	Sampler Type: 5' Macro Core
Project: Former Cummings Oil	Date/Time Completed: 8/7/14 1250	Drive Hammer (lbs.): NA
Location: Winlock, WA	Equipment: GeoProbe 9630	Depth of Water ATD (ft bgs): 7.0
Farallon PN: 283-005	Drilling Company: ESN	Total Boring Depth (ft bgs): 9
Logged By: Dincer K. & Jared K.	Drilling Foreman: Brian Bowes	Total Well Depth (ft bgs): 9.0
	Drilling Method: DP/Hollowstem	

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0.0-0.8 Asphalt	AC							Cement
		0.8-2.8 SILT (90% silt, 10% gravel) fine gravel, black, moist, no odor.	ML							
		2.8-3.7 Gravelly SILT with Sand (60% silt, 25% gravel, 15% sand) fine-coarse gravel, fine-coarse sand, brown, moist, no odor.	ML							
		3.7-4.1 Sandy SILT (60% silt, 30% sand, 10% gravel) fine to coarse sand, cobbles present, orange/brown, moist, no odor.	ML							
		4.1-5.0 No Recovery	NR							
5		5.0-5.8 SILT with Gravel (80% silt, 15% gravel, 5% sand) fine to coarse gravel, fine to coarse sand, dark brown, moist, no odor.	ML							
		5.8-8.1 Silty GRAVEL with Sand (40% gravel, 30% sand, 30% silt) fine to coarse gravel, fine to coarse sand, brown, moist to wet at 7.0' bgs, no odor.	GM							
			GM							
			GM							
		8.1-8.7 Gravelly SILT (60% silt, 30% gravel, 10% sand) fine to coarse gravel, fine to coarse sand, gray, wet, no odor.	ML							
		8.7-10.0 No Recovery	NR							
10										

Monument Type: Flush Mount	Well Construction Information	Ground Surface Elevation (ft): 312.81
Casing Diameter (inches): 2"	Filter Pack: 10/20 Sand	Top of Casing Elevation (ft): 312.41
Screen Slot Size (inches): 0.010"	Surface Seal: Cement	Surveyed Location: X: 1026495.20
Screened Interval (ft bgs): 5.0-9.0	Annular Seal: Bentonite	Y: 433430.33
	Boring Abandonment: NA	

APPENDIX B
LABORATORY ANALYTICAL REPORT

2014 ANNUAL GROUNDWATER MONITORING AND SUPPLEMENTAL
SUBSURFACE INVESTIGATION REPORT
Former Cummings Oil Lease Site
908 Northwest Kerron Avenue
Winlock, Washington

Farallon PN: 283-005

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: 580-44999-1

Client Project/Site: Cummings Oil Lease

For:

Farallon Consulting LLC
975 5th Avenue NW
Suite 100
Issaquah, Washington 98027

Attn: R Hibbs



Authorized for release by:
9/3/2014 4:22:12 PM

Kristine Allen, Manager of Project Management
(253)248-4970
kristine.allen@testamericainc.com

LINKS

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results through

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Visit us at:

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Job ID: 580-44999-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-44999-1

Comments

No additional comments.

Receipt

The samples were received on 8/15/2014 1:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 0.0° C, 0.1° C and 0.5° C.

Except:

6 trip blanks were submitted for analysis with these samples; however, it was not listed on the Chain of Custody (COC).

The container labels for the following samples did not match the information listed on the Chain-of-Custody (COC): MW-2-081414 (580-44999-2), MW-3-081414 (580-44999-3), MW-5-081414 (580-44999-5), MW-6-081414 (580-44999-6).

Sample #2:

Two HCl-preserved ambers and an unpreserved amber do not have a collection date listed on the container labels. All of the HCl voa vials also do not have a collection date listed on the container labels.

Sample #3:

All ambers as well as voa vials do not have a collection date listed on the container labels.

Sample #5:

One HCl-preserved amber does not have a collection time listed on the container label.

Sample #6:

All containers do not have a collection date listed on the container labels.

The sample IDs, collection dates, and collection times not otherwise noted matched the COC. All samples were logged in per the COC.

GC/MS VOA

Method(s) 8260B: The following sample(s) was diluted due to the foamy nature of the sample matrix: MW-1-081414 (580-44999-1), MW-2-081414 (580-44999-2), MW-3-081414 (580-44999-3), MW-6-081414 (580-44999-6). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA

Method(s) 8270C SIM: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with batch 185313.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA

Method(s) NWTPH-Dx: In analytical batch 168018, for the following sample(s) from preparation batch 167607, the results in the #2 Diesel Fuel (C10-C24) and Motor Oil (>C24-C36) range(s) are due to what most closely resembles a complex mixture of a weathered gasoline product, a kerosene range product, weathered/degraded diesel fuel, and a mineral/transformer oil range product: MW-6-081414 (580-44999-6), MW-2-081414 (580-44999-2). The affected analyte range(s) have been Y qualified and reported.

Method(s) NWTPH-Dx: In analytical batch 168018, for the following sample(s) from preparation batch 167607: MW-1-081414 (580-44999-1), MW-3-081414 (580-44999-3), MW-7-081414 (580-44999-7), the results in the #2 Diesel Fuel (C10-C24) and Motor Oil (>C24-C36) range(s) are due primarily to a mineral/transformer oil range product. The affected analyte range(s) have been Y qualified and reported.

Case Narrative

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Job ID: 580-44999-1 (Continued)

Laboratory: TestAmerica Seattle (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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Definitions/Glossary

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
Y	The chromatographic response resembles a typical fuel pattern.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-1-081414

Lab Sample ID: 580-44999-1

Date Collected: 08/14/14 13:30

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0		ug/L			08/23/14 01:27	5
Toluene	ND		5.0		ug/L			08/23/14 01:27	5
Ethylbenzene	ND		5.0		ug/L			08/23/14 01:27	5
m-Xylene & p-Xylene	ND		10		ug/L			08/23/14 01:27	5
o-Xylene	ND		5.0		ug/L			08/23/14 01:27	5
Naphthalene	ND		15		ug/L			08/23/14 01:27	5
Methyl tert-butyl ether	ND		5.0		ug/L			08/23/14 01:27	5
1,2-Dichloroethane	ND		5.0		ug/L			08/23/14 01:27	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		85 - 120		08/23/14 01:27	5
Trifluorotoluene (Surr)	101		70 - 136		08/23/14 01:27	5
4-Bromofluorobenzene (Surr)	101		75 - 120		08/23/14 01:27	5
Dibromofluoromethane (Surr)	99		85 - 115		08/23/14 01:27	5
1,2-Dichloroethane-d4 (Surr)	99		70 - 120		08/23/14 01:27	5

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 04:21	1
2-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 04:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	97		13 - 120	08/21/14 08:20	08/22/14 04:21	1
Nitrobenzene-d5	88		27 - 120	08/21/14 08:20	08/22/14 04:21	1
2-Fluorobiphenyl (Surr)	85		29 - 120	08/21/14 08:20	08/22/14 04:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/24/14 00:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		50 - 150		08/24/14 00:09	1
Trifluorotoluene (Surr)	106		50 - 150		08/24/14 00:09	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 17:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	87		70 - 130	08/28/14 13:11	08/28/14 17:03	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)	0.44	Y	0.12		mg/L		08/20/14 19:12	08/25/14 18:19	1
Motor Oil (>C24-C36)	0.41	Y	0.24		mg/L		08/20/14 19:12	08/25/14 18:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	79		50 - 150	08/20/14 19:12	08/25/14 18:19	1

TestAmerica Seattle

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-2-081414

Lab Sample ID: 580-44999-2

Date Collected: 08/14/14 11:53

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	7.8		5.0		ug/L			08/23/14 01:54	5
Toluene	ND		5.0		ug/L			08/23/14 01:54	5
Ethylbenzene	ND		5.0		ug/L			08/23/14 01:54	5
m-Xylene & p-Xylene	ND		10		ug/L			08/23/14 01:54	5
o-Xylene	ND		5.0		ug/L			08/23/14 01:54	5
Naphthalene	ND		15		ug/L			08/23/14 01:54	5
Methyl tert-butyl ether	ND		5.0		ug/L			08/23/14 01:54	5
1,2-Dichloroethane	ND		5.0		ug/L			08/23/14 01:54	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		85 - 120		08/23/14 01:54	5
Trifluorotoluene (Surr)	99		70 - 136		08/23/14 01:54	5
4-Bromofluorobenzene (Surr)	102		75 - 120		08/23/14 01:54	5
Dibromofluoromethane (Surr)	101		85 - 115		08/23/14 01:54	5
1,2-Dichloroethane-d4 (Surr)	103		70 - 120		08/23/14 01:54	5

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	1.8		0.094		ug/L		08/21/14 08:20	08/22/14 04:45	1
2-Methylnaphthalene	0.81		0.094		ug/L		08/21/14 08:20	08/22/14 04:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	95		13 - 120	08/21/14 08:20	08/22/14 04:45	1
Nitrobenzene-d5	89		27 - 120	08/21/14 08:20	08/22/14 04:45	1
2-Fluorobiphenyl (Surr)	85		29 - 120	08/21/14 08:20	08/22/14 04:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.22		0.050		mg/L			08/24/14 00:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	106		50 - 150		08/24/14 00:42	1
Trifluorotoluene (Surr)	105		50 - 150		08/24/14 00:42	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 17:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	88		70 - 130	08/28/14 13:11	08/28/14 17:29	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)	0.46	Y	0.12		mg/L		08/20/14 19:12	08/25/14 18:37	1
Motor Oil (>C24-C36)	0.30	Y	0.24		mg/L		08/20/14 19:12	08/25/14 18:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	69		50 - 150	08/20/14 19:12	08/25/14 18:37	1

TestAmerica Seattle

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-3-081414

Lab Sample ID: 580-44999-3

Date Collected: 08/14/14 13:43

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0		ug/L			08/23/14 02:21	5
Toluene	ND		5.0		ug/L			08/23/14 02:21	5
Ethylbenzene	ND		5.0		ug/L			08/23/14 02:21	5
m-Xylene & p-Xylene	ND		10		ug/L			08/23/14 02:21	5
o-Xylene	ND		5.0		ug/L			08/23/14 02:21	5
Naphthalene	ND		15		ug/L			08/23/14 02:21	5
Methyl tert-butyl ether	ND		5.0		ug/L			08/23/14 02:21	5
1,2-Dichloroethane	ND		5.0		ug/L			08/23/14 02:21	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		85 - 120		08/23/14 02:21	5
Trifluorotoluene (Surr)	100		70 - 136		08/23/14 02:21	5
4-Bromofluorobenzene (Surr)	101		75 - 120		08/23/14 02:21	5
Dibromofluoromethane (Surr)	101		85 - 115		08/23/14 02:21	5
1,2-Dichloroethane-d4 (Surr)	104		70 - 120		08/23/14 02:21	5

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 05:09	1
2-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 05:09	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	100		13 - 120	08/21/14 08:20	08/22/14 05:09	1
Nitrobenzene-d5	94		27 - 120	08/21/14 08:20	08/22/14 05:09	1
2-Fluorobiphenyl (Surr)	89		29 - 120	08/21/14 08:20	08/22/14 05:09	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/24/14 01:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		50 - 150		08/24/14 01:15	1
Trifluorotoluene (Surr)	105		50 - 150		08/24/14 01:15	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 17:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	81		70 - 130	08/28/14 13:11	08/28/14 17:54	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)	0.44	Y	0.12		mg/L		08/20/14 19:12	08/25/14 18:56	1
Motor Oil (>C24-C36)	0.33	Y	0.24		mg/L		08/20/14 19:12	08/25/14 18:56	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	81		50 - 150	08/20/14 19:12	08/25/14 18:56	1

TestAmerica Seattle

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-4-081414

Lab Sample ID: 580-44999-4

Date Collected: 08/14/14 11:42

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/23/14 02:48	1
Toluene	ND		1.0		ug/L			08/23/14 02:48	1
Ethylbenzene	ND		1.0		ug/L			08/23/14 02:48	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/23/14 02:48	1
o-Xylene	ND		1.0		ug/L			08/23/14 02:48	1
Naphthalene	ND		3.0		ug/L			08/23/14 02:48	1
Methyl tert-butyl ether	ND		1.0		ug/L			08/23/14 02:48	1
1,2-Dichloroethane	ND		1.0		ug/L			08/23/14 02:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		85 - 120		08/23/14 02:48	1
Trifluorotoluene (Surr)	99		70 - 136		08/23/14 02:48	1
4-Bromofluorobenzene (Surr)	102		75 - 120		08/23/14 02:48	1
Dibromofluoromethane (Surr)	103		85 - 115		08/23/14 02:48	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120		08/23/14 02:48	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 05:33	1
2-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 05:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	99		13 - 120	08/21/14 08:20	08/22/14 05:33	1
Nitrobenzene-d5	94		27 - 120	08/21/14 08:20	08/22/14 05:33	1
2-Fluorobiphenyl (Surr)	89		29 - 120	08/21/14 08:20	08/22/14 05:33	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/24/14 01:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		50 - 150		08/24/14 01:48	1
Trifluorotoluene (Surr)	104		50 - 150		08/24/14 01:48	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 18:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	86		70 - 130	08/28/14 13:11	08/28/14 18:20	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		mg/L		08/20/14 19:12	08/25/14 19:14	1
Motor Oil (>C24-C36)	ND		0.24		mg/L		08/20/14 19:12	08/25/14 19:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	59		50 - 150	08/20/14 19:12	08/25/14 19:14	1

TestAmerica Seattle

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-5-081414

Lab Sample ID: 580-44999-5

Date Collected: 08/14/14 16:25

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/23/14 03:15	1
Toluene	ND		1.0		ug/L			08/23/14 03:15	1
Ethylbenzene	ND		1.0		ug/L			08/23/14 03:15	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/23/14 03:15	1
o-Xylene	ND		1.0		ug/L			08/23/14 03:15	1
Naphthalene	ND		3.0		ug/L			08/23/14 03:15	1
Methyl tert-butyl ether	ND		1.0		ug/L			08/23/14 03:15	1
1,2-Dichloroethane	ND		1.0		ug/L			08/23/14 03:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		85 - 120		08/23/14 03:15	1
Trifluorotoluene (Surr)	99		70 - 136		08/23/14 03:15	1
4-Bromofluorobenzene (Surr)	101		75 - 120		08/23/14 03:15	1
Dibromofluoromethane (Surr)	106		85 - 115		08/23/14 03:15	1
1,2-Dichloroethane-d4 (Surr)	109		70 - 120		08/23/14 03:15	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 05:57	1
2-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 05:57	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	98		13 - 120	08/21/14 08:20	08/22/14 05:57	1
Nitrobenzene-d5	89		27 - 120	08/21/14 08:20	08/22/14 05:57	1
2-Fluorobiphenyl (Surr)	87		29 - 120	08/21/14 08:20	08/22/14 05:57	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/24/14 02:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		50 - 150		08/24/14 02:21	1
Trifluorotoluene (Surr)	103		50 - 150		08/24/14 02:21	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 18:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	87		70 - 130	08/28/14 13:11	08/28/14 18:45	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		mg/L		08/20/14 19:12	08/25/14 19:32	1
Motor Oil (>C24-C36)	ND		0.24		mg/L		08/20/14 19:12	08/25/14 19:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	86		50 - 150	08/20/14 19:12	08/25/14 19:32	1

TestAmerica Seattle

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-6-081414

Lab Sample ID: 580-44999-6

Date Collected: 08/14/14 16:00

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		5.0		ug/L			08/23/14 03:45	5
Toluene	ND		5.0		ug/L			08/23/14 03:45	5
Ethylbenzene	ND		5.0		ug/L			08/23/14 03:45	5
m-Xylene & p-Xylene	ND		10		ug/L			08/23/14 03:45	5
o-Xylene	ND		5.0		ug/L			08/23/14 03:45	5
Naphthalene	ND		15		ug/L			08/23/14 03:45	5
Methyl tert-butyl ether	ND		5.0		ug/L			08/23/14 03:45	5
1,2-Dichloroethane	ND		5.0		ug/L			08/23/14 03:45	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		85 - 120		08/23/14 03:45	5
Trifluorotoluene (Surr)	100		70 - 136		08/23/14 03:45	5
4-Bromofluorobenzene (Surr)	101		75 - 120		08/23/14 03:45	5
Dibromofluoromethane (Surr)	105		85 - 115		08/23/14 03:45	5
1,2-Dichloroethane-d4 (Surr)	111		70 - 120		08/23/14 03:45	5

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	0.13		0.094		ug/L		08/21/14 08:20	08/22/14 06:21	1
2-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 06:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	82		13 - 120	08/21/14 08:20	08/22/14 06:21	1
Nitrobenzene-d5	90		27 - 120	08/21/14 08:20	08/22/14 06:21	1
2-Fluorobiphenyl (Surr)	81		29 - 120	08/21/14 08:20	08/22/14 06:21	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	0.11		0.050		mg/L			08/24/14 02:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		50 - 150		08/24/14 02:54	1
Trifluorotoluene (Surr)	104		50 - 150		08/24/14 02:54	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 19:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	90		70 - 130	08/28/14 13:11	08/28/14 19:11	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)	0.52	Y	0.12		mg/L		08/20/14 19:12	08/25/14 19:50	1
Motor Oil (>C24-C36)	0.28	Y	0.24		mg/L		08/20/14 19:12	08/25/14 19:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	83		50 - 150	08/20/14 19:12	08/25/14 19:50	1

TestAmerica Seattle

Client Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-7-081414

Lab Sample ID: 580-44999-7

Date Collected: 08/14/14 17:40

Matrix: Water

Date Received: 08/15/14 13:00

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0		ug/L			08/23/14 04:18	1
Toluene	ND		1.0		ug/L			08/23/14 04:18	1
Ethylbenzene	ND		1.0		ug/L			08/23/14 04:18	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/23/14 04:18	1
o-Xylene	ND		1.0		ug/L			08/23/14 04:18	1
Naphthalene	ND		3.0		ug/L			08/23/14 04:18	1
Methyl tert-butyl ether	ND		1.0		ug/L			08/23/14 04:18	1
1,2-Dichloroethane	ND		1.0		ug/L			08/23/14 04:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		85 - 120		08/23/14 04:18	1
Trifluorotoluene (Surr)	101		70 - 136		08/23/14 04:18	1
4-Bromofluorobenzene (Surr)	99		75 - 120		08/23/14 04:18	1
Dibromofluoromethane (Surr)	105		85 - 115		08/23/14 04:18	1
1,2-Dichloroethane-d4 (Surr)	116		70 - 120		08/23/14 04:18	1

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 06:45	1
2-Methylnaphthalene	ND		0.094		ug/L		08/21/14 08:20	08/22/14 06:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	94		13 - 120	08/21/14 08:20	08/22/14 06:45	1
Nitrobenzene-d5	87		27 - 120	08/21/14 08:20	08/22/14 06:45	1
2-Fluorobiphenyl (Surr)	84		29 - 120	08/21/14 08:20	08/22/14 06:45	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/24/14 03:27	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		50 - 150		08/24/14 03:27	1
Trifluorotoluene (Surr)	101		50 - 150		08/24/14 03:27	1

Method: 8011 - EDB and DBCP in Water by Microextraction

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 13:11	08/28/14 20:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	85		70 - 130	08/28/14 13:11	08/28/14 20:28	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)	0.26	Y	0.12		mg/L		08/20/14 19:12	08/25/14 20:08	1
Motor Oil (>C24-C36)	0.26	Y	0.24		mg/L		08/20/14 19:12	08/25/14 20:08	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	84		50 - 150	08/20/14 19:12	08/25/14 20:08	1

TestAmerica Seattle

QC Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

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

Lab Sample ID: MB 580-167859/4

Matrix: Water

Analysis Batch: 167859

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		ug/L			08/22/14 19:32	1
Toluene	ND		1.0		ug/L			08/22/14 19:32	1
Ethylbenzene	ND		1.0		ug/L			08/22/14 19:32	1
m-Xylene & p-Xylene	ND		2.0		ug/L			08/22/14 19:32	1
o-Xylene	ND		1.0		ug/L			08/22/14 19:32	1
Naphthalene	ND		3.0		ug/L			08/22/14 19:32	1
Methyl tert-butyl ether	ND		1.0		ug/L			08/22/14 19:32	1
1,2-Dichloroethane	ND		1.0		ug/L			08/22/14 19:32	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		85 - 120		08/22/14 19:32	1
Trifluorotoluene (Surr)	100		70 - 136		08/22/14 19:32	1
4-Bromofluorobenzene (Surr)	103		75 - 120		08/22/14 19:32	1
Dibromofluoromethane (Surr)	99		85 - 115		08/22/14 19:32	1
1,2-Dichloroethane-d4 (Surr)	100		70 - 120		08/22/14 19:32	1

Lab Sample ID: LCS 580-167859/5

Matrix: Water

Analysis Batch: 167859

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	20.0	17.0		ug/L		85	80 - 120
Toluene	20.0	16.9		ug/L		84	75 - 120
Ethylbenzene	20.0	17.2		ug/L		86	75 - 125
m-Xylene & p-Xylene	20.0	17.3		ug/L		86	75 - 130
o-Xylene	20.0	17.1		ug/L		86	80 - 120
Naphthalene	20.0	19.9		ug/L		100	55 - 140
Methyl tert-butyl ether	20.0	18.1		ug/L		90	65 - 125
1,2-Dichloroethane	20.0	17.6		ug/L		88	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	100		85 - 120
Trifluorotoluene (Surr)	99		70 - 136
4-Bromofluorobenzene (Surr)	97		75 - 120
Dibromofluoromethane (Surr)	101		85 - 115
1,2-Dichloroethane-d4 (Surr)	101		70 - 120

Lab Sample ID: LCSD 580-167859/6

Matrix: Water

Analysis Batch: 167859

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	20.0	18.9		ug/L		95	80 - 120	11	30
Toluene	20.0	19.5		ug/L		97	75 - 120	14	30
Ethylbenzene	20.0	19.9		ug/L		100	75 - 125	14	30
m-Xylene & p-Xylene	20.0	19.9		ug/L		100	75 - 130	14	30
o-Xylene	20.0	20.1		ug/L		100	80 - 120	16	30

TestAmerica Seattle

QC Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

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

Lab Sample ID: LCSD 580-167859/6

Matrix: Water

Analysis Batch: 167859

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
Naphthalene	20.0	20.8		ug/L		104	55 - 140	4	30
Methyl tert-butyl ether	20.0	18.1		ug/L		91	65 - 125	0	30
1,2-Dichloroethane	20.0	17.6		ug/L		88	70 - 130	0	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	104		85 - 120
Trifluorotoluene (Surr)	103		70 - 136
4-Bromofluorobenzene (Surr)	98		75 - 120
Dibromofluoromethane (Surr)	100		85 - 115
1,2-Dichloroethane-d4 (Surr)	96		70 - 120

Method: 8270C SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 490-185313/1-A

Matrix: Water

Analysis Batch: 185573

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 185313

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1-Methylnaphthalene	ND		0.10		ug/L		08/21/14 08:20	08/22/14 03:33	1
2-Methylnaphthalene	ND		0.10		ug/L		08/21/14 08:20	08/22/14 03:33	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Terphenyl-d14	109		13 - 120	08/21/14 08:20	08/22/14 03:33	1
Nitrobenzene-d5	93		27 - 120	08/21/14 08:20	08/22/14 03:33	1
2-Fluorobiphenyl (Surr)	92		29 - 120	08/21/14 08:20	08/22/14 03:33	1

Lab Sample ID: LCS 490-185313/2-A

Matrix: Water

Analysis Batch: 185573

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 185313

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1-Methylnaphthalene	1.00	0.814		ug/L		81	36 - 120
2-Methylnaphthalene	1.00	0.823		ug/L		82	31 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Terphenyl-d14	106		13 - 120
Nitrobenzene-d5	93		27 - 120
2-Fluorobiphenyl (Surr)	89		29 - 120

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

Lab Sample ID: MB 580-167752/5

Matrix: Water

Analysis Batch: 167752

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.050		mg/L			08/23/14 17:33	1

TestAmerica Seattle

QC Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

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

Lab Sample ID: MB 580-167752/5

Matrix: Water

Analysis Batch: 167752

Client Sample ID: Method Blank

Prep Type: Total/NA

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		50 - 150		08/23/14 17:33	1
Trifluorotoluene (Surr)	102		50 - 150		08/23/14 17:33	1

Lab Sample ID: LCS 580-167752/6

Matrix: Water

Analysis Batch: 167752

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	0.858		mg/L		86	79 - 110

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene (Surr)	102		50 - 150
Trifluorotoluene (Surr)	98		50 - 150

Lab Sample ID: LCSD 580-167752/7

Matrix: Water

Analysis Batch: 167752

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	0.853		mg/L		85	79 - 110	1	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
4-Bromofluorobenzene (Surr)	103		50 - 150
Trifluorotoluene (Surr)	97		50 - 150

Method: 8011 - EDB and DBCP in Water by Microextraction

Lab Sample ID: MB 580-168284/1-A

Matrix: Water

Analysis Batch: 168282

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 168284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane	ND		0.010		ug/L		08/28/14 07:43	08/28/14 10:13	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dibromopropane	75		70 - 130	08/28/14 07:43	08/28/14 10:13	1

Lab Sample ID: LCS 580-168284/2-A

Matrix: Water

Analysis Batch: 168282

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 168284

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromoethane	0.0573	0.0579		ug/L		101	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dibromopropane	105		70 - 130

TestAmerica Seattle

QC Sample Results

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Method: 8011 - EDB and DBCP in Water by Microextraction (Continued)

Lab Sample ID: LCSD 580-168284/3-A

Matrix: Water

Analysis Batch: 168282

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 168284

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dibromoethane	0.0573	0.0572		ug/L		100	70 - 130	1	20
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
1,2-Dibromopropane	108		70 - 130						

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

Lab Sample ID: MB 580-167607/1-A

Matrix: Water

Analysis Batch: 168018

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 167607

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.13		mg/L		08/20/14 19:12	08/25/14 17:25	1
Motor Oil (>C24-C36)	ND		0.25		mg/L		08/20/14 19:12	08/25/14 17:25	1
Surrogate	MB %Recovery	MB Qualifier	Limits						
o-Terphenyl	80		50 - 150						
							Prepared	Analyzed	Dil Fac
							08/20/14 19:12	08/25/14 17:25	1

Lab Sample ID: LCS 580-167607/2-A

Matrix: Water

Analysis Batch: 168018

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 167607

			Spike	LCS	LCS				%Rec.		
Analyte			Added	Result	Qualifier	Unit	D	%Rec	Limits		
#2 Diesel (C10-C24)			0.500	0.347		mg/L		69	59 - 120		
Motor Oil (>C24-C36)			0.500	0.408		mg/L		82	71 - 140		

Lab Sample ID: LCSD 580-167607/3-A

Matrix: Water

Analysis Batch: 168018

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 167607

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
#2 Diesel (C10-C24)	0.500	0.367		mg/L		73	59 - 120	6	27
Motor Oil (>C24-C36)	0.500	0.421		mg/L		84	71 - 140	3	27
Surrogate	LCSD %Recovery	LCSD Qualifier	Limits						
o-Terphenyl	78		50 - 150						

TestAmerica Seattle

Lab Chronicle

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-1-081414

Date Collected: 08/14/14 13:30

Date Received: 08/15/14 13:00

Lab Sample ID: 580-44999-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	167859	08/23/14 01:27	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 04:21	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 00:09	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 17:03	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 18:19	JJP	TAL SEA

Client Sample ID: MW-2-081414

Date Collected: 08/14/14 11:53

Date Received: 08/15/14 13:00

Lab Sample ID: 580-44999-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	167859	08/23/14 01:54	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 04:45	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 00:42	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 17:29	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 18:37	JJP	TAL SEA

Client Sample ID: MW-3-081414

Date Collected: 08/14/14 13:43

Date Received: 08/15/14 13:00

Lab Sample ID: 580-44999-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	167859	08/23/14 02:21	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 05:09	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 01:15	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 17:54	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 18:56	JJP	TAL SEA

TestAmerica Seattle

Lab Chronicle

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-4-081414

Lab Sample ID: 580-44999-4

Date Collected: 08/14/14 11:42

Matrix: Water

Date Received: 08/15/14 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	167859	08/23/14 02:48	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 05:33	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 01:48	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 18:20	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 19:14	JJP	TAL SEA

Client Sample ID: MW-5-081414

Lab Sample ID: 580-44999-5

Date Collected: 08/14/14 16:25

Matrix: Water

Date Received: 08/15/14 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	167859	08/23/14 03:15	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 05:57	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 02:21	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 18:45	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 19:32	JJP	TAL SEA

Client Sample ID: MW-6-081414

Lab Sample ID: 580-44999-6

Date Collected: 08/14/14 16:00

Matrix: Water

Date Received: 08/15/14 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	167859	08/23/14 03:45	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 06:21	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 02:54	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 19:11	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 19:50	JJP	TAL SEA

TestAmerica Seattle

Lab Chronicle

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Client Sample ID: MW-7-081414

Lab Sample ID: 580-44999-7

Date Collected: 08/14/14 17:40

Matrix: Water

Date Received: 08/15/14 13:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	167859	08/23/14 04:18	A1C	TAL SEA
Total/NA	Prep	3510C			185313	08/21/14 08:20	CLM	TAL NSH
Total/NA	Analysis	8270C SIM		1	185573	08/22/14 06:45	BES	TAL NSH
Total/NA	Analysis	NWTPH-Gx		1	167752	08/24/14 03:27	IWH	TAL SEA
Total/NA	Prep	8011			168284	08/28/14 13:11	CGM	TAL SEA
Total/NA	Analysis	8011		1	168282	08/28/14 20:28	CGM	TAL SEA
Total/NA	Prep	3510C			167607	08/20/14 19:12	WJR	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	168018	08/25/14 20:08	JJP	TAL SEA

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

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

Certification Summary

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Laboratory: TestAmerica Seattle

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-113	07-25-15
California	NELAP	9	01115CA	01-31-14 *
California	State Program	9	2901	01-31-15
L-A-B	DoD ELAP		L2236	01-19-16
L-A-B	ISO/IEC 17025		L2236	01-19-16
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-06-14
USDA	Federal		P330-11-00222	04-08-17
Washington	State Program	10	C553	02-17-15

Laboratory: TestAmerica Nashville

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-15
A2LA	ISO/IEC 17025		0453.07	12-31-15
Alaska (UST)	State Program	10	UST-087	10-31-14
Arizona	State Program	9	AZ0473	05-05-15
Arkansas DEQ	State Program	6	88-0737	04-25-15
California	NELAP	9	1168CA	10-31-14
Connecticut	State Program	1	PH-0220	12-31-15
Florida	NELAP	4	E87358	06-30-15
Illinois	NELAP	5	200010	12-09-14
Iowa	State Program	7	131	04-01-16
Kansas	NELAP	7	E-10229	10-31-14
Kentucky (UST)	State Program	4	19	06-30-15
Louisiana	NELAP	6	30613	06-30-15
Maryland	State Program	3	316	03-31-15
Massachusetts	State Program	1	M-TN032	06-30-15
Minnesota	NELAP	5	047-999-345	12-31-14
Mississippi	State Program	4	N/A	06-30-15
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-15
New Hampshire	NELAP	1	2963	10-09-14
New Jersey	NELAP	2	TN965	06-30-15
New York	NELAP	2	11342	03-31-15
North Carolina (WW/SW)	State Program	4	387	12-31-14
North Dakota	State Program	8	R-146	06-30-14 *
Ohio VAP	State Program	5	CL0033	10-16-15
Oklahoma	State Program	6	9412	08-31-15
Oregon	NELAP	10	TN200001	04-29-15
Pennsylvania	NELAP	3	68-00585	06-30-15
Rhode Island	State Program	1	LAO00268	12-30-14
South Carolina	State Program	4	84009 (001)	02-28-15
South Carolina (DW)	State Program	4	84009 (002)	02-23-17
Tennessee	State Program	4	2008	02-23-17
Texas	NELAP	6	T104704077	08-31-15
USDA	Federal		S-48469	10-30-16
Utah	NELAP	8	TN00032	07-31-15
Virginia	NELAP	3	460152	06-14-15

* Certification renewal pending - certification considered valid.

TestAmerica Seattle

Certification Summary

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Laboratory: TestAmerica Nashville (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Washington	State Program	10	C789	07-19-15
West Virginia DEP	State Program	3	219	02-28-15
Wisconsin	State Program	5	998020430	08-31-15
Wyoming (UST)	A2LA	8	453.07	12-31-15

Sample Summary

Client: Farallon Consulting LLC
Project/Site: Cummings Oil Lease

TestAmerica Job ID: 580-44999-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-44999-1	MW-1-081414	Water	08/14/14 13:30	08/15/14 13:00
580-44999-2	MW-2-081414	Water	08/14/14 11:53	08/15/14 13:00
580-44999-3	MW-3-081414	Water	08/14/14 13:43	08/15/14 13:00
580-44999-4	MW-4-081414	Water	08/14/14 11:42	08/15/14 13:00
580-44999-5	MW-5-081414	Water	08/14/14 16:25	08/15/14 13:00
580-44999-6	MW-6-081414	Water	08/14/14 16:00	08/15/14 13:00
580-44999-7	MW-7-081414	Water	08/14/14 17:40	08/15/14 13:00



CHAIN OF CUSTODY

BNSF		LABORATORY INFORMATION		LAB WORK ORDER:	
RAILWAY		Project Manager:		SHIPMENT INFORMATION	
CHAIN OF CUSTODY		Laboratory: Test America		Shipment Method:	
BNSF PROJECT INFORMATION		Address: 5755 8th St E.		Phone: 253-922-2310	
Project State of Origin: WA		City/State/Zip: Tacoma, WA. 98424		Fax: 253-922-5047	
BNSF Project Number: 283-005		CONSULTANT INFORMATION		Tracking Number:	
BNSF Project Name: Cummings Oil Lease		Project Manager: Ryan Hibbs		Project Number: 283-005	
BNSF Contact: BNSF Work Order No.:		Company: Farallon Consulting		Email: r.hibbs@farallonconsulting.com	
		Address: 975 5th Ave NW		Phone: Fax:	
		City/State/Zip: Issaquah, WA, 98027.			

TURNAROUND TIME		DELIVERABLES		METHODS FOR ANALYSIS	
☐ 1-day Rush ☐ 2-day Rush ☐ 3-day Rush	☐ 5- to 8-day Rush ☒ Standard 10-Day ☐ Other _____	☒ BNSF Standard (Level II) ☐ Level III ☐ Level IV	☐ Other Deliverables? _____	☐ EDD Req. Format? _____	- Gx 3-VOC - Dx BCP, 123-CP
Cooler/TB ²⁴ Disc/IR cores un ²⁴ ₂₄ Cooler Dsc ²⁴ 63/24 @ Lab ²⁴ ₂₄ WetPacks Packing ²⁴ ₂₄					

[illegible]

ORIGINAL - RETURN TO LABORATORY WITH SAMPLES

DUPLICATE - CONSULTANT

580-44999 Chain of Custody



Login Sample Receipt Checklist

Client: Farallon Consulting LLC

Job Number: 580-44999-1

Login Number: 44999

List Source: TestAmerica Seattle

List Number: 1

Creator: Abello, Andrea N

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are 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	Not requested on COC.
There are no discrepancies between the containers received 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	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	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: Farallon Consulting LLC

Job Number: 580-44999-1

Login Number: 44999

List Number: 2

Creator: Ford, Easton

List Source: TestAmerica Nashville

List Creation: 08/19/14 12:13 PM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are 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 containers received 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	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	