ecology and environment, inc.
Global Environmental Specialists
720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

April 4, 2018

Brooks Stanfield, On-Scene Coordinator
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-133
Seattle, Washington 98101

Re: **Contract Number: EP-S7-13-07**
Task Order Number: TO-22-T1-SS1
Final North Santiam River Gasoline Spill Response Trip Report

Dear Mr. Stanfield:

Enclosed please find the Final Trip Report for the North Santiam River Gasoline Spill Response site which is located in Idanha, Linn County, Oregon. If you have any question regarding this submittal, please call Renee Nordeen or me at (206) 624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Brad Martin

Brad Martin
START-IV Team Leader

cc: Renee Nordeen, START-IV Project Manager, E & E, Seattle, WA

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FINAL TRIP REPORT

North Santiam River Gasoline Spill
Idanha, Oregon
Task Order: TO-22-T1-SS1

Prepared for

U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Prepared by

Ecology and Environment, Inc.
720 Third Avenue, Suite 1700
Seattle, Washington 98104

April 2018

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. PLACE VISITED

Site Name	North Santiam River Gasoline Spill Response
Potentially Responsible Party Name	Central Petro
Land Owners	United States Forest Service, Oregon Department of Transportation
Location	Idanha, Linn County, Oregon
SSID	Z0EX
Latitude	44.6614552
Longitude	-121.9555389
Dates of Trip	15 December 2017 through 20 December 2017

2. PURPOSE

The United States Environmental Protection Agency (EPA) has tasked Ecology and Environment, Inc. (E & E), under Superfund Technical Assessment and Response Team (START) contract number EP-S7-13-07, Task Order TO-22-T1-SS1 to support an EPA-led emergency response at the North Santiam River Gasoline Spill, which was located in Idanha, Linn County, Oregon (Figure 1).

START personnel were tasked with recording site conditions through logbook entries, photographic documentation, conducting air monitoring between the spill location and Detroit, Oregon, and collection of surface water samples from the North Santiam River, including municipal drinking water systems and a fish hatchery. Following the document are several attachments associated with START tasks:

- Attachment A – Photographs taken during the North Santiam River Gasoline Spill activities;
- Attachment B – Sample Forms;
- Attachment C – Data Validation Memoranda for samples collected during site activities;
- Attachment D – NWFF Environmental Soil, Surface Water, and Groundwater Analytical Tables; and
- Attachment E – North Santiam River Reconnaissance Memorandum.

START activities for the emergency response were performed in accordance with a site-specific sampling plan which included standard operating procedures and methods followed by START during field activities and in accordance with the site-specific data management plan (2018).

3. PERSONS INVOLVED

Agency	Contact Persons	Phone Number
EPA	Brooks Stanfield	206-553-4423
	Eric Vanderboom	208-378-5755
START – Ecology and Environment, Inc.	Erin Lynch	503-248-5600
	Renee Nordeen	206-624-9537
	Eric Lindeman	206-624-9537
	Seth Wing	206-624-9537
NWFF Environmental	Jason True	541-231-2620
	Chuck Carver	800-942-4614
	Ross McMakin	800-942-4614
Environmental Resource Management, Inc.	Jeff Williams	503-488-5282

Oregon Department of Environmental Quality	Bryn Thoms	541-687-7424
	Don Hanson	541-687-7349
	Geoff Brown	541-686-7819
Oregon Department of Transportation	Bart Bretherton	503-966-2647
US Fish and Wildlife Service	Dr. Mike Szumski	541-867-4558
Oregon Department of Fish and Wildlife	Elise Kelley	541-243-3052
	Nancy Taylor	541-757-5226

4. BACKGROUND

4.1. Site Description and Location

The site consists of an approximately 200-yard section of two-lane highway running adjacent to the fast-moving North Santiam River (Figure 1). The highway is winding and runs east-west across the Cascade Mountain range connecting the Salem and Bend-Redmond-Sisters metropolitan areas.

The gasoline discharge occurred at approximately milepost 62 of Oregon State Highway 22 just east of the towns of Detroit and Idanha. The accident occurred on a section of highway running through the Willamette National Forest and was directly adjacent to the North Santiam River sitting approximately 15 feet above the water. The highway resides on US Forest Service land. A right-of-way has been granted to the Oregon Department of Transportation for the highway.

4.2. Chronology of Events

At approximately 2230 on 15 December 2017, a tanker truck carrying 11,600 gallons of gasoline hit a patch of ice, rolled over and caught fire. The tanker truck came to rest directly above the 15-foot embankment leading down to the North Santiam River. An unknown amount of gasoline entered the river; odors were reported at least six miles downstream. The driver was killed in the accident. Oregon State HazMat Team 13, local fire and law enforcement, Oregon State Patrol, and Oregon Department of Transportation (ODOT) were first to respond to the scene. The fire was extinguished around 0330 on 16 December. Water was used to extinguish the fire and rills were noted in the bank leading down to the North Santiam River indicating that fuel and runoff from the firefighting activities entered the river.

By the time the Oregon Department of Environmental Quality (ODEQ) State On-Scene Coordinator (SOSC) and EPA OSC arrived on scene at approximately 1030 on 16 December, strong odors of gasoline were present indicating significant contamination still present in surrounding soil. A sheen in the river was observed emanating from along the bank where the incident occurred. There was a report from a contractor representing the potentially responsible party (PRP) that a large sheen was visible in the Detroit Lake Reservoir, which is approximately six miles downstream. Residents in the town of Detroit reported the odor of gasoline in the air. Also on 16 December, the Oregon Health Authority (OHA) notified four downstream public drinking water system intakes to shut down. The PRP contractor, NWFF Environmental, deployed 24 inch hard boom, sorbent boom, and sorbent pads along approximately 500 feet was riverbank and placed a visqueen cover over the impacted soil on the north side of Highway 22. One START member mobilized to the site and conducted air monitoring along the impacted areas of Highway 22. Details of monitoring results are discussed in Section 5.2.

On 17 December, NWFF Environmental staff began excavation of contaminated soil on the south side of Highway 22 between the highway and the North Santiam River. The excavated soil was removed from the spill area and staged on plastic in a gravel lot at the Highway 22 road closure at Idanha. NWFF Environmental staff also collected three surface water samples from the North Santiam River. START

staff collected surface water samples from the North Santiam River near the spill location and down river as far as Detroit, as well as at four downstream municipal surface water intakes. START staff also conducted community air monitoring between the site and Detroit, targeting residential locations on the river side of Highway 22. Details of community air monitoring locations and results are discussed in Section 5.1 and details of the surface water sampling work are discussed in Section 5.3. NWFF Environmental sampling results are discussed in Section 5.4.

On 18 December, NWFF Environmental staff ceased excavation of contaminated soil along the North Santiam River side of the spill. Some contaminated soil was left in place in order to preserve the integrity of the highway. It was decided to install groundwater wells in the vicinity of the spill location to attempt natural attenuation of the contaminated soil through extracting contaminated groundwater from the wells and shipping the contaminated groundwater off-site. The excavation on the north side of the highway was impeded by utility lines that were discovered approximately 36 inches below the road surface level. NWFF Environmental staff also collected soil samples from the exposed soil and surface water samples from the North Santiam River. A US Fish and Wildlife Service (USFWS) representative was on-site to assess potential impacts to sensitive and natural resources in the North Santiam River. The USFWS representative discovered a deceased whitefish approximately two river miles downstream of the spill location; however, the cause of death could not be determined at the time. START staff collected samples from the downriver municipal intakes as well as from the Minto Fish Hatchery at the request of the US Army Corps of Engineers (Corps).

On 19 December, Cascade Drilling, on behalf of the RP, began installation of monitoring wells on the south side of Highway 22 within the area where the spill occurred. NWFF collected soil and groundwater samples during the installation of the wells. There was no sheen observed on the groundwater collected from the two monitoring wells. NWFF Environmental staff prepared to backfill the areas of excavated soil and collected additional soil and water samples. Oregon Department of Fish and Wildlife (ODFW) representatives worked with the USFWS representative in the assessment of potential impacts to natural resources. ODFW representatives indicated the North Santiam River is habitat known to be used by Chinook salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), rainbow trout (*Oncorhynchus mykiss*), steelhead (*Oncorhynchus mykiss*), and whitefish (*Coregonus clupeaformis*) and the area near the spill may be spawning locations. ODWF and USFWS representatives discovered an additional six deceased whitefish and rainbow trout downstream of the spill location. Additionally, they noted a small sheen in an eddy approximately 500 feet downstream of the spill location. Samples were planned to be collected from this location; however, due to weather conditions, the location could not be safely accessed and was referred to NWFF Environmental and ODEQ to address during better weather conditions. START members collected three surface water samples from the North Santiam River.

On 20 December, Cascade Drilling continued with monitoring well installation. NWFF Environmental staff continued with backfilling and collection of soil, groundwater, and surface water samples. START staff collected samples from the four downstream municipal drinking water systems. Following sample collection, START and EPA demobilized from the site.

5. SAMPLING AND MONITORING

5.1. Community Air Monitoring

Community air monitoring was conducted in response to citizen reports of strong gasoline odors in Detroit, Oregon. Five locations (RES01 through RES05) between the spill location and Detroit were

targeted for air monitoring activities (Figure 2). The locations were selected based on the presence of residential properties and proximity to the North Santiam River. Monitoring was conducted on publicly accessible streets. Monitoring was conducted utilizing a MultiRAE Pro multi-gas meter and an UltraRAE 3000 meter. Monitoring parameters of interest included: volatile organic compounds (VOCs) via photoionization detectors (11.6 eV lamp on MultiRAE, and 9.6 lamp on UltraRAE); Oxygen levels via an electrochemical sensor; and lower explosive limit levels via wheatstone bridge. The meters were fresh air calibrated prior to use. The meters were allowed to stabilize for approximately 1 minute at chest level at each monitoring location. The readings were then recorded on data reconnaissance devices. VOCs were not detected at any of the locations which indicated downgradient residences were not being impacted by vapors associated with the release. Concentrations of VOCs utilizing the MultiRAE Pro were zero parts per billion (ppb). Because there were no detections of VOCs utilizing the MultiRAE Pro, benzene tubes were not utilized when monitoring with the UltraRAE 3000. Results on the UltraRAE 3000 ranged from 0 to 15 parts per million (ppm). Oxygen levels did not deviate from standard ambient conditions and no LEL was detected. Community air monitoring activities were ceased because there were no measurements of VOC vapors and no additional reports of gasoline odors were received. Figure 2 provides the locations and results from community air monitoring activities.

5.2. Spill Location Air Monitoring

Spill location air monitoring was conducted on the day of the spill to characterize the vapor levels of contamination present and assess respiratory hazards posed to site workers. Monitoring utilizing a MultiRAE Pro and UltraRAE was conducted on the north side of Highway 22 where the pup trailer spill occurred; along the south side of Highway 22 where the truck spill occurred; and along the bank of the North Santiam River inside as well as downstream of the deployed boom. A layer of visqueen had been laid over the soil in the area of the spill on the north side of Highway 22. Monitoring along the north side of Highway 22 was conducted both above and below the visqueen. The monitoring locations were randomly selected and spaced generally every 50 feet along the length of the impacted areas beginning at the western edge of the spill area. Readings were collected from a total of 14 locations. Due to the elevated VOC readings, a benzene-specific tube was attached to the UltraRAE and additional benzene measurements were conducted at three of the previous locations, all of the locations were not reevaluated due to impending darkness and potential safety concerns of working near the river. The results were used to establish an exclusion zone based on the presence of volatile vapors in the air at the spill location indicating respiratory protection is recommended as outlined by standard EPA worker health and safety guidelines (EPA 1992). These measurement readings also confirmed that gasoline had spilled and was impacting soil as well as the North Santiam River in the vicinity of the spill. These results also indicated soil contamination in the area of the spill and that a removal of contaminated soil in the area of the spill was necessary. A summary of the monitoring results is provided in Table 1.

Table 1 – Summary of Spill Location Air Monitoring Results

Location	VOC range (ppm)	Oxy (%)	LEL (%)	Benzene (ppm)
Above visqueen	0.119 – 0.891	21.2	0	17.8
Below visqueen	64.07 – 10.35	21.2	0	n/a
Bank Area	184.85	21.3	0	n/a
Guard Rail	30.4	0	0	9.25
North Santiam River	3.75 – 623	21.1 – 21.2	0	n/a

5.3. EPA Surface Water Sampling

START staff collected a total of 27 water samples (including quality assurance/quality control) during the response. One background sample (BG01) was collected approximately 0.25 mile upstream of the spill location. One sample (SR01) was collected from within the boom in an area of visible sheen at the spill location. Four samples (SR05 through SR08) were collected from the North Santiam River between the spill locations and Idanha. Four samples (SR02, SR04, SR09, and SR10) were collected from the Detroit Lake Reservoir. One sample (FH01) was collected from the Minto Fish Hatcher. Figure 3 depicts the North Santiam River sampling locations relative to the spill location. Finally, four downstream municipal intakes were sampled (City of Gates – SR03; Lyons-Mehama Water District – DI01; Salem Public Works – DI02; and Stayton Water Supply – DI03). Figure 4 depicts the locations of the drinking water sample locations. The samples collected from the North Santiam River, the City of Gates, and the Stayton Water Supply were collected by direct dipping the pre-preserved sample containers into the water. The samples collected from the Minto Fish Hatchery, Lyons-Mehama Water District, Stayton Water Supply, and Salem Public Works were collected from spigots, prior to any water treatment, in pre-preserved sample containers. Samples were collected on three different days from each of the water supply systems. Samples were collected from the same location each time.

5.3.1. Analytical Methods

Samples were submitted to TestAmerica Laboratories in Corvallis, Oregon for benzene, toluene, ethylbenzene, and xylene (BTEX) and gasoline range organics analyses. The samples that were collected from drinking water intakes were subject to drinking water analytical method 524.2 for BTEX analysis. The samples collected from the river (not associated with drinking water) were analyzed for BTEX using EPA SW-846 Method 8260. All samples were analyzed for gasoline range organics utilizing method NWTPH-Gx.

5.3.2.Sample Result Comparison Criteria

Surface water results from samples associated with the municipal drinking water intakes are compared to the federal maximum contaminant level (MCL) which protect public health by limiting the levels of contamination in drinking water (EPA 2017b). All other samples collected from the North Santiam River are compared to the national recommended water quality criteria (NRWQC) – human health criteria for the consumption of water and organisms, which are levels of contamination which if present in water, are not expected to cause adverse effects to human health (EPA 2017a). These criteria values are presented in the first row of the analytical results tables (Table 2 and 3)

5.3.3.Sample Results

Sample results from the North Santiam River, Detroit Lake Reservoir, and Minto Fish Hatchery are provided in Table 2. Sample results indicate the presence of benzene at a concentration of 8.84 micrograms per liter (µg/L) in the sample collected at the spill location. These results exceed the NWRQC benzene concentration of 0.58 µg/L. The benzene screening level was not exceeded in any of the other samples collected. No other analyte was detected at concentrations that exceeded the analyte-specific NRWQC; however, sample results of locations down river of the spill location indicated detections of Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethylbenzene, m,p-Xylene, and o-Xylene. No detections were reported for the background sample. These sample results indicated that gasoline had migrated from the spill location to areas downriver.

Sample results for the drinking water intakes are provided in Table 3. No analytes were detected above the method detection limit or federal MCL for any of the samples collected from any of the drinking water intake. These results indicate the drinking water supplies were not impacted as a result of the gasoline spill. Oregon Health Authority informed all of these drinking water systems it was safe to resume pumping water from the North Santiam River.

Table 2 – North Santiam River Surface Water Samples Analytical Results

Sample Number	NRWQC – Human Health Criteria (µg/L)	17120002	17120001	17120003	17120008	17120009	17120010	17120011	171220013	17120019	17120020	17120021
Station Location		BG01	SR01	SR02	SR04	SR05	SR06	SR07	FH01	SR08	SR09	SR10
Sample Date		12/17/2017	12/17/2017	12/17/2017	12/17/2017	12/17/2017	12/17/2017	12/17/2017	12/18/2017	12/19/2017	12/19/2017	
Description		Background	Spill Location	Detroit Lake Reservoir	Mongold Boat Launch	Idanha	Mile Marker 58	Mile Marker 60	Minto Fish Hatchery	Mile Marker 62	Detroit Lake Dam	
NWTPH-Gx (µg/L)												
TPH-Gasoline	NA	35.0 U	**1,520**	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	**49.7 JQ**	35.0 U	35.0 U
BTEX (µg/L)												
Benzene	0.58	0.150 U	**8.84**	0.150 U	**0.320 JQ**	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U
Toluene	57	0.150 U	**35.5**	**0.240 JQ**	**2.87**	**0.210 JQ**	**0.350 JQ**	**0.590**	0.150 U	**0.470 JQ**	0.150 U	0.150 U
Ethylbenzene	68	0.150 U	**8.99**	0.150 U	**0.520**	0.150 U	0.150 U	**0.190 JQ**	0.150 U	**0.160 JQ**	0.150 U	0.150 U
m,p-Xylene	NA	0.300 U	**41.7**	0.300 U	**2.09**	**0.310 JQ**	**0.480 JQ**	**0.780 JQ**	0.300 U	**0.590 JQ**	0.300 U	0.300 U
o-Xylene	NA	0.150 U	**20.0**	0.150 U	**0.850**	**0.170 JQ**	**0.250 JQ**	**0.360 JQ**	0.150 U	**0.260 JQ**	0.150 U	0.150 U

Note: Bold type indicates the sample result is above the method detection limit.
Highlight type indicates the sample result exceeds the National Recommended Water Quality Criteria – Human Health (consumption of water and organism).

Key:
µg/L = micrograms per liter.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NRWQC = National Recommended Water Quality Criteria
Q = Detected concentration is below the method reporting limit but is above the method quantitation limit.
U = The analyte was analyzed for, but was not detected above the level of the reported sample.

Table 3 – Municipal Drinking Water System Analytical Results

Sample Number	Maximum Contaminant Level (µg/L)	17120004	17120015	17120023	17120005	17120016	17120024	17120025	17120006	17120017	17120026	17120007	17120014	17120027
Station Location			DI01			DI02				DI03			SR03	
Sample Date		12/17/2017	12/18/2017	12/20/2017	12/17/2017	12/18/2017	12/20/2017	12/20/2017	12/17/2017	12/18/2017	12/20/2017	12/17/2017	12/18/2017	12/20/2017
Description		Lyons Mehama Water District			Salem Public Works				Stayton Water Supply				City of Gates	
NWTPH-Gx (µg/L)														
TPH-Gasoline	NA	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U	35.0 U
BTEX (µg/L)														
Benzene	5	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U
Toluene	1,000	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U
Ethylbenzene	700	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U
m,p-Xylene	580	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U	0.300 U
o-Xylene	580	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U	0.150 U

Key:
µg/L = micrograms per liter.
U = The analyte was analyzed for, but was not detected above the level of the reported sample.

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5.4. PRP Sampling

NWFF Environmental began conducting surface water sampling on 17 December and soil sampling on 18 December. Samples were submitted to an off-site fixed laboratory for analysis of VOCs by EPA Method 8260B and gasoline by Method NWTPH-Gx. Surface water samples were collected from upstream of the spill location, at the spill location, and seven locations downstream of the site. The surface water sample results as well as a sample location map are provided in Attachment D. Surface water results through 13 January have been provided to EPA. The surface water sample results are compared to NRWQC for human health consumption. Sample results indicate benzene at concentrations that exceeded the NRWQC in samples collected at the spill location and in all locations downstream to sample location North Santiam River - #7. No other analytes were detected above the NRWQC in any of the locations or samples. In general, it appears benzene concentrations are declining over time and with distance from the spill location.

Soil samples were collected along the bank in a grid pattern following excavation activities, two samples were collected from the stock pile for disposal purposes, soil samples were also collected from the monitoring well boreholes as well as well vaults. The soil samples collected from the excavated areas were further divided into Area A (the south side of Highway 22) Area B (the north side of Highway 22) and Area C (area not defined). At the time of the start of sampling, NWFF selected a criteria of 5,000 milligrams per kilogram (mg/kg) as a soil screening level for gasoline. The basis for this screening level is not known. ODEQ risk-based concentrations for gasoline is 20,000 mg/kg for occupational soil dermal contact. Gasoline range organics were detected at concentrations greater than 5,000 mg/kg in the samples collected from the south side of Highway 22 near the spill location. Known contamination was left in place temporarily to preserve the integrity of Highway 22, which would allow for the road to be reopened prior to the holiday weekend and avoid attempting to pave or patch the road in adverse conditions.

As part of the well installation on Highway 22, NWFF collected soil and groundwater samples during the installation of the wells. The soil samples and groundwater samples were not evaluated with respect to screening criteria as part of this report. Gasoline range organics were detected in soil samples ranging in concentration from 40.5 milligrams per kilogram (mg/kg) to 20,500 mg/kg in Area A. In Area B, concentrations ranged from 9.12 mg/kg to 40,200 mg/kg. Concentrations in Area C ranged from 8.57 mg/kg to 213 mg/kg.

5.5. North Santiam River Reconnaissance

On 5 January 2018 Environmental Resource Management, Inc. (ERM), on behalf of the PRP, along with NWFF, ODEQ, USFWS, and ODFW conducted a reconnaissance of the North Santiam River. Neither EPA nor START participated in reconnaissance activities. The purpose of the reconnaissance was to determine if there were visual signs of free product remaining in the North Santiam River or on its banks to guide future planning for sampling and/or cleanup efforts. The reconnaissance effort was conducted beginning near the spill location and continued approximately 2 miles downstream of the spill location. The reconnaissance team noted seven impacted locations along 0.65 mile of the North Santiam River. The memorandum noted there was no visual evidence of free product adhering to vegetation, debris, or the banks but sheen appeared to be clinging to the substrate and was discovered through the agitation of the surface water/sediment by walking in the river. The reconnaissance team also conducted observations of two salmonid spawning beds upstream of the spill location that had been identified by

ODFW. Although only observed from the side of Highway 22, no free product was noted in these areas (ERM 2018). The full text of the reconnaissance report is provided in Attachment E.

6. SUMMARY AND CONCLUSIONS

On 15 December 2017 a tanker truck and pup trailer hauling gasoline hit a patch of ice, rolled, and caught fire resulting in a spill of an unknown quantity of gasoline into the North Santiam River. EPA and START mobilized to the site and conducted air monitoring in the vicinity of the spill. Monitoring indicated the presence of VOC vapors in the vicinity of the spill location which necessitated the removal of impacted soil at the spill location.

START also conducted air monitoring in residential areas downstream between the spill location and the town of Detroit. Monitoring results did not indicate the presence of VOCs at any of the monitoring locations. Community air monitoring activities were ceased because there were no measurements of VOC vapors and no additional reports of gasoline odors were received.

START collected 13 surface water samples from downstream municipal water system intakes. No analytes were detected above the federal MCLs or method detection limit in any of these samples.

In addition, surface water samples were collected from the North Santiam River from upgradient of the site down to the Minto Fish Hatchery. Sample results did not indicate the presence of any contaminants above the NRWQC in any of the downriver samples. The sample from the spill location, indicated the presence of benzene in excess of the NRWQC.

Excavation of the bank was conducted by the PRP and was stopped prior to removal of all contaminated soil in order to maintain the integrity of the highway. A series of groundwater wells were installed at the spill location to address the residual contamination under Highway 22 and between the highway and the North Santiam River. Ongoing work is being conducted under authority of ODEQ.

At the request of USFWS and ODFW, a reconnaissance of the North Santiam River was conducted by the PRP and contractors, USFWS, and ODFW to determine potential impacts to the river, wildlife, or the shoreline downstream of the spill location. Areas of product were noted in seven locations for a total of approximately 0.65 miles of river; however, the team did not note visual impacts to the shoreline, vegetation, or wildlife.

7. REFERENCES

Ecology and Environment, Inc. (E & E), January 2018, *Site-Specific Sampling Plan and Data Management Plan*, prepared for US Environmental Protection Agency, Contract Number EP-S7-13-07, Task Order Number TO-22-T1-SS1.

Environmental Resources Management, Inc. (ERM), January 8, 2018, memorandum to Ross McMakin, NWFF Environmental, regarding North Santiam River Gasoline Spill Recon, January 5, 2018

United States Environmental Protection Agency, May 22, 2017a, Drinking Water Contaminants – Standards and Regulations, www.epa.gov/dwstandardsregulations.

———, May 9, 2017b, National Recommended Water Quality Criteria – Human Health Criteria, www.epa.gov/wqc/national-recommended-water-quality-criteria

———, June 1992, *Standard Operating Safety Guides*, Publication 9285.1-03 PB92-963414.

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FIGURES

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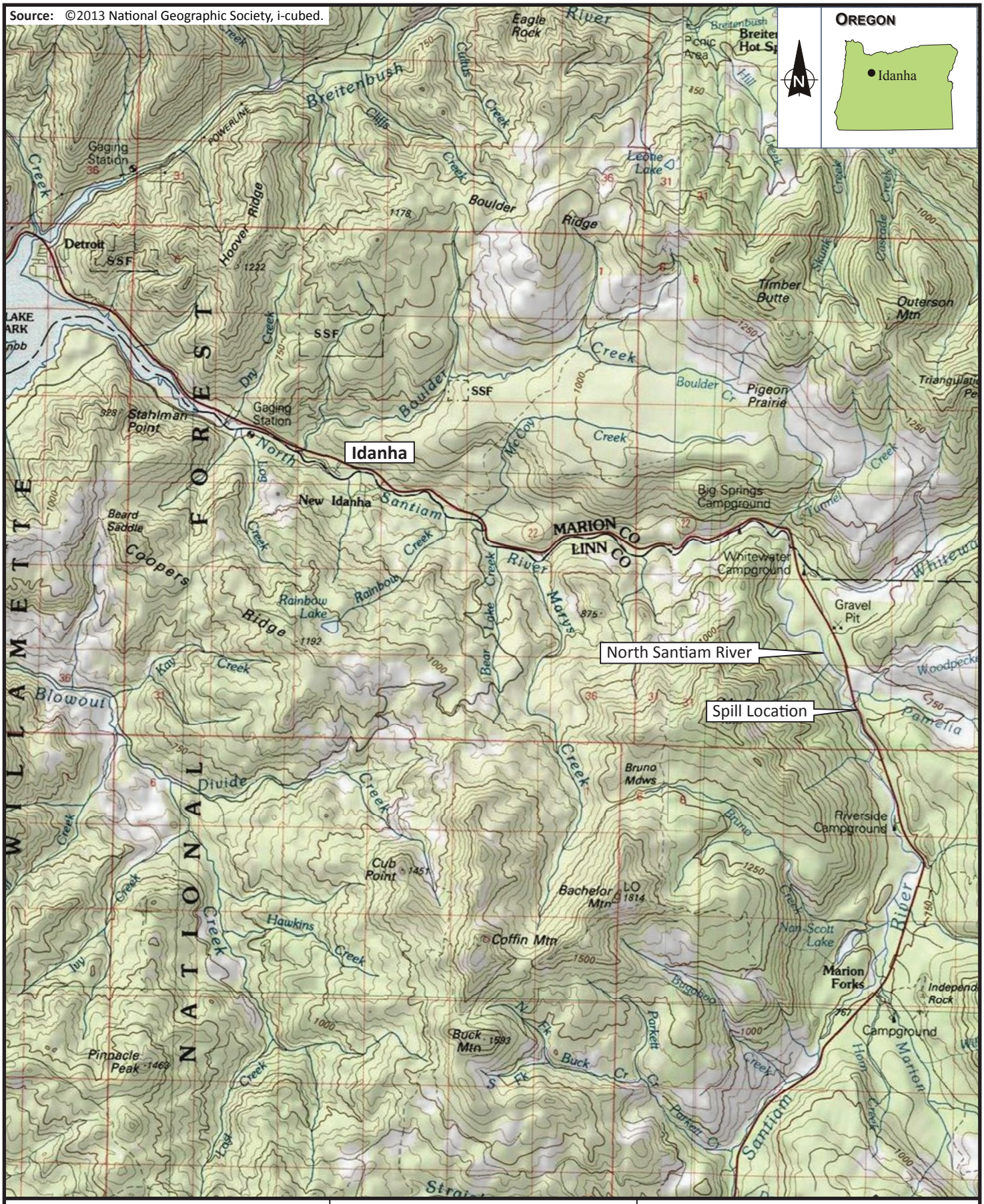


ecology and environment, inc.
Global Environmental Specialists
Seattle, Washington

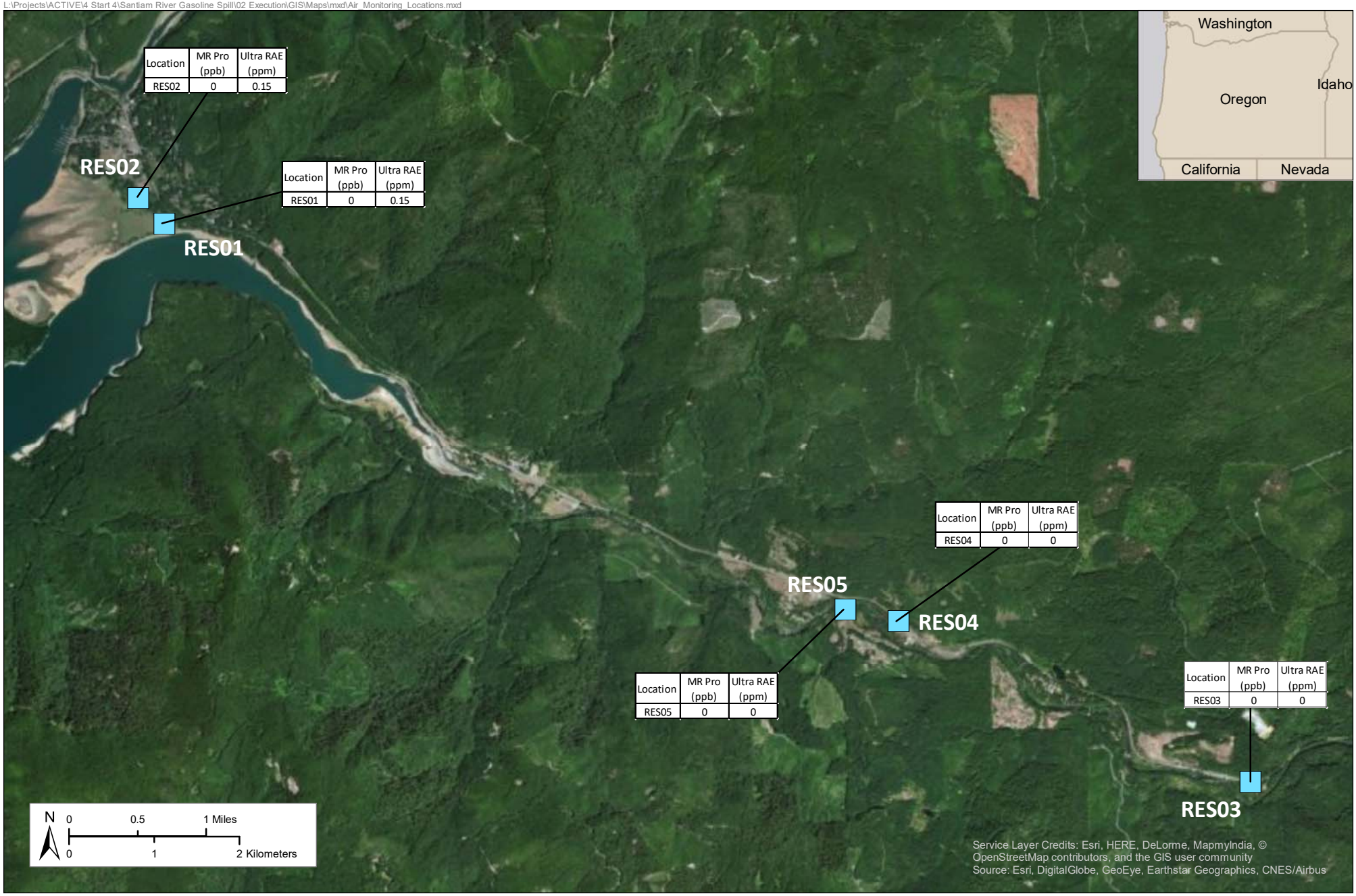
NORTH SANTIAM RIVER
GASOLINE SPILL
Idanha, Oregon

0 1 2
Approximate Scale in Miles

Figure 1
SITE VICINITY MAP

Date:	Drawn by:	
2/7/18	AES	10:START-IV\TO22T1SS1\fig 1

L:\Projects\ACTIVE\4 Start 4\Santiam River Gasoline Spill\02 Execution\GIS\Maps\mxd\Air_Monitoring_Locations.mxd



ecology and environment, inc.
Global Environmental Specialists

Figure 2
AIR MONITORING LOCATIONS
NORTH SANTAIUM RIVER GASOLINE SPILL
Idanha, Oregon

Date: 3/8/2018

EPA EMERGENCY RESPONSE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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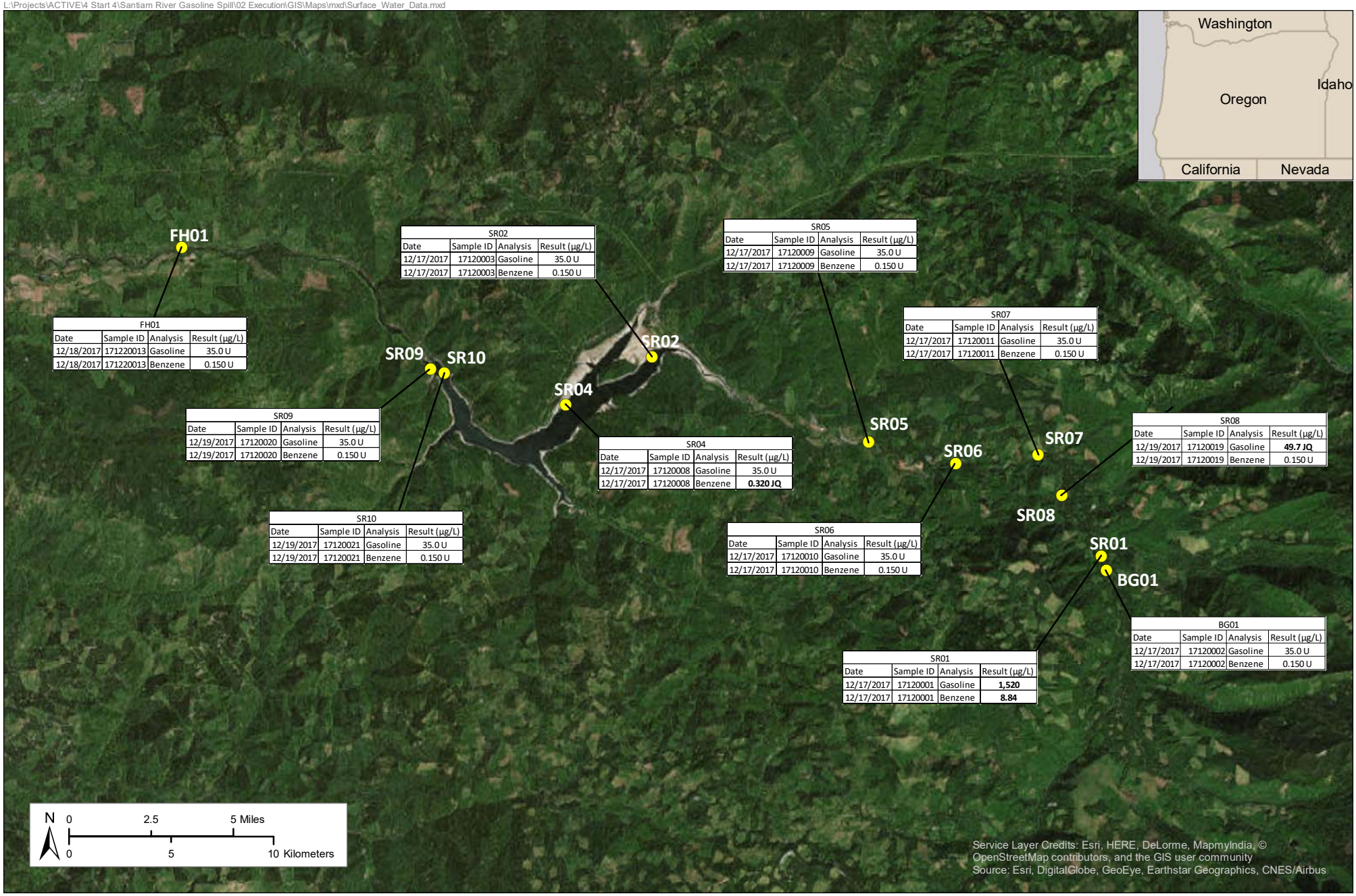

FH01			
Date	Sample ID	Analysis	Result (µg/L)
12/18/2017	171220013	Gasoline	35.0 U
12/18/2017	171220013	Benzene	0.150 U

SR02			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120003	Gasoline	35.0 U
12/17/2017	17120003	Benzene	0.150 U

SR05			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120009	Gasoline	35.0 U
12/17/2017	17120009	Benzene	0.150 U

SR07			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120011	Gasoline	35.0 U
12/17/2017	17120011	Benzene	0.150 U

SR09			
Date	Sample ID	Analysis	Result (µg/L)
12/19/2017	17120020	Gasoline	35.0 U
12/19/2017	17120020	Benzene	0.150 U

SR04			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120008	Gasoline	35.0 U
12/17/2017	17120008	Benzene	**0.320 JQ**

SR08			
Date	Sample ID	Analysis	Result (µg/L)
12/19/2017	17120019	Gasoline	**49.7 JQ**
12/19/2017	17120019	Benzene	0.150 U

SR10			
Date	Sample ID	Analysis	Result (µg/L)
12/19/2017	17120021	Gasoline	35.0 U
12/19/2017	17120021	Benzene	0.150 U

SR06			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120010	Gasoline	35.0 U
12/17/2017	17120010	Benzene	0.150 U

BG01			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120002	Gasoline	35.0 U
12/17/2017	17120002	Benzene	0.150 U

SR01			
Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120001	Gasoline	**1,520**
12/17/2017	17120001	Benzene	**8.84**

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Figure 3
SURFACE WATER SAMPLE LOCATIONS AND RESULTS
NORTH SANTAIUM RIVER GASOLINE SPILL
Idanha, Oregon

Date: 3/8/2018

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY EPA EMERGENCY RESPONSE

L:\Projects\ACTIVE\4 Start 4\Santiam River Gasoline Spill\02 Execution\GIS\Maps\mxd\Drinking_Water_Data.mxd

Stayton Water Supply

Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120006	Gasoline	35.0 U
12/17/2017	17120006	Benzene	0.150 U
12/18/2017	17120017	Gasoline	35.0 U
12/18/2017	17120017	Benzene	0.150 U
12/19/2017	17120026	Gasoline	35.0 U
12/19/2017	17120026	Benzene	0.150 U

Lyons-Mehama Water District

Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120004	Gasoline	35.0 U
12/17/2017	17120004	Benzene	0.150 U
12/18/2017	17120015	Gasoline	35.0 U
12/18/2017	17120015	Benzene	0.150 U
12/19/2017	17120023	Gasoline	35.0 U
12/19/2017	17120023	Benzene	0.150 U

Salem Public Works

Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120005	Gasoline	35.0 U
12/17/2017	17120005	Benzene	0.150 U
12/18/2017	17120016	Gasoline	35.0 U
12/18/2017	17120016	Benzene	0.150 U
12/19/2017	17120024	Gasoline	35.0 U
12/19/2017	17120024	Benzene	0.150 U
12/19/2017	17120025	Gasoline	35.0 U
12/19/2017	17120025	Benzene	0.150 U

City of Gates

Date	Sample ID	Analysis	Result (µg/L)
12/17/2017	17120007	Gasoline	35.0 U
12/17/2017	17120007	Benzene	0.150 U
12/18/2017	17120014	Gasoline	35.0 U
12/18/2017	17120014	Benzene	0.150 U
12/19/2017	17120027	Gasoline	35.0 U
12/19/2017	17120027	Benzene	0.150 U

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Figure 4
DRINKING WATER INTAKE SAMPLE LOCATIONS AND RESULTS
NORTH SANTAIUM RIVER GASOLINE SPILL
Idanha, Oregon

Date: 3/8/2018

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY EPA EMERGENCY RESPONSE

ATTACHMENT A

Photographic Documentation

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North Santiam River Gasoline Spill

Idanha, Oregon

Task Order Number: TO-22-T1-SS1

Photographed by: Erin Lynch (EL), Seth Wing (SW)

Photo 1 Air Monitoring location #1 - North side of Highway 22.

Direction: *East* *Date: 12/16/17* *Time: 14:59* *Taken by: EL*

Photo 2 Air Monitoring location #6 - Inside the boom at the spill location.

Direction: *East* *Date: 12/16/17* *Time: 15:21* *Taken by: EL*

Photo 3 Air Monitoring location #7 - Inside the boom at the spill location.

Direction: *East* *Date: 12/16/17* *Time: 15:27* *Taken by: EL*

Photo 4 Air Monitoring location #9 - Inside the boom, note the sheen on the river and product adsorbed by the pads.

Direction: *Down* *Date: 12/16/17* *Time: 15:31* *Taken by: EL*

Photo 5 Gasoline sheen on the North Santiam River inside the sorbent boom.

Direction: *West* *Date: 12/16/17* *Time: 15:33* *Taken by: EL*

Photo 6 Air Monitoring location #11 - Downstream of boomed area. Note small sheen on water.

Direction: *East* *Date: 12/16/17* *Time: 15:36* *Taken by: EL*

Photo 7 Air Monitoring location #13 - Approximately 40 feet downstream of boomed area.

Direction: *East* *Date: 12/16/17* *Time: 15:41* *Taken by: EL*

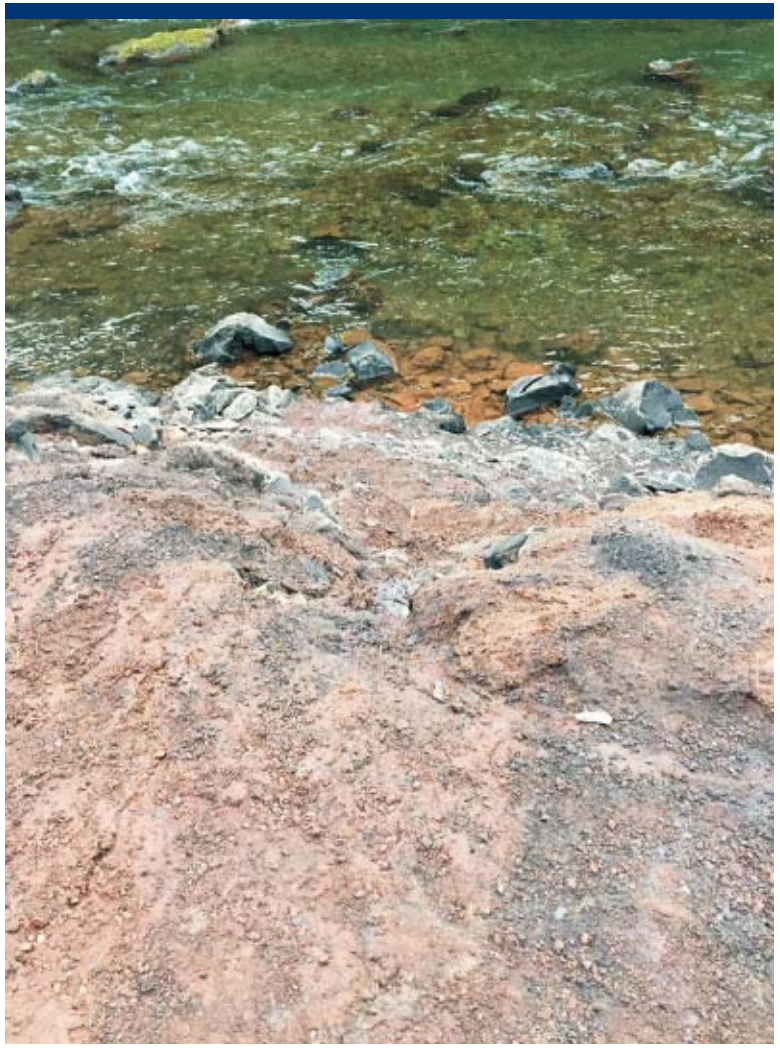

Photo 8 Rill from firefighting efforts.

Direction: *Down* *Date: 12/16/17* *Time: 15:54* *Taken by: EL*

Photo 9 NWFF Environmental installing hard boom on North Santiam River.

Direction: *Down* *Date: 12/16/17* *Time: 15:55* *Taken by: EL*

Photo 10 Visqueen and impacted soil on north side of Highway 22.

Direction: *North* *Date: 12/16/17* *Time: 15:59* *Taken by: EL*

Photo 11 Panoramic of boomed area on North Santiam River at the spill location.

Direction: *South* *Date: 12/16/17* *Time: 16:25* *Taken by: EL*

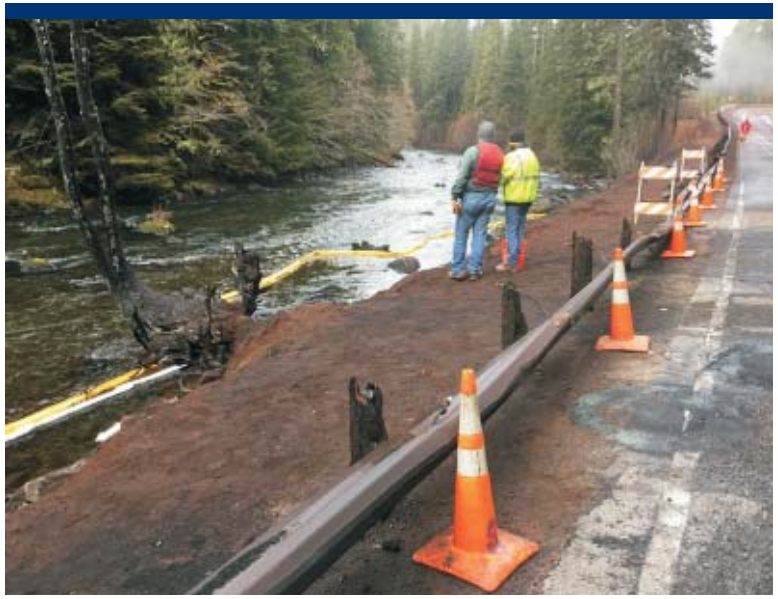

Photo 12 South side Highway 22 at spill location.

Direction: *Southwest* *Date: 12/17/17* *Time: 09:26* *Taken by: SW*

Photo 13 Collecting sample from North Santiam River at the spill location.

Direction: *South* *Date: 12/17/17* *Time: 09:43* *Taken by: SW*

Photo 14 Collecting a background sample upstream of the spill location.

Direction: *Southwest* *Date: 12/17/17* *Time: 09:58* *Taken by: SW*

Photo 15 Collecting a sample from the east end of Detroit Lakes Reservoir.

Direction: *East* *Date: 12/17/17* *Time: 11:12* *Taken by: SW*

Photo 16 Air monitoring on banks of Detroit Lakes Reservoir.

Direction: *Northeast* *Date: 12/17/17* *Time: 11:29* *Taken by: SW*

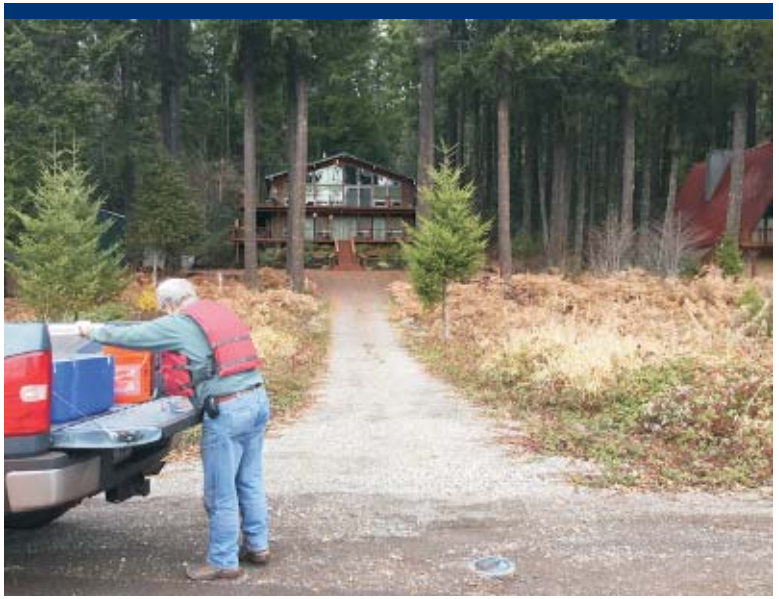

Photo 17 Road close to Detroit flats recreation area.

Direction: *North* *Date: 12/17/17* *Time: 11:42* *Taken by: SW*

Photo 18 Pump House at Lyons-Mehama Water District.

Direction: *East* *Date: 12/17/17* *Time: 12:40* *Taken by: SW*

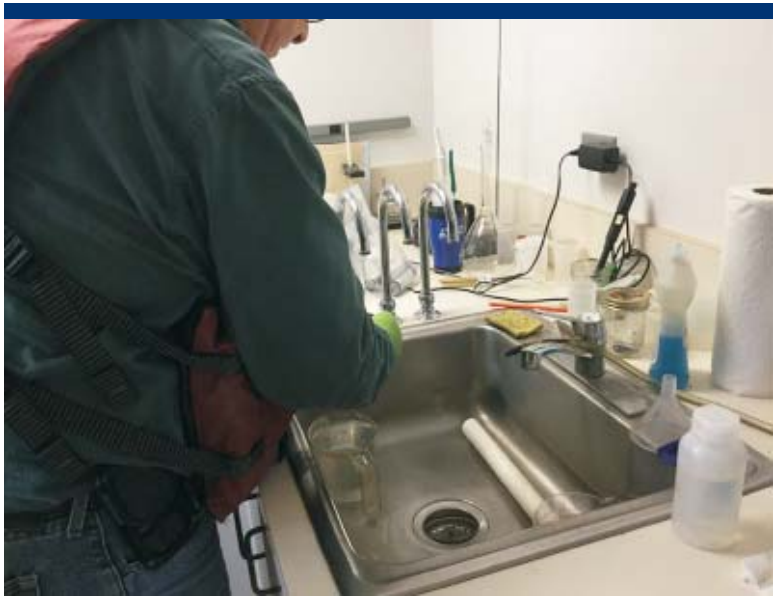

Photo 19 Collecting a sample from Lyons-Mehama Water District intake.

Direction: *East* *Date: 12/17/17* *Time: 12:42* *Taken by: SW*

Photo 20 Salem Public Works surface water intake.

Direction: *Northeast* *Date: 12/17/17* *Time: 13:11* *Taken by: SW*

Photo 21 Collecting a sample from Salem Public Works intake.

Direction: *Northeast* *Date: 12/17/17* *Time: 13:14* *Taken by: SW*

Photo 22 Collecting a sample from Stayton Water District intake.

Direction: *North* *Date: 12/17/17* *Time: 13:35* *Taken by: SW*

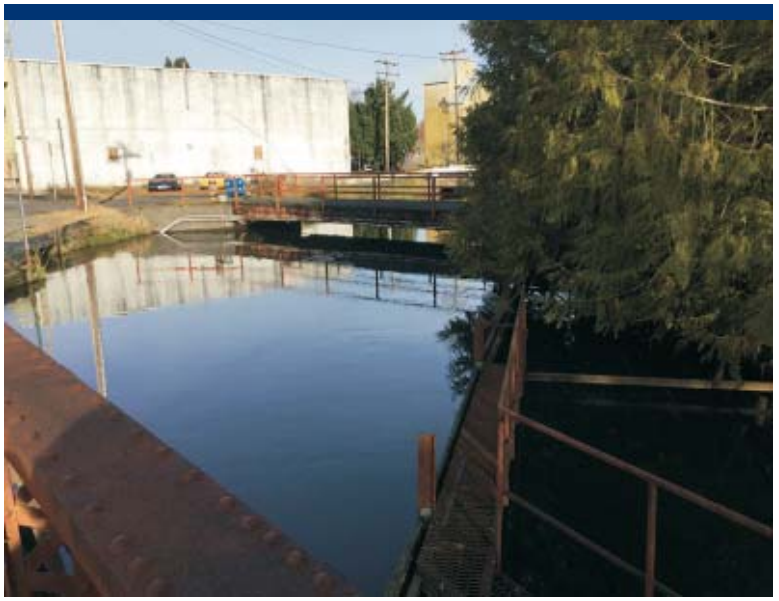

Photo 23 Stayton Water District intake.

Direction: *Northeast* *Date: 12/17/17* *Time: 13:40* *Taken by: SW*

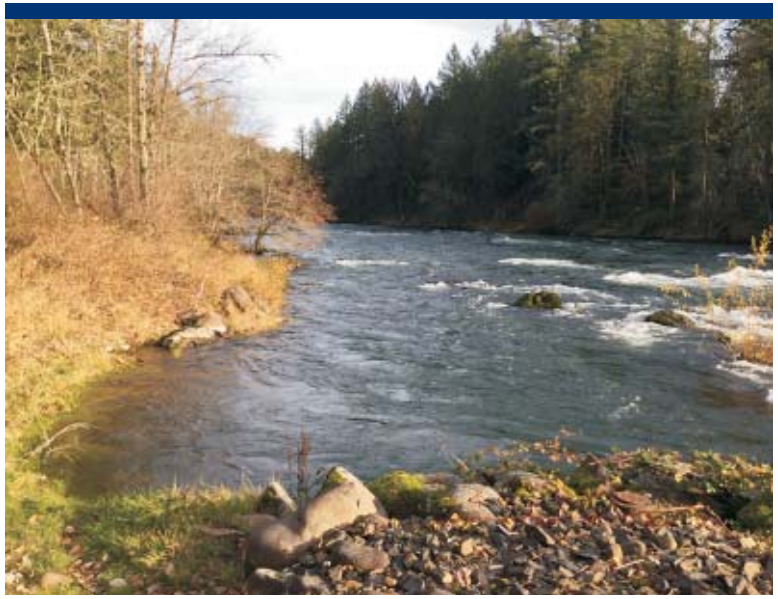

Photo 24 Location of City of Gates intake.

Direction: *East* *Date: 12/17/17* *Time: 14:14* *Taken by: SW*

Photo 25 Collecting a sample at City of Gates intake.

Direction: *Northeast* *Date: 12/17/17* *Time: 14:20* *Taken by: SW*

Photo 26 Collecting a sample from Detroit Lakes Reservoir at Mongold boat launch.

Direction: *Southwest* *Date: 12/17/17* *Time: 15:13* *Taken by: SW*

Photo 27 Air monitoring on Church St. near Idanha.

Direction: *Southwest* *Date: 12/17/17* *Time: 15:40* *Taken by: SW*

Photo 28 Collecting a sample near Idanha.

Direction: *Southwest* *Date: 12/17/17* *Time: 15:48* *Taken by: SW*

Photo 29 Collecting a sample near Mile Marker 58.

Direction: *West* *Date: 12/17/17* *Time: 16:04* *Taken by: SW*

Photo 30 Collecting a sample near Mile Marker 60.

Direction: *West* *Date: 12/17/17* *Time: 16:15* *Taken by: SW*

Photo 31 Air monitoring along road near Mile Marker 56.

Direction: *Southwest* *Date: 12/17/17* *Time: 17:57* *Taken by: SW*

Photo 32 Collecting a sample at Minto Fish Hatchery intake.

Direction: *East* *Date: 12/18/17* *Time: 12:21* *Taken by: SW*

Photo 33 Minto Fish Hatchery.

Direction: *South* *Date: 12/18/17* *Time: 12:21* *Taken by: SW*

Photo 34 On top of Detroit Lakes Dam.

Direction: *Southwest* *Date: 12/19/17* *Time: 10:59* *Taken by: SW*

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ATTACHMENT B

Sampling Forms

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North Santiam Gasoline Spill
Event Summary

Site Name	North Santiam River
Address	MP 60 Highway 22
Event	Sampling
TDD	TO-22-T1-SS1
Owner	US Forest Service/Oregon
Sampling Dates	12/17/17 - 12/20/17

Sample Number	Location	Date	Time	Signed
17120002	BG01	12/17/2017	956	
17120001	SR01	12/17/2017	943	
17120019	SR08	12/19/2017	1418	
17120011	SR07	12/17/2017	1615	
17120010	SR06	12/17/2017	1601	
17120009	SR05	12/17/2017	1547	
17120003	SR02	12/17/2017	1111	
17120008	SR04	12/17/2017	1512	
17120021	SR10	12/19/2017	1224	

North Santiam River Gasoline Spill Sampling

Event Summary (Continued)

Sample Number	Location	Date	Time	Signed
17120020	SR09	12/19/2017	1138	
17120013	FH01	12/18/2017	1223	
17120007	SR03	12/17/2017	1417	
17120014	SR03	12/18/2017	1244	
17120027	SR03	12/20/2017	1010	
17120004	DI01	12/17/2017	1239	
17120015	DI01	12/18/2017	1315	
17120023	DI01	12/20/2017	1103	
17120005	DI02	12/17/2017	1312	
17120016	DI02	12/18/2017	1343	
17120024	DI02	12/20/2017	1207	
17120025	DI02	12/20/2017	1209	
17120006	DI03	12/17/2017	1337	

North Santiam River Gasoline Spill Sampling

Event Summary (Continued)

Sample Number	Location	Date	Time	Signed
17120017	DI03	12/18/2017	1420	
17120026	DI03	12/20/2017	1234	

North Santiam Gasoline Spill
Sample Details

Sample Number **17120002**

Sampling Date	12/17/2017
Sampling Time	09:56
Matrix	Surface Water
Location	BG01
Sub Location	Background
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
TPHGX	3	40 mL Amber
BTEX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120001**

Sampling Date	12/17/2017
Sampling Time	09:43
Matrix	Surface Water
Location	SR01
Sub Location	Spill location
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
TPHGX	3	40 mL Amber
BTEX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120019**

Sampling Date	12/19/2017
Sampling Time	14:18
Matrix	Surface Water
Location	SR08
Sub Location	Forest Service Road 47
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120011**

Sampling Date	12/17/2017
Sampling Time	16:15
Matrix	Surface Water
Location	SR07
Sub Location	Mile Marker 60
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120010**

Sampling Date	12/17/2017
Sampling Time	16:01
Matrix	Surface Water
Location	SR06
Sub Location	Mile Marker 58
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120009**

Sampling Date	12/17/2017
Sampling Time	15:47
Matrix	Surface Water
Location	SR05
Sub Location	Idahna
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120003**

Sampling Date	12/17/2017
Sampling Time	11:11
Matrix	Surface Water
Location	SR02
Sub Location	Detroit Lake Reservoir
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120008**

Sampling Date	12/17/2017
Sampling Time	15:12
Matrix	Surface Water
Location	SR04
Sub Location	Mangold Boat Launch
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120021**

Sampling Date	12/19/2017
Sampling Time	12:24
Matrix	Surface Water
Location	SR10
Sub Location	Detroit Lake Dam
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120020**

Sampling Date	12/19/2017
Sampling Time	11:38
Matrix	Surface Water
Location	SR09
Sub Location	Detroit Lake Dam
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120013**

Sampling Date	12/18/2017
Sampling Time	12:23
Matrix	Surface Water
Location	FH01
Sub Location	Minto Fish Hatchery
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120007**

Sampling Date	12/17/2017
Sampling Time	14:17
Matrix	Surface Water
Location	SR03
Sub Location	City of Gates
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120014**

Sampling Date	12/18/2017
Sampling Time	12:44
Matrix	Surface Water
Location	SR03
Sub Location	City of Gates
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120027**

Sampling Date	12/20/2017
Sampling Time	10:10
Matrix	Surface Water
Location	SR03
Sub Location	City of Gates
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120004**

Sampling Date	12/17/2017
Sampling Time	12:39
Matrix	Surface Water
Location	DI01
Sub Location	Lyons-Mehama Water District
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct from pump house faucet

North Santiam Gasoline Spill
Sample Details

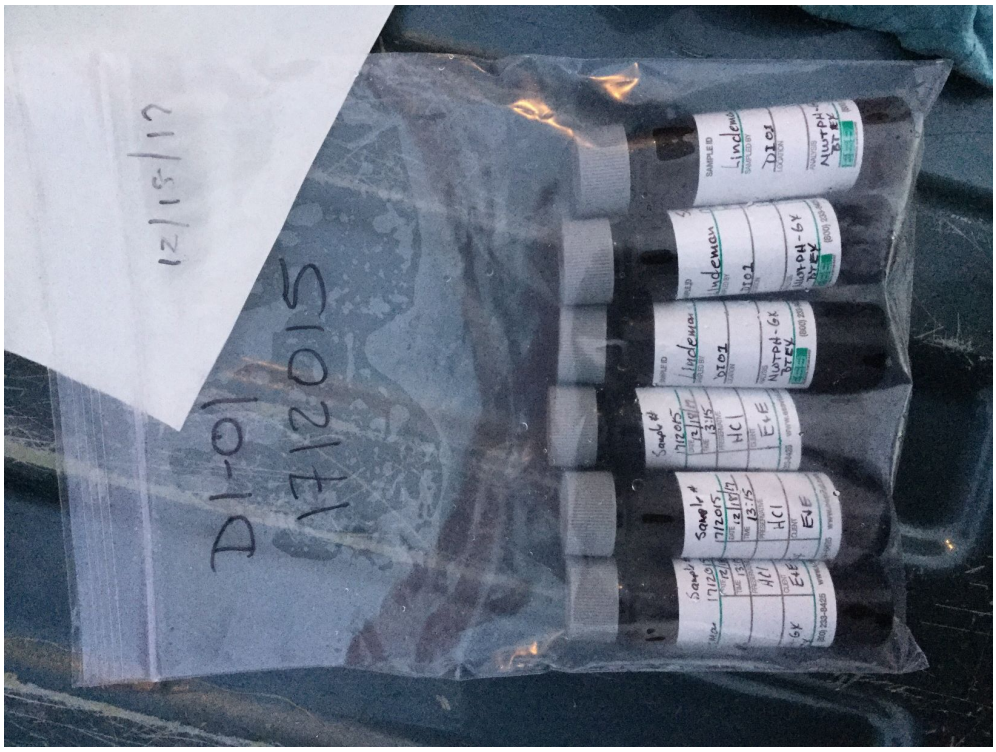
Sample Number **17120015**

Sampling Date	12/18/2017
Sampling Time	13:15
Matrix	Surface Water
Location	DI01
Sub Location	Lyons-Mehama Water District
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct from pump house faucet



North Santiam Gasoline Spill
Sample Details

Sample Number **17120023**

Sampling Date	12/20/2017
Sampling Time	11:03
Matrix	Surface Water
Location	DI01
Sub Location	Lyons-Mehama Water District
Sampled By	E. Lindeman

Collection Method	Grab
Type	MS/MSD

Analysis	Quantity	Type
BTEX	9	40 mL Amber
TPHGX	9	40 mL Amber

Sampling Equipment/Technique:

Direct from pump house faucet

North Santiam Gasoline Spill
Sample Details

Sample Number **17120005**

Sampling Date	12/17/2017
Sampling Time	13:12
Matrix	Surface Water
Location	DI02
Sub Location	Salem Public Works
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct from spigot

North Santiam Gasoline Spill
Sample Details

Sample Number **17120016**

Sampling Date	12/18/2017
Sampling Time	13:43
Matrix	Surface Water
Location	DI02
Sub Location	Salem Public Works
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct from spigot

North Santiam Gasoline Spill
Sample Details

Sample Number **17120024**

Sampling Date	12/20/2017
Sampling Time	12:07
Matrix	Surface Water
Location	DI02
Sub Location	Salem Public Works
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct from spigot

North Santiam Gasoline Spill
Sample Details

Sample Number **17120025**

Sampling Date	12/20/2017
Sampling Time	12:09
Matrix	Surface Water
Location	DI02
Sub Location	Salem Public Works
Sampled By	E. Lindeman

Collection Method	Grab
Type	Field Duplicate

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct from spigot

North Santiam Gasoline Spill
Sample Details

Sample Number **17120006**

Sampling Date	12/17/2017
Sampling Time	13:37
Matrix	Surface Water
Location	DI03
Sub Location	Stayton Water District
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120017**

Sampling Date	12/18/2017
Sampling Time	14:20
Matrix	Surface Water
Location	DI03
Sub Location	Stayton Water District
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

North Santiam Gasoline Spill
Sample Details

Sample Number **17120026**

Sampling Date	12/20/2017
Sampling Time	12:34
Matrix	Surface Water
Location	DI03
Sub Location	Stayton Water District
Sampled By	E. Lindeman
Collection Method	Grab
Type	Field Sample

Analysis	Quantity	Type
BTEX	3	40 mL Amber
TPHGX	3	40 mL Amber

Sampling Equipment/Technique:

Direct dip

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ATTACHMENT C

Data Validation Memoranda

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ecology and environment, inc.
Global Environmental Specialists
720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: December 20, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 8 water samples collected from the Santiam River Gasoline site in Idanha, Oregon, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method 8260) was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

1712001	1712002	1712003	1712008
1712009	1712010	1712011	1712012

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on December 17 or 18, 2017, and were analyzed by December 18, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for soil and preserved water samples.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All average Relative Response Factors (RRFs) were within the QC limits of < 20%. All Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were no detections in the trip blank (sample 1712012; analyzed in a separate batch).

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards were within ± 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan, the analytical method(s), and/or the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712001

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Lab Name: TestAmerica ASL

Lab Sample ID: R363901

Lab File ID: 363901.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	8.84	
108-88-3	Toluene	0.150	0.500	35.5	
100-41-4	Ethylbenzene	0.150	0.500	8.99	
108-38-3/1	m,p-Xylene	0.300	1.00	41.7	
95-47-6	o-Xylene	0.150	0.500	20.0	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712002

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363902

Lab File ID: 363902.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712003

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363903

Lab File ID: 363903.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.240	J
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712008**

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363908

Lab File ID: 363908.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.320	J
108-88-3	Toluene	0.150	0.500	2.87	
100-41-4	Ethylbenzene	0.150	0.500	0.520	
108-38-3/1	m,p-Xylene	0.300	1.00	2.09	
95-47-6	o-Xylene	0.150	0.500	0.850	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712009

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363909

Lab File ID: 363909.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.210	JQ
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.310	JQ
95-47-6	o-Xylene	0.150	0.500	0.170	JQ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712010**

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363910

Lab File ID: 363910.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.350	JQ
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.480	JQ
95-47-6	o-Xylene	0.150	0.500	0.250	JQ

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712011

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363911

Lab File ID: 363911.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.590	
100-41-4	Ethylbenzene	0.150	0.500	0.190	J
108-38-3/1	m,p-Xylene	0.300	1.00	0.780	J
95-47-6	o-Xylene	0.150	0.500	0.360	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712012

SDG No.: R3639

Analysis Method: SW8260B

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Lab Name: TestAmerica ASL

Lab Sample ID: R363912

Lab File ID: 363912.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

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MEMORANDUM

DATE: December 20, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 4 water samples collected from the Santiam River Gasoline site in Idanha, Oregon, has been completed. Volatile Organic Compound (VOC) analysis (EPA Method 524.2) was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

1712004 1712005 1712006 1712007

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $4^{\circ}C \pm 2^{\circ}C$. The samples were collected on December 17, 2017, and were analyzed by December 18, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for soil and preserved water samples.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All average Relative Response Factors (RRFs) were within the QC limits of < 20%. All Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were no detections in the trip blank (sample 1712012; analyzed in a separate batch).

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards were within $\pm$ 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan, the analytical method(s), and/or the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712004

SDG No.: R3639

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R363904

Lab File ID: 363904.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712005

SDG No.: R3639

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R363905

Lab File ID: 363905.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712006

SDG No.: R3639

Analysis Method: E524.2

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363906

Lab File ID: 363906.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

MW 12-20-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712007**

SDG No.: R3639

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R363907

Lab File ID: 363907.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-2017

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MEMORANDUM

DATE: December 20, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington MW

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 12 water samples collected from the Santiam River Gasoline site located in Idanha, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (ODEQ Method NWTPH-Gx) analyses was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

1712001	1712002	1712003	1712004
1712005	1712006	1712007	1712008
1712009	1712010	1712011	1712012

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on December 17, 2017, and were analyzed by December 18, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for preserved water samples.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. The correlation coefficient was within the QC limits of 0.99 or greater.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences were less than or equal to the laboratory control limits.

4. Error Determination: Not Performed.

Samples necessary for bias and precision determination were not provided to the laboratory. All samples were flagged RND (Recovery Not Determined) and PND (Precision Not Determined), although the flags are not found on the Form I's.

5. Blanks: Acceptable.

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank or in the trip blank (sample 1712012).

6. System Monitoring Compounds (SMC): Acceptable.

All recoveries of the SMCs were greater than 10% and within QC limits.

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spikes (BS) and BS Duplicate (BSD) Analyses: Acceptable.

BS and BSD results were within laboratory QC limits.

9. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

10. Laboratory Contact: Not Required.

No laboratory contact was required.

11. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan, the analytical method(s), and/or the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712001

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363901

Lab File ID: R363901.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	1520	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712002

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363902

Lab File ID: R363902.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712003

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Lab Name: TestAmerica ASL

Lab Sample ID: R363903

Lab File ID: R363903.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712004**

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Lab Name: TestAmerica ASL

Lab Sample ID: R363904

Lab File ID: R363904.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

MW 12-20-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712005

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363905

Lab File ID: R363905.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712006

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Lab Name: TestAmerica ASL

Lab Sample ID: R363906

Lab File ID: R363906.D

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

JMW 12-20-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712007

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363907

Lab File ID: R363907.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712008

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363908

Lab File ID: R363908.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712009

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363909

Lab File ID: R363909.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712010

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363910

Lab File ID: R363910.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712011

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363911

Lab File ID: R363911.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: 1712012

SDG No.: R3639

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R363912

Lab File ID: R363912.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/18/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

MW 12-20-17

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MEMORANDUM

DATE: December 20, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 6 water samples collected from the Santiam River Gasoline site in Idanha, Oregon, has been completed. Volatile Organic Compound (VOC) analysis (EPA Methods 524.2 and 8260) was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

1712013	1712014	1712015	1712016	1712017	1712018

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on December 18, 2017, and were analyzed by December 19, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for preserved water samples.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All average Relative Response Factors (RRFs) were within the QC limits of < 20%. All Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were no detections in the trip blank (sample 1712018; analyzed in a separate batch).

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

BS analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries were within QC limits.

8. Internal Standards: Acceptable.

All internal standards were within $\pm$ 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan, the analytical method(s), and/or the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712013**

SDG No.: R3641

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R364101

Lab File ID: 364101.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712014**

SDG No.: R3641

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364102

Lab File ID: 364102.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712015**

SDG No.: R3641

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364103

Lab File ID: 364103.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712016**

SDG No.: R3641

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364104

Lab File ID: 364104.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712017**

SDG No.: R3641

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364105

Lab File ID: 364105.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712018**

SDG No.: R3641

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364106

Lab File ID: 364106.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

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MEMORANDUM

DATE: December 20, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 6 water samples collected from the Santiam River Gasoline site located in Idanha, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (ODEQ Method NWTPH-Gx) analyses was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

1712013	1712014	1712015	1712016	1712017	1712018

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on December 18, 2017, and were analyzed by December 19, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for soil and preserved water samples.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were less than or equal to the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences were less than or equal to the laboratory control limits.

4. Blanks: Acceptable.

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank or in the trip blank.

5. System Monitoring Compounds (SMC): Acceptable.

All recoveries of the SMCs were greater than 10% and within QC limits.

6. Blank Spikes (BS) and BS Duplicate (BSD) Analyses: Acceptable.

BS and BSD results were within laboratory QC limits.

7. Duplicates: Acceptable.

All spike duplicate results were within laboratory QC limits.

8. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

9. Laboratory Contact: Not Required.

No laboratory contact was required.

10. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), and the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample

quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712013**

SDG No.: R3641

Analysis Method: NWTPH-GX

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364101

Lab File ID: R364101.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-20-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712014**

SDG No.: R3641

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R364102

Lab File ID: R364102.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

MW 12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712015**

SDG No.: R3641

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R364103

Lab File ID: R364103.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712016**

SDG No.: R3641

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R364104

Lab File ID: R364104.D

Level: (LOW/MED) LOW

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-20-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712017**

SDG No.: R3641

Analysis Method: NWTPH-GX

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364105

Lab File ID: R364105.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-2017

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **1712018**

SDG No.: R3641

Analysis Method: NWTPH-GX

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R364106

Lab File ID: R364106.D

Date Received: 12/18/17

Date Analyzed: 12/19/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-2017

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MEMORANDUM

DATE: December 21, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 9 water samples collected from the Santiam River Gasoline site in Idanha, Oregon, has been completed. Volatile Organic Compound (VOC) analysis (EPA Methods 524.2 and 8260) was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

17120019	17120020	17120021	17120022	17120023	17120024
17120025	17120026	17120027			

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $4^{o}C \pm 2^{o}C$. The samples were collected on December 19 or 20, 2017, and were analyzed by December 21, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for preserved water samples.

2. Tuning: Acceptable.

Tuning was performed at the beginning of each 12-hour analysis sequence. All results were within QC limits.

3. Initial Calibration: Acceptable.

All average Relative Response Factors (RRFs) were within the QC limits of < 20%. All Relative Standard Deviations (RSDs) and/or correlation coefficients were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank. There were no detections in the trip blank (sample 17120022).

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) and Matrix Spike (MS) Analysis: Acceptable.

BS and MS analyses were performed per SDG or per matrix per concentration level, whichever was more frequent. All recoveries and percent differences for spike duplicates were within QC limits.

8. Internal Standards: Acceptable.

All internal standards were within $\pm$ 30 seconds of the continuing calibration internal standard retention times. All area counts were within 50 % to 200 % of the continuing calibration area counts.

9. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan, the analytical method(s), and/or the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".

NJ - The analyte has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the sample.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120019**

SDG No.: R3673

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367301

Lab File ID: 367301.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.470	J
100-41-4	Ethylbenzene	0.150	0.500	0.160	J
108-38-3/1	m,p-Xylene	0.300	1.00	0.590	J
95-47-6	o-Xylene	0.150	0.500	0.260	J

MW 12-24-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120020**

SDG No.: R3673

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367302

Lab File ID: 367302.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

gmw 12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120021**

SDG No.: R3673

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367303

Lab File ID: 367303.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

MW 12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120022**

SDG No.: R3673

Analysis Method: SW8260B

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367304

Lab File ID: 367304.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120023**

SDG No.: R3673

Analysis Method: E524.2

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367305

Lab File ID: 367305.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-27-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120024**

SDG No.: R3673

Analysis Method: E524.2

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367308

Lab File ID: 367308.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-27-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120025**

SDG No.: R3673

Analysis Method: E524.2

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367309

Lab File ID: 367309.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

1/4/2018

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120026**

SDG No.: R3673

Analysis Method: E524.2

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367310

Lab File ID: 367310.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/21/17

Dilution Factor: 1

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-27-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120027**

SDG No.: R3673

Analysis Method: E524.2

Matrix: WATER

Sample wt/vol: (G/ML) 5 ML

Level: (LOW/MED) LOW

Instrument: MSE

GC Column: DB-VRX ID: 0.25 (mm)

Lab Name: TestAmerica ASL

Lab Sample ID: R367311

Lab File ID: 367311.D

Date Received: 12/20/17

Date Analyzed: 12/21/17

Dilution Factor: 1

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
71-43-2	Benzene	0.150	0.500	0.150	U
108-88-3	Toluene	0.150	0.500	0.150	U
100-41-4	Ethylbenzene	0.150	0.500	0.150	U
108-38-3/1	m,p-Xylene	0.300	1.00	0.300	U
95-47-6	o-Xylene	0.150	0.500	0.150	U

12-21-17

ecology and environment, inc.
Global Environmental Specialists
720 Third Avenue, Suite 1700
Seattle, Washington 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: December 21, 2017

TO: Renee Nordeen, START-IV Project Manager, E & E, Seattle, Washington

FROM: Mark Woodke, START-IV Chemist, E & E, Seattle, Washington

SUBJ: **Organic Data Quality Assurance Review, Santiam River Gasoline Site, Idanha, Oregon**

REF: TDD: TO-22-T1-SS1 PAN: 1004530.0022.001.02

The data quality assurance review of 9 water samples collected from the Santiam River Gasoline site located in Idanha, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (ODEQ Method NWTPH-Gx) analyses was performed by Test America, Inc., Corvallis, Oregon. All sample analyses were evaluated following EPA's Stage 2B and/or 4 Data Validation Electronic and/or Manual Process (S2B/4VE/M).

The samples were numbered:

17120019	17120020	17120021	17120022	17120023	17120024
17120025	17120026	17120027			

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of 4°C ± 2°C. The samples were collected on December 19 or 20, 2017, and were analyzed by December 21, 2017, therefore meeting QC criteria of less than 14 days between collection and analysis for preserved water samples.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were less than or equal to the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences were less than or equal to the laboratory control limits.

4. Blanks: Acceptable.

A method blank was analyzed at the required frequency of every 12 hours for each matrix, preparation technique, and analysis system. Gasoline-range TPHs were not detected in the method blank or in the trip blank.

5. System Monitoring Compounds (SMC): Acceptable.

All recoveries of the SMCs were greater than 10% and within QC limits.

6. Blank Spikes (BS), BS Duplicate (BSD), Matrix Spike (MS), and MS Duplicate (MSD) Analyses: Acceptable.

BS, BSD, MS, and MSD results were within laboratory QC limits.

7. Duplicates: Acceptable.

All spike duplicate results were within laboratory QC limits.

8. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

9. Laboratory Contact: Not Required.

No laboratory contact was required.

10. Overall Assessment of Data for Use

The reviewer used professional judgment to apply a single bias qualifier when more than one bias qualifier was applicable to an individual estimated sample result.

The overall usefulness of the data is based on the criteria outlined in the Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the analytical method(s), and the EPA Region 10 Emergency Management Program SOG 144E Analytical Data Validation. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

H - The sample result is biased high.

J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

K - The bias of the sample is not known.

L - The sample result is biased low.

Q - Detected concentration is below the method reporting limit/Contract Required Quantitation Limit, but is above the method quantitation limit.

R - The data is rejected and unusable. The analyte may or may not be present in the sample.

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The material was analyzed for but was not detected. The reported detection limit is estimated because QC criteria were not met.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120019**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367301

Lab File ID: R367301.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	49.7	J

MW 12-27-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120020**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367302

Lab File ID: R367302.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-27

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120021**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367303

Lab File ID: R367303.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm)

Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120022**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367304

Lab File ID: R367304.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-22-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120023**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367305

Lab File ID: R367305.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120024**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367308

Lab File ID: R367308.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-27-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120025**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367309

Lab File ID: R367309.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

MR 12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120026**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367310

Lab File ID: R367310.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-21-17

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

Field Sample ID: **17120027**

SDG No.: R3673

Analysis Method: NWTPH-GX

Matrix: WATER

Lab Name: TestAmerica ASL

Sample wt/vol: (G/ML) 5 ML

Lab Sample ID: R367311

Lab File ID: R367311.D

Level: (LOW/MED) LOW

Date Received: 12/20/17

Date Analyzed: 12/20/17

Dilution Factor: 1

Instrument: GCZ

GC Column: Rxi-624 ID: 0.25 (mm) Concentration Units: ug/L

CAS No.	Analyte	DL	PQL	Result	Q
TPH-Gasoline	TPH-Gasoline	35.0	250	35.0	U

12-21-17

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ATTACHMENT D

NWFF Environmental Soil, Surface Water, and Groundwater Analytical Tables

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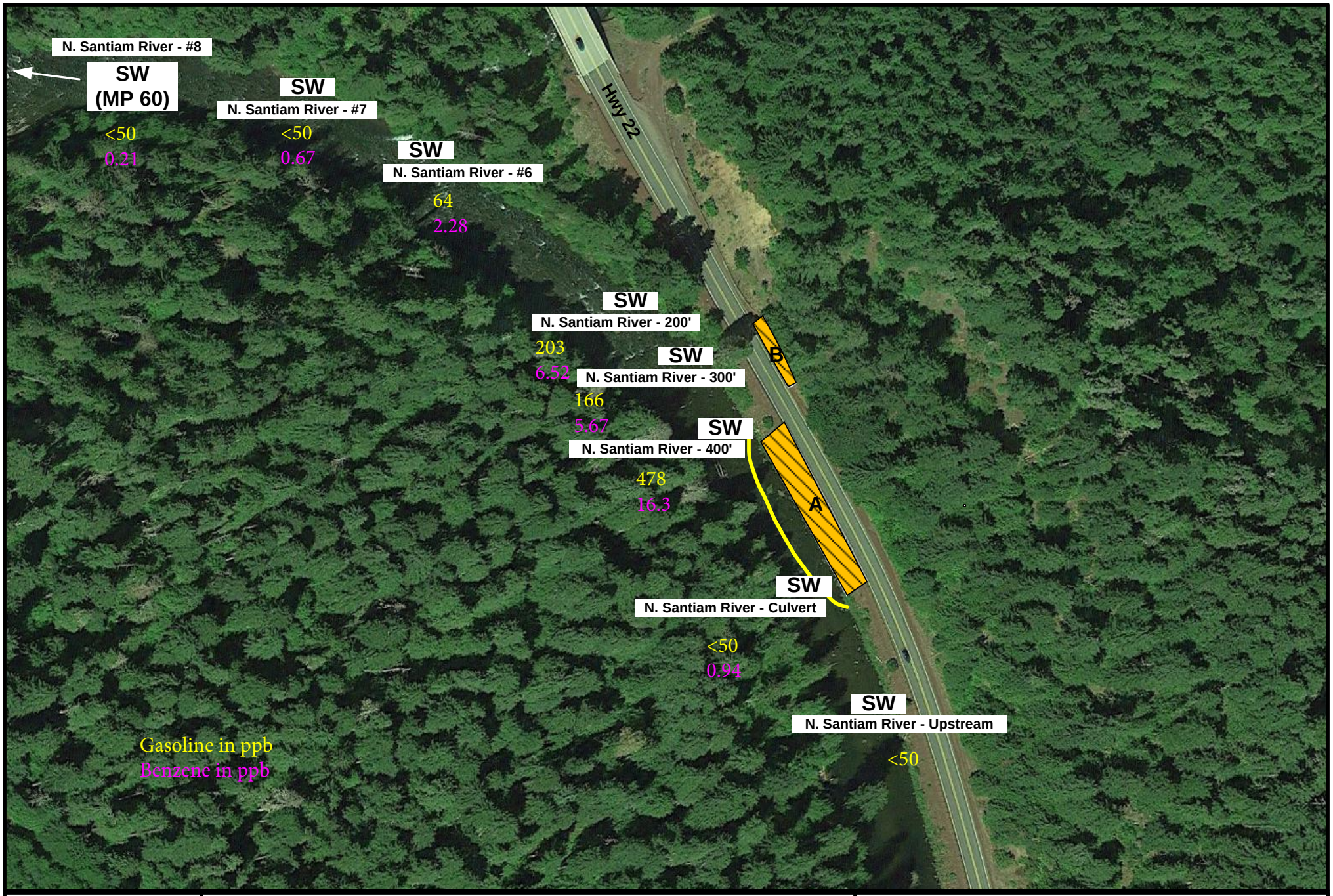

December 28, 2017

FIGURE 4: SURFACE WATER SAMPLE LOCATIONS

BNB ENVIRONMENTAL, PC
4090 BARRETT DRIVE
HOOD RIVER, OR 97031
503-913-7870

Highway 22 Mile Post 62.5
Gasoline Tanker Spill

LEGEND

- A — Soil Sampling Area On River Side of Highway
- B — Soil Sampling Area On Hill Side of Highway
- SW — Surface Water Sample Location
- Outer Oil Boom

N

SCALE IN FEET (Approximate)

0 37.5 80 160

TABLE 1
Soil Sample Results - Total Petroleum Hydrocarbons and Volatile Organic Compounds (mg/Kg)
Highway 22 - MP 62.5 Gasoline Tanker Spill (OERS 2017-????)
Idanha, Oregon 97???

Sample I.D.	Depth (ft bsg)	Date Collected	TPH-Gasoline by Northwest Method NWTPH-Gx	Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/Kg)										
				Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Isopropyl-benzene	MTBE	Naphthalene
STOCKPILE SAMPLES - COLLECTED 12/18/17														
SP-1	0.5 feet	12/18/17	NA	**4.8**	**198**	**132**	**843**	**414**	**123**	< 6.6	< 3.3	**18.9**	< 6.6	**73.4**
SP-2	0.5 feet	12/18/17	NA	**6.94**	**249**	**159**	**904**	**428**	**139**	< 2.69	< 1.34	**23.6**	< 2.69	**102**
AREA A SAMPLES - COLLECTED 12/18-19/17														
(603,17,2)	2 feet	12/18/17	**172**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(592,26,8)	8 feet	12/18/17	**13,800**	**11.7**	**279**	**161**	**910**	**371**	**121**	< 2.97	< 1.48	**21.7**	< 2.97	**68.2**
(580,17,2)	2 feet	12/18/17	**20,500**	**46.8**	**983**	**244**	**1180**	**407**	**137**	< 2.68	< 1.34	**27.3**	< 2.68	**80.4**
(592,36,15)	15 feet	12/18/17	**4,800**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(571,36,15)	15 feet	12/18/17	**7,150**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(561,26,8)	8 feet	12/18/17	**7,710**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(561,36,15)	15 feet	12/18/17	**12,600**	**8.69**	**148**	**98.7**	**620**	**386**	**120**	< 2.84	< 1.42	**16.8**	< 2.84	**120**
(555,17,2)	2 feet	12/18/17	**8,390**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(551,26,8)	8 feet	12/18/17	**11,200**	**6.53**	**151**	**97.7**	**611**	**335**	**101**	< 3.55	< 1.77	**15.5**	< 3.55	**84.0**
(533,36,15)	15 feet	12/18/17	**4,520**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(415,41,8)	8 feet	12/19/17	**8.78**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(475,17,2)	2 feet	12/19/17	**18.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(495,17,2)	2 feet	12/19/17	**6,830**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(561,17,2)	2 feet	12/19/17	**201**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(515,41,15)	15 feet	12/19/17	**4,720**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(495,41,15)	15 feet	12/19/17	**8,610**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(515,17,2)	2 feet	12/19/17	**45.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(415,17,2)	2 feet	12/19/17	**235**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(580,26,8)	8 feet	12/19/17	**7,380**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(435,41,8)	8 feet	12/19/17	**4,550**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(580,36,15)	15 feet	12/19/17	**13,300**	**3.82**	**159**	**111**	**720**	**433**	**121**	< 5.88	< 2.94	**16.3**	< 5.88	**144**
(455,17,2)	2 feet	12/19/17	< 8.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(425,17,2)	2 feet	12/19/17	**102**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(455,41,10)	10 feet	12/19/17	**40.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(555,26,8)	8 feet	12/19/17	**16,200**	**5.40**	**179**	**137**	**946**	**455**	**156**	< 2.63	< 1.32	**20.0**	< 2.63	**118**
(533,17,2)	2 feet	12/19/17	**289**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(521,26,8)	8 feet	12/19/17	**5,340**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(521,17,2)	2 feet	12/19/17	**967**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(551,36,15)	15 feet	12/19/17	**415**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(571,17,2)	2 feet	12/19/17	< 7.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(571,26,8)	8 feet	12/19/17	**73.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(617,36,15)	15 feet	12/19/17	**602**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(617,17,2)	2 feet	12/19/17	**89.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(475,41,15)	15 feet	12/19/17	**118**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(521,36,15)	15 feet	12/19/17	**33,000**	**58.5**	**802**	**388**	**2530**	**923**	**324**	< 5.12	< 2.56	**47.8**	< 5.12	**163**
(617,26,8)	8 feet	12/19/17	**43.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(603,36,15)	15 feet	12/19/17	**9,400**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(592,17,2)	2 feet	12/19/17	**2,820**	< 0.501	**10.6**	**17.8**	**137**	**131**	**32.5**	< 2.50	< 1.25	**3.35**	< 2.50	**23.8**
AREA B SAMPLES - COLLECTED 12/20/17														
(300,-19,3)	3 feet	12/20/17	**4,310**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(320,-19,3)	3 feet	12/20/17	< 4.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(330,-24,-2)	+2 feet	12/20/17	**40,200**	**30.6**	**762**	**617**	**2970**	**1310**	**543**	< 4.61	< 2.31	**82.9**	< 4.61	**279**
(340,-19,3)	3 feet	12/20/17	**9.12**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(350,-24,-2)	+2 feet	12/20/17	**643**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(360,-19,3)	3 feet	12/20/17	**79.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(370,-24,-2)	+2 feet	12/20/17	**36.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(380,-19,3)	3 feet	12/20/17	**67**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(390,-24,-2)	+2 feet	12/20/17	**46.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(394,-19,3)	3 feet	12/20/17	< 8.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 1
Soil Sample Results - Total Petroleum Hydrocarbons and Volatile Organic Compounds (mg/Kg)
Highway 22 - MP 62.5 Gasoline Tanker Spill (OERS 2017-????)
Idanha, Oregon 97???

Sample I.D.	Depth (ft bsg)	Date Collected	TPH-Gasoline by Northwest Method NWTPH-Gx	Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/Kg)										
				Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Isopropyl-benzene	MTBE	Naphthalene
AREA C SAMPLES - COLLECTED 1/3/18														
(330,-27,-2)	+2 feet	1/3/18	< 5.35	< 0.0107	< 0.0535	< 0.0268	< 0.0803	< 0.0535	< 0.0535	< 0.0535	< 0.0268	< 0.0535	< 0.0535	< 0.107
(319,-32,-2)	2 feet	1/3/18	**32.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(300,-19,4)	4 feet	1/3/18	**213**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(300,-32,-2)	+2 feet	1/3/18	**10.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(280,-19,2)	2 feet	1/3/18	**113**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(280,-27,1)	1 foot	1/3/18	**8.57**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(267,-19,1)	1 foot	1/3/18	< 8.59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(319,-19,3.5)	3.5 feet	1/3/18	**74.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BOREHOLE SAMPLES														
(423,10,30)	30 feet	12/19/17	< 7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(487,10,30)	30 feet	12/20/17	< 7.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(556,10,30)	30 feet	12/20/17	< 6.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(602,10,30)	30 feet	12/20/17	< 4.84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(520,-13,25)	25 feet	1/2/18	< 3.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(469,-13,20)	20 feet	1/3/18	< 3.76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(407,-13,15)	15 feet	1/3/18	< 3.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(316,-13,12)	12 feet	1/3/18	**11.6**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
WELL VAULT SAMPLES														
BH-5														
BH-5-3.5'-Vault	3.5 feet	1/11/18	< 2.24	**0.00538**	< 0.0224	< 0.0112	< 0.0336	< 0.0224	< 0.0224	< 0.0224	< 0.0112	< 0.0224	< 0.0224	< 0.0448
BH-4														
(602,14,2)	2 feet	1/16/18	< 3.42	**0.116**	**0.192**	< 0.0171	< 0.0513	< 0.0342	< 0.0342	< 0.0342	< 0.0171	< 0.0342	< 0.0342	< 0.0685
(602,6,2)	2 feet	1/16/18	< 3.19	< 0.00638	< 0.0319	< 0.0160	< 0.0479	< 0.0319	< 0.0319	< 0.0319	< 0.0160	< 0.0319	< 0.0319	< 0.0638
(598.5,10,2)	2 feet	1/16/18	< 4.43	< 0.00886	< 0.0443	< 0.0222	< 0.0665	< 0.0443	< 0.0443	< 0.0443	< 0.0222	< 0.0443	< 0.0443	< 0.0886
(605.5,10,2)	2 feet	1/16/18	**5.17**	**0.0319**	**0.160**	**0.0297**	**0.137**	**0.0460**	< 0.0371	< 0.0371	< 0.0186	< 0.0371	< 0.0371	< 0.0743
(602,8,4.5)	4.5 feet	1/16/18	**4.93**	**0.0417**	**0.221**	**0.0385**	**0.296**	**0.106**	< 0.0409	< 0.0409	< 0.0205	< 0.0409	< 0.0409	< 0.0819
(602,12,4.5)	4.5 feet	1/16/18	**12.6**	**0.210**	**0.883**	**0.130**	**0.764**	**0.157**	**0.0552**	< 0.0345	< 0.0172	< 0.0345	< 0.0345	< 0.0690
BH-3														
(556,14,2)	2 feet	1/16/18	**2350**	**6.00**	**57.1**	**23.0**	**146**	**69.0**	**19.7**	< 0.267	< 0.134	**2.88**	< 0.267	**10.1**
(556,6,2)	2 feet	1/16/18	< 4.18	< 0.00836	< 0.0418	< 0.0209	< 0.0627	< 0.0418	< 0.0418	< 0.0418	< 0.0209	< 0.0418	< 0.0418	< 0.0836
(552.5,10,2)	2 feet	1/16/18	< 3.15	< 0.00629	< 0.0315	< 0.0157	< 0.0472	< 0.0315	< 0.0315	< 0.0315	< 0.0157	< 0.0315	< 0.0315	< 0.0629
(559.5,10,2)	2 feet	1/16/18	< 2.77	< 0.00555	< 0.0277	< 0.0139	< 0.0416	< 0.0277	< 0.0277	< 0.0277	< 0.0139	< 0.0277	< 0.0277	< 0.0555
(556,8,4.5)	4.5 feet	1/16/18	**34.0**	**0.381**	**1.61**	**0.220**	**3.04**	**0.504**	**0.305**	< 0.0364	< 0.0182	< 0.0364	< 0.0364	< 0.0728
(556,12,4.5)	4.5 feet	1/16/18	< 6.42	**0.147**	**0.557**	**0.0648**	**0.328**	**0.0346**	< 0.0321	< 0.0321	< 0.0160	< 0.0321	< 0.0321	< 0.0642
BH-2														
(487,14,2)	2 feet	1/17/18	**1290**	**2.10**	**33.7**	**14.7**	**94.7**	**44.0**	**12.1**	< 0.587	< 0.294	**1.50**	< 0.587	5.64
(487,6,2)	2 feet	1/17/18	< 3.12	**0.0112**	**0.0549**	< 0.0156	< 0.0468	< 0.0312	< 0.0312	< 0.0312	< 0.0156	< 0.0312	< 0.0312	< 0.0624
(483.5,10,2)	2 feet	1/17/18	< 3.71	< 0.00742	< 0.0371	< 0.0185	< 0.0556	< 0.0371	< 0.0371	< 0.0371	< 0.0185	< 0.0371	< 0.0371	< 0.0742
(490.5,10,2)	2 feet	1/17/18	< 2.91	< 0.00582	< 0.0291	< 0.0145	< 0.0436	< 0.0291	< 0.0291	< 0.0291	< 0.0145	< 0.0291	< 0.0291	< 0.0582
(487,8,4.5)	4.5 feet	1/17/18	**5.19**	**0.136**	**0.458**	**0.0469**	**0.224**	< 0.0335	< 0.0335	< 0.0335	< 0.0168	< 0.0335	< 0.0335	< 0.0670
(487,12,4.5)	4.5 feet	1/17/18	**225**	**0.247**	**5.45**	**2.56**	**16.1**	**7.20**	**1.91**	< 0.0596	< 0.0298	**0.260**	< 0.0596	**1.04**

TABLE 1
Soil Sample Results - Total Petroleum Hydrocarbons and Volatile Organic Compounds (mg/Kg)
Highway 22 - MP 62.5 Gasoline Tanker Spill (OERS 2017-????)
Idanha, Oregon 97???

Sample I.D.	Depth (ft bsg)	Date Collected	TPH-Gasoline by Northwest Method NWTPH-Gx	Volatile Organic Compounds (VOCs) by EPA Method 8260B (mg/Kg)										
				Benzene	Toluene	Ethyl-benzene	Total Xylenes	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Isopropyl-benzene	MTBE	Naphthalene
BH-1														
(423,14,2)	2 feet	1/17/18												
(423,6,2)	2 feet	1/17/18												
(419.5,10,2)	2 feet	1/17/18												
(426.5,10,2)	2 feet	1/17/18												
(423,8,4.5)	4.5 feet	1/17/18												
(423,12,4.5)	4.5 feet	1/17/18												

NOTES: **RED** indicates TPH-G concentration > 5,000 mg/kg (milligrams per Kilogram)
1,2,4-TMB = 1,2,4-trimethylbenzene
1,3,5-TMB = 1,3,5-trimethylbenzene
EDB = 1,2-dibromoethane
EDC = 1,2-dichloroethane
MTBE = methyl tert-butyl ether

TABLE 2
Summary of Surface Water Sample Laboratory Analytical Data For TPH-G and Select VOCs
Collected Via North Santiam River
Highway 22 Mile Post Petroleum Tanker Spill (OERS 2012-0678)
Idanha, Oregon 97463

Sample I.D.	Date Collected	TPH-G by Method NWTPH-Gx (µg/L)	VOCs by EPA Method 8260B (µg/L)										
		Gasoline	Benzene	Toluene	Ethyl-benzene	Total Xylenes	iso-Propyl-benzene	MTBE	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Naph-thalene
N. Santiam River - Upstream	12/17/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/18/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/19/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/20/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/21/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/22/17	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/23/17	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/30/17	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
N. Santiam River - Culvert	12/17/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/18/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/19/17	< 100	**0.270**	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/20/17	< 100	**0.538**	**2.12**	< 0.500	**2.07**	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/21/17	< 100	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/22/17	< 50	< 0.200	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/23/17	< 50	**0.411**	**1.30**	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/30/17	< 50	**0.944**	**2.92**	**0.414**	**2.14**	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	**0.173**	**0.703**	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	**0.145**	**0.627**	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
N. Santiam River - 500'	12/17/17	**256**	**4.01**	**17.2**	**3.64**	**20.1**	< 1.00	< 1.00	**6.48**	**1.84**	< 0.500	< 0.500	< 2.00
N. Santiam River - 400'	12/18/17	**213**	**2.75**	**11.8**	**3.16**	**17.7**	< 1.00	< 1.00	**6.46**	**1.94**	< 0.500	< 0.500	< 2.00
	12/19/17	**541**	**15.6**	**38.9**	**5.97**	**33.2**	< 1.00	< 1.00	**10.4**	**2.58**	< 0.500	< 0.500	**2.58**
	12/20/17	**311**	**7.71**	**24.3**	**4.45**	**24.9**	< 1.00	< 1.00	**7.46**	**2.10**	< 0.500	< 0.500	**2.01**
	12/21/17	**146**	**4.29**	**10.9**	**1.62**	**7.38**	< 1.00	< 1.00	**2.15**	< 1.00	< 0.500	< 0.500	< 2.00
	12/22/17	**103**	**3.13**	**8.20**	**1.24**	**5.47**	< 0.500	< 0.500	**1.61**	**0.530**	< 0.250	< 0.250	< 1.00
	12/23/17	**107**	**3.09**	**8.18**	**1.48**	**7.44**	< 0.500	< 0.500	**2.58**	**0.807**	< 0.250	< 0.250	< 1.00
	12/30/17	**478**	**16.3**	**52.9**	**7.10**	**42.9**	< 0.500	< 0.500	**7.35**	**2.26**	< 0.250	< 0.250	**1.36**
	1/2/18	< 50	**1.87**	**7.00**	**1.06**	**5.91**	< 0.500	< 0.500	**1.25**	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	**1.57**	**5.78**	**0.911**	**4.77**	< 0.500	< 0.500	**0.939**	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	**74.7**	**1.42**	**7.40**	**1.15**	**8.05**	< 0.500	< 0.500	**1.54**	**0.605**	< 0.250	< 0.250	< 1.00
N. Santiam River - 300'	12/18/17	**250**	< 0.200	< 1.00	< 0.500	< 1.50	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< 0.500	< 2.00
	12/20/17	**305**	**5.79**	**19.0**	**3.91**	**22.6**	< 1.00	< 1.00	**8.40**	**2.38**	< 0.500	< 0.500	**2.16**
	12/21/17	**134**	**3.75**	**9.50**	**1.46**	**6.24**	< 1.00	< 1.00	**2.05**	< 1.00	< 0.500	< 0.500	< 2.00
	12/22/17	**91.7**	**2.66**	**6.75**	**1.04**	**4.49**	< 0.500	< 0.500	**1.49**	**0.520**	< 0.250	< 0.250	< 1.00
	12/23/17	**97.4**	**2.77**	**7.23**	**1.34**	**0.653**	< 0.500	< 0.500	**2.48**	**0.768**	< 0.250	< 0.250	< 1.00
	12/30/17	**166**	**5.67**	**19.3**	**2.68**	**14.7**	< 0.500	< 0.500	**2.53**	**0.839**	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	**1.41**	**5.53**	**0.804**	**4.51**	< 0.500	< 0.500	**1.00**	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	**1.13**	**4.26**	**0.705**	**3.58**	< 0.500	< 0.500	**0.744**	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	**1.07**	**6.23**	**1.02**	**6.81**	< 0.500	< 0.500	**1.38**	**0.515**	< 0.250	< 0.250	< 1.00

TABLE 2
Summary of Surface Water Sample Laboratory Analytical Data For TPH-G and Select VOCs
Collected Via North Santiam River
Highway 22 Mile Post Petroleum Tanker Spill (OERS 2012-0678)
Idanha, Oregon 97463

Sample I.D.	Date Collected	TPH-G by Method NWTPH-Gx (µg/L)	VOCs by EPA Method 8260B (µg/L)										
		Gasoline	Benzene	Toluene	Ethyl-benzene	Total Xylenes	iso-Propyl-benzene	MTBE	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Naph-thalene
N. Santiam River - 200'	12/18/17	255	2.73	12.0	3.37	19.3	< 1.00	< 1.00	8.36	2.44	< 0.500	< 0.500	2.25
	12/20/17	267	4.77	15.7	3.50	19.9	< 1.00	< 1.00	7.83	2.34	< 0.500	< 0.500	2.30
	12/21/17	141	3.17	8.37	1.47	6.59	< 1.00	< 1.00	2.49	< 1.00	< 0.500	< 0.500	< 2.00
	12/22/17	76.7	2.07	5.33	0.950	4.12	< 0.500	< 0.500	1.80	0.570	< 0.250	< 0.250	< 1.00
	12/23/17	60.4	1.92	5.13	0.967	5.08	< 0.500	< 0.500	2.05	0.660	< 0.250	< 0.250	< 1.00
	12/30/17	203	6.52	22.2	3.10	17.3	< 0.500	< 0.500	3.14	1.06	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	1.41	5.30	0.830	4.57	< 0.500	< 0.500	1.06	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	0.865	3.29	0.500	2.75	< 0.500	< 0.500	0.576	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	1.00	5.76	0.930	6.19	< 0.500	< 0.500	1.26	< 0.500	< 0.250	< 0.250	< 1.00
N. Santiam River - #6	12/22/17	< 50	0.110	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/23/17	< 50	0.732	2.03	0.416	2.02	< 0.500	< 0.500	0.845	< 0.500	< 0.250	< 0.250	< 1.00
	12/30/17	63.7	2.28	8.04	1.21	5.96	< 0.500	< 0.500	1.15	< 0.500	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	0.454	1.83	0.311	1.46	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	0.295	1.21	< 0.250	0.968	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	0.362	2.23	0.381	2.25	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
N. Santiam River - #7	12/22/17	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/23/17	< 50	0.175	0.516	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/30/17	< 50	0.667	2.41	0.341	1.67	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	0.114	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	0.112	0.624	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
N. Santiam River - #8	12/22/17	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/23/17	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	12/30/17	< 50	0.213	0.780	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/2/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/6/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00
	1/13/18	< 50	< 0.100	< 0.500	< 0.250	< 0.750	< 0.500	< 0.500	< 0.500	< 0.500	< 0.250	< 0.250	< 1.00

TABLE 3
Summary of Groundwater Sample Laboratory Analytical Data For TPH-G and Select VOCs
Collected Via North Santiam River
Highway 22 Mile Post Petroleum Tanker Spill (OERS 2012-0678)
Idanha, Oregon 97463

Sample I.D.	Date Collected	TPH-G by Method NWTPH-Gx (µg/L)	VOCs by EPA Method 8260B (µg/L)										
		Gasoline	Benzene	Toluene	Ethyl-benzene	Total Xylenes	iso-Propyl-benzene	MTBE	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Naph-thalene
BH-1													
BH-2													
BH-3													

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		Gasoline	Benzene	Toluene	Ethyl-benzene	Total Xylenes	iso-Propyl-benzene	MTBE	1,2,4-TMB	1,3,5-TMB	EDB	EDC	Naph-thalene
BH-4													
BH-5	1/11/18	425	14.3	35.4	3.27	19.7	< 0.500	< 0.500	1.24	0.748	< 0.250	< 0.250	< 1.00
BH-6	1/11/18	< 50	6.44	18.5	1.77	13.1	< 0.500	< 0.500	0.872	0.574	< 0.250	< 0.250	< 1.00
BH-7	1/11/18	145	3.33	9.87	1.06	8.46	< 0.500	< 0.500	0.562	0.563	< 0.250	< 0.250	< 1.00
Pre-Develop BH-8	1/11/18	173	3.00	8.40	1.14	11.3	< 0.500	< 0.500	1.38	0.857	< 0.250	< 0.250	< 1.00
BH-8	1/11/18	120	1.09	3.30	0.375	3.54	< 0.500	< 0.500	0.573	< 0.500	< 0.250	< 0.250	< 1.00

ATTACHMENT E

North Santiam River Reconnaissance Memorandum

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To: Ross McMakin

Company: NWFF Environmental

From: Jeff Williams, ERM, Inc.

Date: January 8, 2018

Subject: North Santiam River Gasoline Spill Recon, January 5, 2018

On Friday, January 5 2018, a site reconnaissance (Recon) was completed near the vicinity of the North Santiam River Gasoline Spill Site (Site) to determine if there were remnant visual signs of free product remaining in the North Santiam river system, within the vicinity of Site. The results of this effort would inform the Project team for future planning of sampling and/or cleanup efforts. ERM has prepared the following notes from this Site Recon in an effort to summarize the results of this field effort.

Representatives from various agencies and companies were present at the Site Recon and included the following individuals:

- Ross McMakin – NWFF Environmental
- Mike Everaert – NWFF Environmental
- John Imse – ERM
- Jeff Williams - ERM
- Geoff Brown – ODEQ
- Mike Szumski – USFWS
- Paul Olmstead - ODFW

The Site Recon effort focused on an intensive visual pedestrian survey of the North Santiam River, downstream from the Site, where the riverbank and nearshore riparian areas, where walked, between approximately SW6 and OS7, as summarized on the map in **Attachment 1**.

Two additional locations where separately accessed, which included Redd1, Redd2, and No OS1 (**Attachment 1**).

The site recon effort included approximately three hours of effort, between 0900 and 1215.

The results of the visual pedestrian survey indicated there were seven (7) locations where free product was noted by either a noticeable sheen or odor, or both. These areas are represented by OS1 to OS7 in **Attachment 1**,

and generally were described as pool-type habitat, outside of the main current, adjacent to runs. There was no visual evidence (e.g. staining) of free product adhering to either vegetation, debris, or the shoreline sediments. The indicators of the free product at these locations were generally exacerbated by walking in the water, which suggests the free product was clinging to the substrate or riparian/surface water interface and was dislodged from the agitation of walking action.

The location of the pedestrian survey where free product noted was chosen based, partly, on geography and the location of the nearest access points from the Hwy. 22 roadway. The total length of the pedestrian survey where free product was noted included approximately 0.65 river miles, downstream from the Site.

Another location was assessed approximately 2.1 river miles downstream from the Site, as this was an area where four mountain whitefish (*Prosopium williamsoni*) were noted as deceased, subsequent to the gasoline spill, and were observed on December 18, 2017. The pedestrian survey effort at this location (No OS1) resulted in no visible sheen or odor, and no free product was noted at this site.

The pedestrian survey team also performed a visual observation of the area upstream from the Site where salmonid spawning gravel (redds) had previously been noted by Recon ODFW team member, Paul Olmstead. These locations are noted as Redd1 and Redd2 in **Attachment 1**. No free product was observed at these locations; however, the Recon team observed these locations from the edge of the Hwy. 22 roadway and did not traverse the steep banks to access the river at these locations. The survey team briefly discussed potential pore water sampling that may be needed at these locations during future survey efforts, but noted that proper sample planning was needed before discussing further. It was noted by Geoff Brown that ODFW staff, Paul Olmstead, would be the point of contact if future sampling efforts were needed at these upstream locations.

The locations noted in **Attachment 1** were recorded using a Garmin 62T handheld GPS unit, by ERM biologist, Jeff Williams. Photographs were also taken at most of these locations by ERM and are included in a photographic log, **Attachment 2**.

Attachment 1

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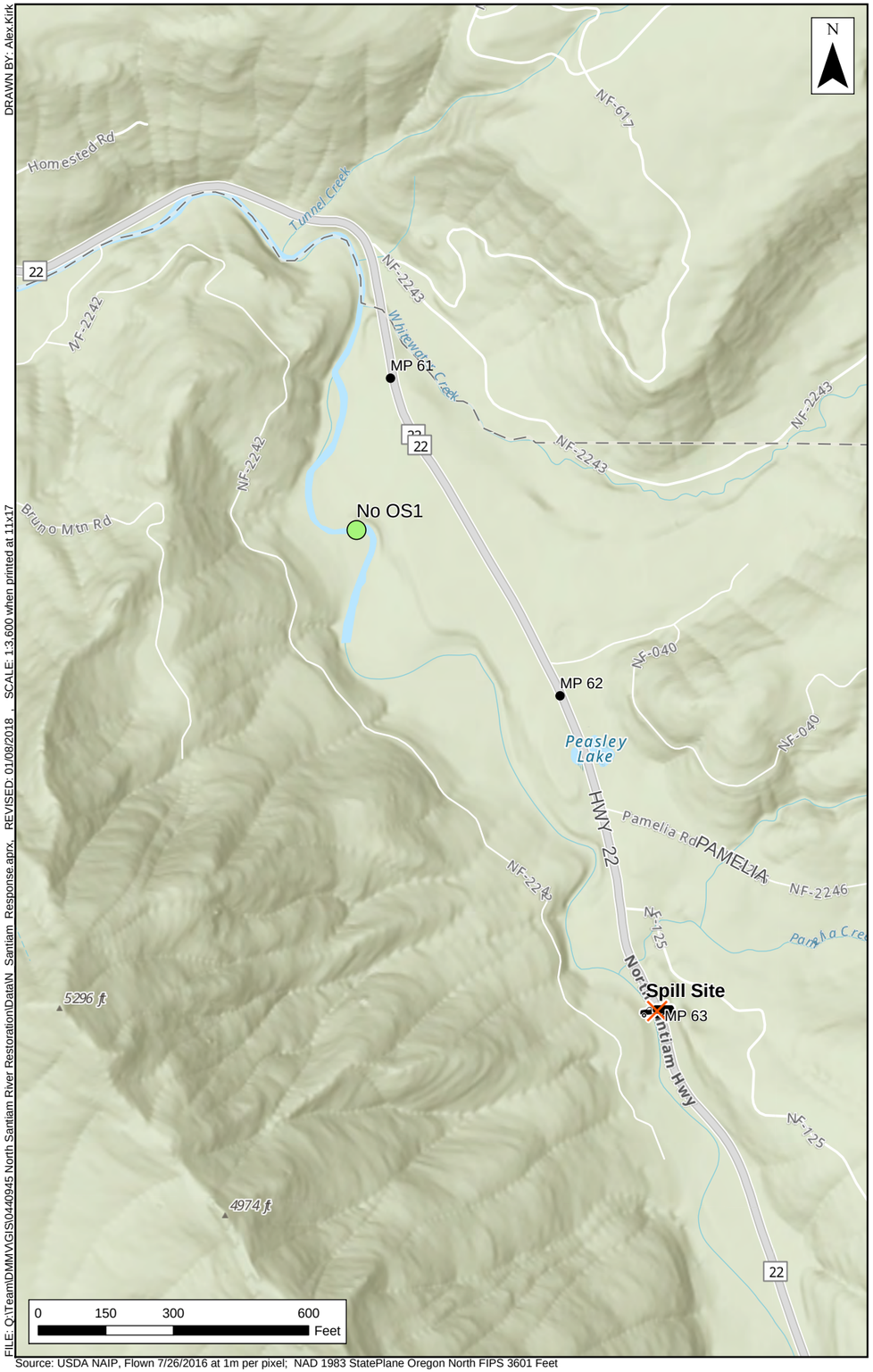
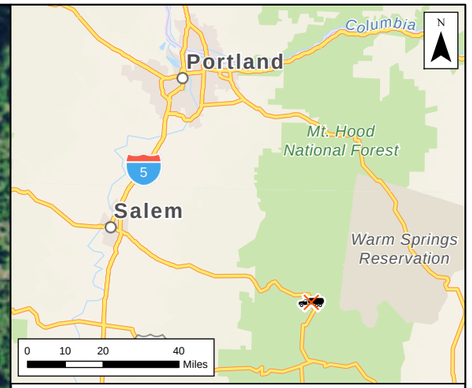
DRAWN BY: Alex.Kirk

FILE: Q:\Team\DMM\GIS\0440945 North Santiam River Restoration\Data\N_Santiam_Response.aprx, REVISED: 01/08/2018 , SCALE: 1:3,600 when printed at 11x17





Legend

- Spill Site
- Salmonid Spawning Gravel
- Odor and/or Sheen Noted
- Existing Surface Water Sampling Location
- No Oil and/or Sheen Noted
- Highway 22 Mile Post Sign

Notes:
GPS Points collected 1/5/2018.

Source: USDA NAIP, Flown 7/26/2016 at 1m per pixel; NAD 1983 StatePlane Oregon North FIPS 3601 Feet

Figure 1
Inital Site Visit
North Santiam River Spill Response
NWFF
Idahna, Oregon

Environmental Resources Management
www.erm.com
ERM

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Attachment 2

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ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 1	**Date:** 01/05/18

Direction Photo Taken:

Southwest

Description:

Existing surfacewater sampling site SW6

Photo No. 2	**Date:** 01/05/18

Direction Photo Taken:

Southeast

Description:

SW6 surfacewater sampling site, looking upstream

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 3	**Date:** 01/05/18

Direction Photo Taken:

Southwest

Description:

Site OS1 where free product odor and sheen were noted. Recon team noted assessing this site

Photo No. 4	**Date:** 01/05/18

Direction Photo Taken:

South

Description:

Site OS1

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 5	**Date:** 01/05/18

Direction Photo Taken:

Southeast

Description:

Site OS1 looking upstream

Photo No. 6	**Date:** 01/05/18

Direction Photo Taken:

Southwest

Description:

Site OS2 looking downstream

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 7	**Date:** 01/05/18

Direction Photo Taken:

Southeast

Description:

Site OS2 looking upstream

Photo No. 8	**Date:** 01/05/18

Direction Photo Taken:

West

Description:

Site OS3

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 9	**Date:** 01/05/18

Direction Photo Taken:

North

Description:

Site OS3 looking downstream

Photo No. 10	**Date:** 01/05/18

Direction Photo Taken:

South

Description:

Site OS3 looking upstream

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 11	**Date:** 01/05/18

Direction Photo Taken:

West

Description:

Site OS5

Photo No. 12	**Date:** 01/05/18

Direction Photo Taken:

North

Description:

Site OS5 looking downstream

ERM

PHOTOGRAPHIC LOG

Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No.	**Date:**
13	01/05/18

Direction Photo Taken:

South

Description:

Site OS5 looking upstream

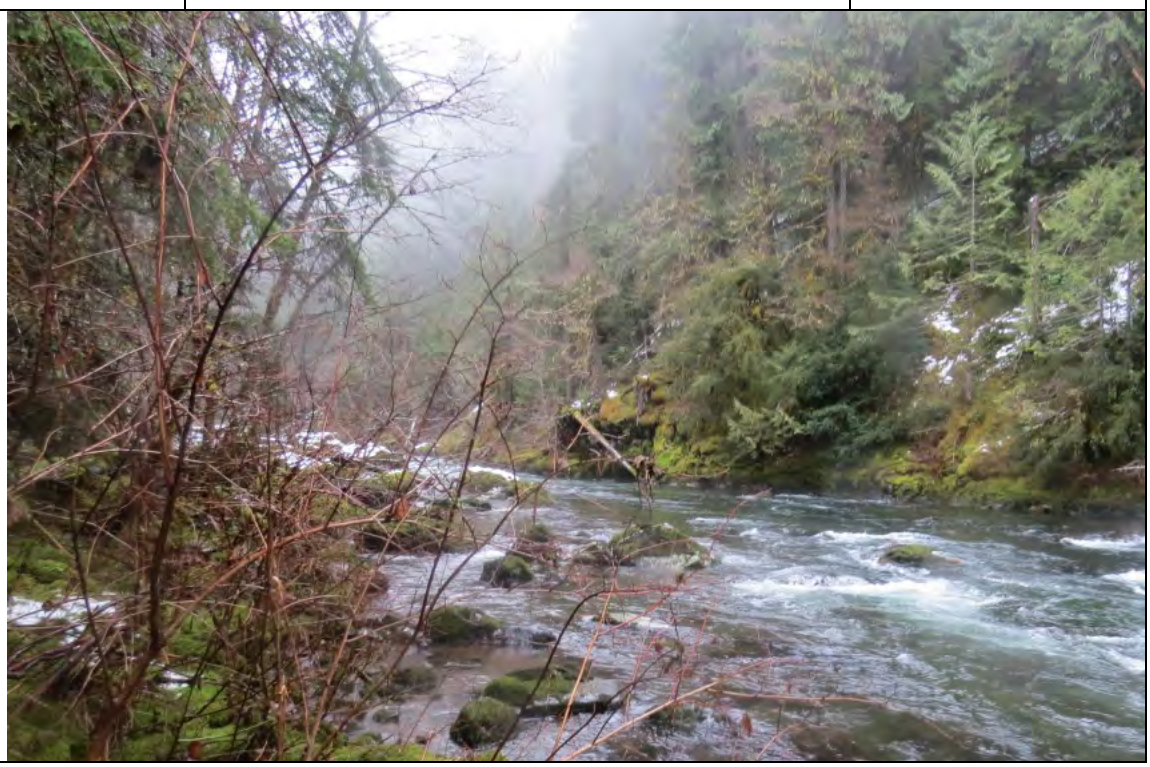

Photo No.	**Date:**
14	01/05/18

Direction Photo Taken:

Northwest

Description:

Site OS6

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 15	**Date:** 01/05/18

Direction Photo Taken:

Northeast

Description:

Site OS6 looking downstream

Photo No. 16	**Date:** 01/05/18

Direction Photo Taken:

Southwest

Description:

Site OS6 looking upstream

ERM	PHOTOGRAPHIC LOG
	Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No. 17	**Date:** 01/05/18

Direction Photo Taken:

West

Description:

Site OS7

Photo No. 18	**Date:** 01/05/18

Direction Photo Taken:

Northeast

Description:

Site OS7 looking downstream

ERM

PHOTOGRAPHIC LOG

Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No.	**Date:**
19	01/05/18

Direction Photo Taken:

Southwest

Description:

Site OS7 looking upstream

Photo No.	**Date:**
20	01/05/18

Direction Photo Taken:

West

Description:

Site Red1. Potential salmonid spawning gravel on far bank

ERM

PHOTOGRAPHIC LOG

Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No.	**Date:**
21	01/05/18

Direction Photo Taken:

North

Description:

Site Red1 looking downstream at Spill Site

Photo No.	**Date:**
22	01/05/18

Direction Photo Taken:

south

Description:

Site Red1 looking upstream

ERM

PHOTOGRAPHIC LOG

Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No.	**Date:**
23	01/05/18

Direction Photo Taken:

Southwest

Description:

Site Red2 showing potential salmonid spawning gravel along far bank

Photo No.	**Date:**
24	01/05/18

Direction Photo Taken:

South

Description:

Site Red2 looking upstream

ERM

PHOTOGRAPHIC LOG

Photographer: Jeff Williams

Project Name:	**Site Location:**	**Project No.**
North Santiam River Gasoline Spill Site Reconnaissance	Highway 22, North Santiam River Gasoline Spill Site	0440945

Photo No.	**Date:**
25	01/05/18

Direction Photo Taken:

West

Description:

Site No OS1 looking downstream

Photo No.	**Date:**
26	01/05/18

Direction Photo Taken:

East

Description:

Site No OS1 looking upstream

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