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February 7, 2014

Kathy Parker, On-Scene Coordinator
United States Environmental Protection Agency, Region 10
1200 Sixth Avenue, ECL-116
Seattle, Washington 98102

Re: Final Trip Report for the Warm Springs Tanker Spill Site
Contract Number EP-S7-13-07, Technical Direction Document Number 13-09-0010

Dear Ms. Parker:

Enclosed please find the final Trip Report for the Warm Springs Tanker Spill Site. If you have any questions regarding this submittal, please call Jake Moersen or me at (206) 624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Brad Martin
START-IV Project Leader

cc: Jake Moersen, START-IV Project Manager, Seattle, Washington

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TRIP REPORT

**Warm Springs Tanker Spill Site
Near Warm Springs, Oregon
TDD: 13-09-0010**



Prepared for:

U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue, ECL-116
Seattle, Washington 98102

Prepared by:

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

February 2014

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1. Place Visited

Site Name: Warm Springs Tanker Spill Site
Property Owner: Confederated Tribes of the Warm Springs
Location: US Highway 26 near Milepost 82, North of Warm Springs, Oregon
SSID: Z0DK
CERCLIS ID: Not Applicable
Latitude: 44.8923 **Longitude:** -121.3825
Dates of Response: September 24 – 30, 2013

2. Purpose

EPA performed the emergency response under the authority of the Oil Pollution Act. EPA tasked Ecology and Environment, Inc. (E & E), under Superfund Technical Assessment and Response Team (START)-3 contract number EP-S7-13-02, Technical Direction Document (TDD) number 13-09-0010, to provide technical assistance, sampling support, and documentation of response activities. Attachment A contains photographs collected during the emergency response.

The purpose of the response to the Warm Springs Tanker Spill Site was to assess the impact to the environment from the reported release of 3,500 gallons of unleaded gasoline and 1,500 gallons of diesel fuel during the evening of September 24, 2013. The spill site is located approximately 150 feet southwest of Beaver Creek, which is critical habitat for salmon as defined by the Confederated Tribes of the Warm Springs.

3. Persons Involved

Agency/Company	Contact Persons/ Position	Phone Number
United States Environmental Protection Agency	Kathy Parker – Federal On-Scene Coordinator	(206) 553-0062
Ecology and Environment, Inc.	Jake Moersen – Project Manager/Responder	(206) 624-9537
	Eric Lindeman – Site Safety Officer/Responder	(206) 624-9537
	Maren Fulton – Responder	(503) 248-5600
	Eric Nuchims – Responder	(206) 624-9537
Confederated Tribes of the Warm Springs	Richard Craig – Environmental Officer	(541) 553-2018
Central Petro	Clint Monchamp – Operator/Fuel Owner	(541) 383-2729
Oregon Department of Environmental Quality	Mike Renz – State On-Scene Coordinator	(541) 480-4783
Oregon Department of Transportation	Mike Darling – Hazmat Coordinator	(541) 388-6329
SMAF Environmental	Tom Kichenmaster – Project Manager	(541) 447-5643

4. Background

EPA received a report on the evening of September 24, 2013, that a tractor trailer truck combination operated by Central Petro Trucking, the responsible party (RP), was traveling southbound on U.S. Highway 26 toward Warm Springs, Oregon. At milepost 81.5 the vehicle made contact with an elk in the roadway and subsequently skidded off the eastern shoulder of the road (Figure 1). During the rollover, the trailer separated from the tractor and released gasoline and diesel fuel into the soil along the highway shoulder. A second adjoining trailer also disconnected and overturned, however it sustained only limited damage and minimal loss of its contents. The initial responders secured the scene, transported the driver to a nearby hospital, and off-loaded the contents of the second trailer. The accident scene was cleared and the highway reopened to traffic by 0700 hours on September 25.

The location of the incident occurred on the property of the Confederated Tribes of the Warm Springs (CTWS). Approximately 150 feet to the northeast of the spill site, across a relatively flat forested area, is Beaver Creek (Figure 2). In addition to being an important stream to the heritage of the CTWS, the creek is a critical resource for the spawning of salmon. It also provides water to a fish hatchery and water treatment facility located approximately 5 and 7 miles downstream from the spill site, respectively. Beaver Creek flows into the Warm Springs River that drains into the Deschutes River, which in turn drains into the Columbia River. The primary concern of the incident was the presence of fuel that could potentially migrate to Beaver Creek.

5. Response Activities

Early in the morning of September 25, 2013, EPA and START contractors mobilized to the site at the request of the CTWS to document site activities, provide air monitoring support during the off-loading of product, and participate in Unified Command. Additional responding agencies included the Oregon Department of Environmental Quality (ODEQ), the Oregon Department of Transportation (ODOT). A Unified Command was established that included CTWS representatives, an EPA on-scene coordinator (OSC), and the RP's designated cleanup contractor SMAF Environmental (SMAF).

The Unified Command met at the He He Longhouse to discuss potential removal actions to mitigate the threat posed by the released fuel. The consensus was to initiate an immediate excavation at the source of the spill to determine the location and direction of migrating fuel as well as to determine the depth to groundwater. The pathway of fuel was used to guide the remaining excavation.

The Unified Command also agreed that EPA and the RP would collect split samples of soil and water media, submit these samples to their respective contracted laboratories, and compare the results during future planning meetings. The OSC directed START to coordinate with Terry Sprecher of the Sprecher Group, an environmental consultant for SMAF, to collect five targeted surface soil samples (13100002 – 13100006) along the spill area plus one background sample (13100001) north of the spill area (Figure 3). These samples were collected by mid-afternoon on September 25.

With supplies from EPA, Sprecher also collected six background soil samples (13100007 – 13100011) from a nearby site that was approved by CTWS for stockpiling petroleum contaminated soil excavated from the spill area (Figure 2). The purpose of these samples was to

identify potential preexisting contamination at the stockpile site. Upon collecting the split samples at the stockpile location, SMAF proceeded to place a protective plastic liner on the ground to act as a barrier for the stockpiled soil.

In the afternoon of September 25, SMAF began to excavate the petroleum contaminated soil from the spill area. The soil was placed in haul trucks and transported to the stockpile location. Later that day SMAF placed 6-inch hard boom across Beaver Creek near the access road to the stockpile location (Figure 2). Sausage absorbent boom was placed upstream adjacent to the 6 inch boom as a preventive measure. SMAF deployed shoreline cleanup and assessment technique (SCAT) teams to perform multiple surveys each day along Beaver Creek and record physical signs of fuel entering the creek. There were no reports from the SCAT teams of fuel migrating into the creek during EPA involvement at the site.

On September 26, START and Sprecher collected two split surface water samples from Beaver Creek. One surface water sample (13100014) was collected from a location upstream from the spill site (SW001), and the second surface water sample (13100015) was collected from a location downstream from the spill site (SW002) near the sausage absorbent boom (Figure 2). These surface water samples were processed in the same manner as the split soil samples for delivery to the respective EPA- or RP-contracted laboratories.

With the assistance of Mike Renz from Oregon Department of Environmental Quality (ODEQ), the SMAF excavation crew installed one exploratory pit between the highway and Beaver Creek to determine the depth to groundwater and possibly identify the presence of fuel. The depth to groundwater was approximately 10 feet below ground surface (bgs) which indicated that the Beaver Creek was likely a losing stream at this location, which appeared to limit the immediate threat of fuel contaminating the creek. The Unified Command determined that the remediation of the incident was to continue excavating petroleum contaminated soil from the spill site in an expeditious manner.

By the evening of September 26, the excavation pit was approximately 55 x 45 x 10 feet with the excavation moving southward. Approximately 1,000 yards of contaminated soil was stockpiled and the CTWS provided approval for SMAF to enlarge the stockpile area as needed to accommodate additional petroleum contaminated soil. Approximately 1,900 gallons of suspected contaminated water was pumped from the excavation for product recovery by the end of the day.

EPA demobilized from the site on the evening of September 26. Upon demobilization from the site, EPA and the CTWS determined that the RP would continue to collect split samples of soil and water matrices for analysis by both RP- and EPA-contracted laboratories. From September 27 – 30, five additional soil samples (13100016, 13100023 – 13100026) were collected from around the stockpile pile and four surface water samples (13100017, 13100019, 13100021, and 13100023) were collected from location SW002. On October 1, this arrangement was discontinued when the CTWS determined the RP was providing reliable actionable data. Therefore, only split samples that were collected from September 25 – 30 were analyzed by both EPA- and RP-contracted laboratories. Information related to sample results and interpretation is found in Section 6.

The excavation continued in the southward direction; a section of Highway 26 was even rerouted to a temporary lane so that an area underneath the road could be excavated. The threat of fuel migrating into Beaver Creek was mitigated by the removal of the petroleum contaminated soil.

On October 21, the Unified Command transitioned to a reconstruction and restoration phase. The excavated soil was replaced with clean backfill and compacted, and the highway was returned to the previous location. On November 13, the Unified Command met at the He He Longhouse for a post incident review of the site.

6. Data Interpretation and Correlation

Quality assurance (QA)/quality control (QC) data are necessary to determine precision and accuracy and to demonstrate the absence of interferences and/or contamination of sampling equipment, glassware and reagents. Specific QC requirements for laboratory analyses are incorporated in the *Contract Laboratory Program Statement of Work for Organic Analyses* (EPA 2007). These QC requirements or equivalent requirements found in the analytical methods were followed for analytical work on the project. This section describes the QA/QC measures taken for the project and provides an evaluation of the usability of data presented in this report.

Data from the START-subcontracted commercial laboratory were reviewed and validated by a START chemist. Data qualifiers and labels were applied as necessary according to the following guidance:

- EPA (2008) *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*.
- EPA (2009) *Guidance for Labeling Externally Validated Laboratory Data for Superfund Use*.

In the absence of other QC guidance, method- and/or SOP-specific QC limits were also utilized to apply qualifiers to the data.

6.1 Satisfaction of Data Quality Objectives

The following EPA (EPA 2000) guidance document was used to establish data quality objectives (DQOs) for this project:

- *Guidance for the Data Quality Objectives Process* (EPA QA/G-4), EPA/600/R-96/055.

The EPA OSC determined that definitive data without error and bias determination would be used for the sampling and analyses conducted during the field activities. The data quality achieved during the field work produced sufficient data that met the DQOs stated in the SSSP (E & E 2013). A detailed discussion of accomplished project objectives is presented in the following sections.

6.2 QA/QC Samples

Rinsate blank QA samples are only required for samples collected using non-dedicated sampling equipment and were not collected for this project. Trip blank QA samples are only required for volatile organic compound analyses and were collected for this project. QC samples included matrix spike/matrix spike duplicate (MS/MSD) and/or blank spike (BS) samples at a rate of one MS/MSD and/or BS per 20 samples per matrix.

6.3 Project-Specific Data Quality Objectives

The laboratory data were reviewed to ensure that DQOs for the project were met. The following describes the laboratories' and/or field team's abilities to meet project DQOs for precision,

accuracy and completeness and the field team's ability to meet project DQOs for representativeness and comparability. The laboratories and the field team were able to meet DQOs for the project.

6.3.1 Precision

Precision measures the reproducibility of the sampling and analytical methodology. Laboratory and field precision is defined as the relative percent difference (RPD) between duplicate sample analyses. The laboratory duplicate samples or MS/MSD samples measure the precision of the analytical method. The field duplicate samples measure the precision of laboratory and field procedures. The RPD values were reviewed for all commercial laboratory samples. A total of 8 sample results (approximately 1.1 % of the data) were qualified based on precision outliers; therefore the project DQO for precision was met.

6.3.2 Accuracy

Accuracy indicates the conformity of the measurements to fact. Laboratory accuracy is defined as the surrogate spike percent recovery (%R) or the MS/MSD/BS %Rs for all laboratory analyses. The surrogate %R values were reviewed for all appropriate sample analyses. All surrogate results were within QC limits.

The %R values were reviewed for all MS/MSD/BS analyses. A total of one sample result (approximately 0.1 % of the data) was qualified as an estimated quantity (J) based on MS/MSD/BS outliers; therefore the project DQO for accuracy of 90% was met.

6.3.3 Completeness

Data completeness is defined as the percentage of usable data (usable data divided by the total possible data). All laboratory data were reviewed for data validation and usability. No sample results were rejected (R); therefore the project DQO for completeness of 90% was met.

6.3.4 Representativeness

Data representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or environmental condition. The number and selection of samples were determined in the field to account accurately for site variations and sample matrices. The DQO for representativeness was met.

6.3.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared to another. Data produced for this site followed applicable field sampling techniques and specific analytical methodology. The DQO for comparability was met.

6.4 Field and Laboratory QA/QC Parameters

The laboratory data also were reviewed for holding times/temperatures/sample containers, laboratory blank samples, trip blanks, and split samples. These QA/QC parameters are summarized below.

6.4.1 Holding Times/Temperatures/Sample Containers

All holding times, sample temperatures, and containers were acceptable.

6.4.2 Laboratory Blanks

All laboratory blanks met the frequency criteria. No potential contaminants of concern were detected in the laboratory blanks.

6.4.3 Trip Blank

A trip blank sample was associated with VOC samples 13100001 through 13100015. There were no detections in the trip blank sample. A trip blank VOC sample was not associated with the remainder of the VOC samples; no action was required as there was only one VOC detection in these samples so it was apparent that no cross-contamination had occurred.

6.4.4 Split Samples

Six water samples and 17 soil samples were analyzed by both START and SMAF subcontracted laboratories. A comparison was performed for sample results that exceeded one or more regulatory limits (Tables 1 and 2). None of the water samples exceeded the listed regulatory limits which were identified as ODEQ risk-based concentrations (RBCs) groundwater ingestion and inhalation from tapwater and/or ODEQ screening level values (SLVs) in surface water (Attachment B). Sixteen soil samples exceeded regulatory limits in the START and/or SMAF analyses which were identified as RBCs soil leaching to groundwater and/or SLVs in soil (Attachment C). Seven of these samples had positive results in both analyses with a percent difference less than 50% and seven of these samples had a positive START result within two times the SMAF reporting limit; these 14 results were considered acceptable. The two remaining samples had positive START results that were less than the sample quantitation limit, the associated SMAF results were non-detect, and the positive START results were greater than two times the SMAF sample quantitation limits; no actions were taken based on these slight QC outliers.

Soil sample 13100004 was collected from the spill site; this sample had the most elevated concentrations of total petroleum hydrocarbons (TPHs), semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The remaining soil samples from the spill site were identified with trace concentrations of VOCs and SVOCs. All soil samples, including those collected as background samples at the stockpile location, were identified with at least trace concentrations of TPHs. A copy of EPA data memoranda is found in Attachment D.

7. Summary and Conclusions

EPA responded to the Warm Springs Tanker Spill Site to assess the impact to the environment from the release of 3,500 gallons of unleaded gasoline and 1,500 gallons of diesel fuel that occurred during the evening of September 24, 2013. The spill site is located on property owned by the Confederated Tribes of Warm Springs. The fuel posed an immediate threat to Beaver Creek, which is critical habitat for salmon as well as a primary water source for a nearby fish hatchery and municipal water treatment facility.

EPA participated in the Unified Command to discuss potential removal actions to mitigate the threat posed by the released fuel. The consensus was to initiate an immediate excavation at the source of the spill to determine the location and direction of migrating fuel as well as to determine the depth to groundwater. The pathway of fuel was used to guide the remaining excavation. EPA coordinated with the RP's removal contractor to collect split samples of soil and water media from the dates of September 25 – 30.

Soil sample 13100004 was collected from the spill site; this sample had the most elevated concentrations of total petroleum hydrocarbons (TPHs), semivolatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The remaining soil samples from the spill site were identified with trace concentrations of VOCs and SVOCs. All soil samples, including those collected as background samples at the stockpile location, were identified with at least trace concentrations of TPHs. However, none of the water samples exceeded the listed regulatory limits for TPHs, SVOCs, or VOCs. In conclusion, no detectable concentrations of fuel were identified in Beaver Creek during EPA's participation in site activities.

8. References

E & E (Ecology and Environment, Inc.), October 2013, *Site Specific Sampling Plan for Warm Springs Tanker Spill Site* prepared for the United States Environmental Protection Agency, Seattle, Washington, under Contract No. EP-S7-13-02, TDD No. 13-09-0010.

United States Environmental Protection Agency (EPA), January 2009, *Guidance for Labeling Externally Validated Laboratory Data for Superfund Use*, EPA-540-R-08-005.

_____, June 2008, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, OSWER 9240.1-48, USEPA-540-R-08-01.

_____, April 2007, *USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, SOM01.2*.

_____, August 2000, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, Office of Research and Development, Washington, D.C., EPA/600/R-96/055.

Source: Maptech, Inc. 2001.

OREGON



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Seattle, Washington

WARM SPRINGS TANKER SPILL SITE
Warm Springs, Oregon

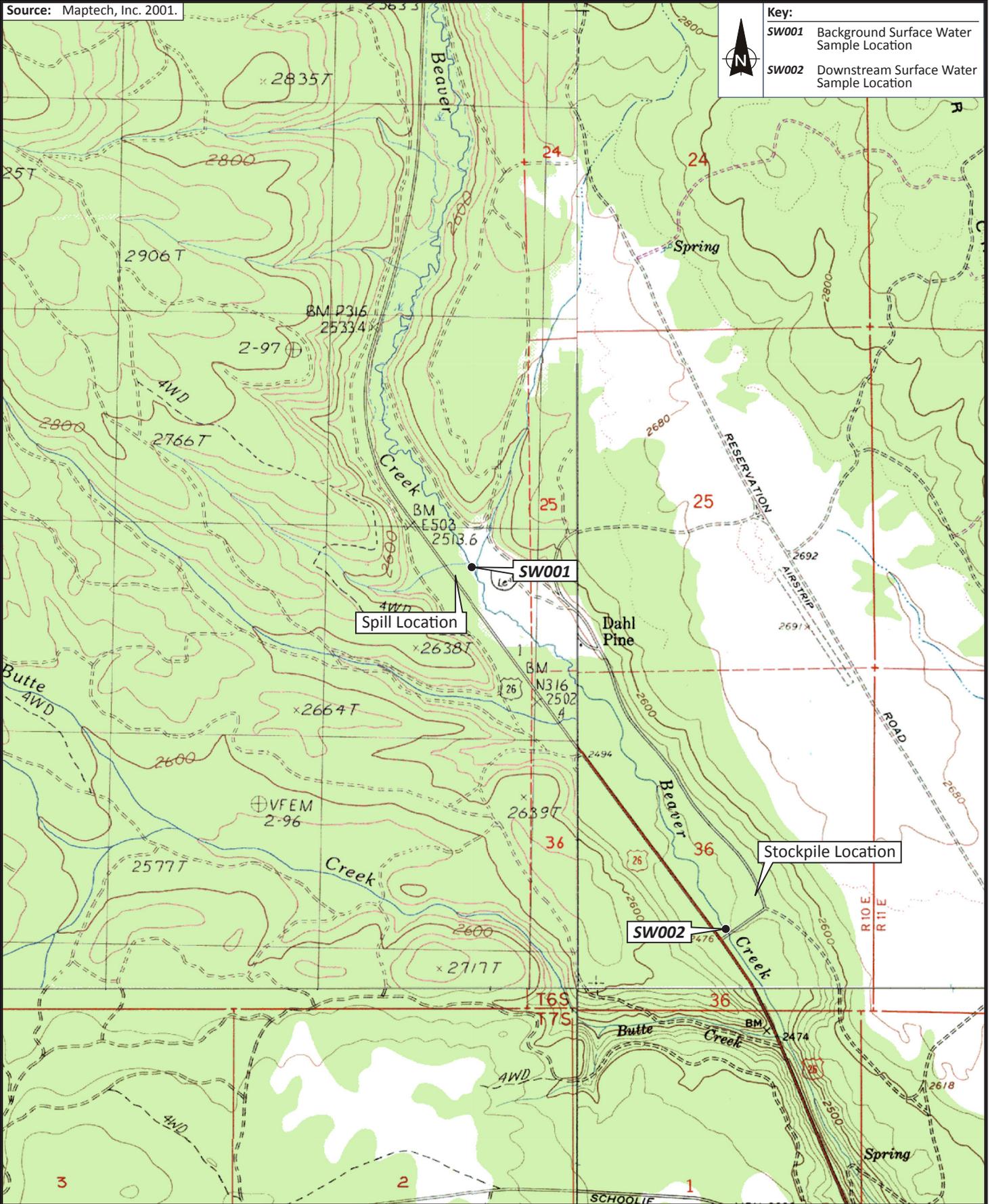


Figure 1
SITE VICINITY MAP

Date:	Drawn by:
9/30/13	AES
10:START-IV\13090010\fig 1	

Source: Maptech, Inc. 2001.

Key:	
SW001	Background Surface Water Sample Location
SW002	Downstream Surface Water Sample Location



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

WARM SPRINGS TANKER SPILL SITE
 Warm Springs, Oregon

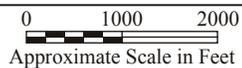
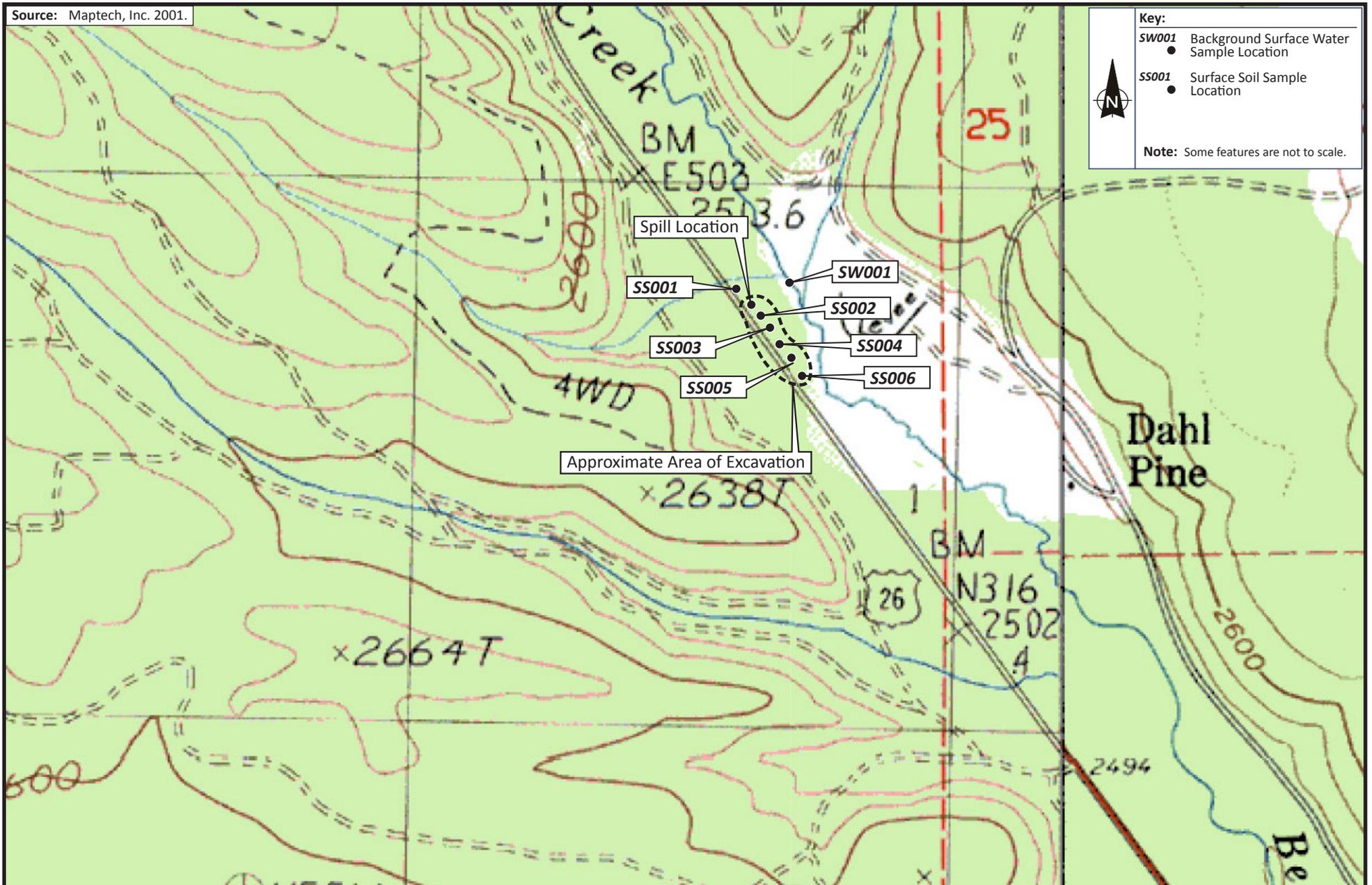


Figure 2
 SITE LOCATION MAP

Date:	Drawn by:	
1/23/14	AES	10:START-IV\13090010\fig 2

Source: Maptech, Inc. 2001.



Key:

- SW001 Background Surface Water Sample Location
- SS001 Surface Soil Sample Location

Note: Some features are not to scale.

Attachment A
Photographic Documentation

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Photo 1 Accident scene with leaking fuel in the foreground.

Direction: North *Date: 9/24/13* *Taken by: SMAF*



Photo 2 Accident scene.

Direction: Southeast *Date: 9/24/13* *Taken by: SMAF*



Photo 3 Accident scene.

Direction: Northeast *Date: 9/24/13* *Taken by: SMAF*

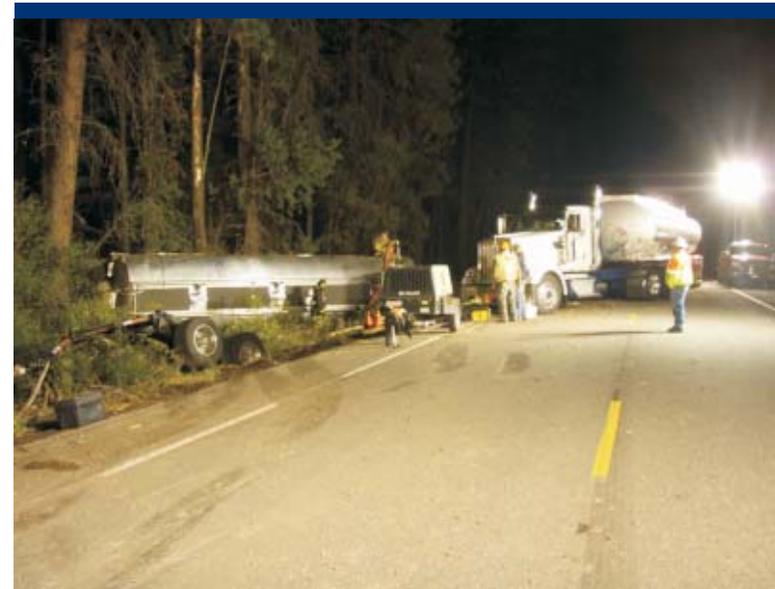


Photo 4 Offloading of fuel from the pup.

Direction: South *Date: 9/25/13* *Taken by: START*



Photo 5 Accident scene after the truck and pup were removed.

Direction: South *Date: 9/25/13* *Taken by: START*



Photo 6 Collecting soil samples from near the accident scene.

Direction: East *Date: 9/25/13* *Taken by: START*

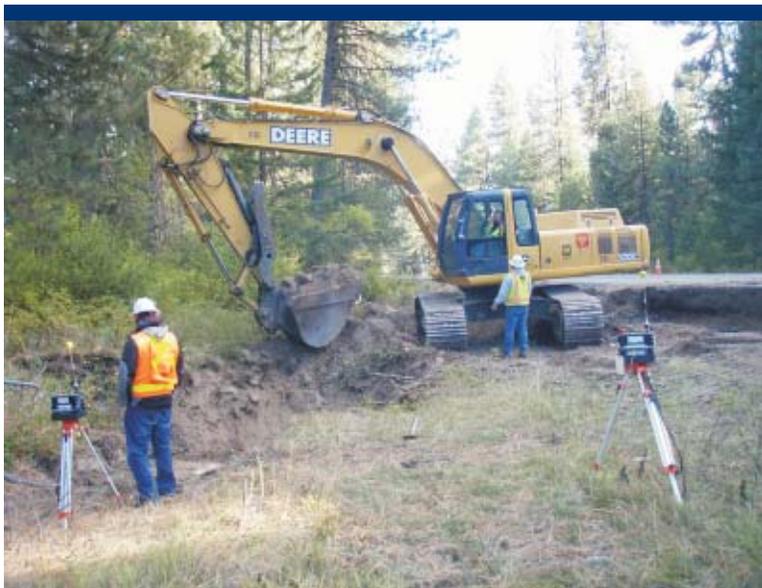


Photo 7 Excavation of contaminated soil with START performing air monitoring.

Direction: Southwest *Date: 9/25/13* *Taken by: START*



Photo 8 Contaminated soil visible in the excavation pit.

Direction: Closeup *Date: 9/25/13* *Taken by: START*



Photo 9 Groundwater accumulating in the excavation pit.

Direction: East *Date: 9/26/13* *Taken by: SMAF*



Photo 10 Vacuum truck removing contaminated groundwater from the excavation pit.

Direction: West *Date: 9/26/13* *Taken by: START*

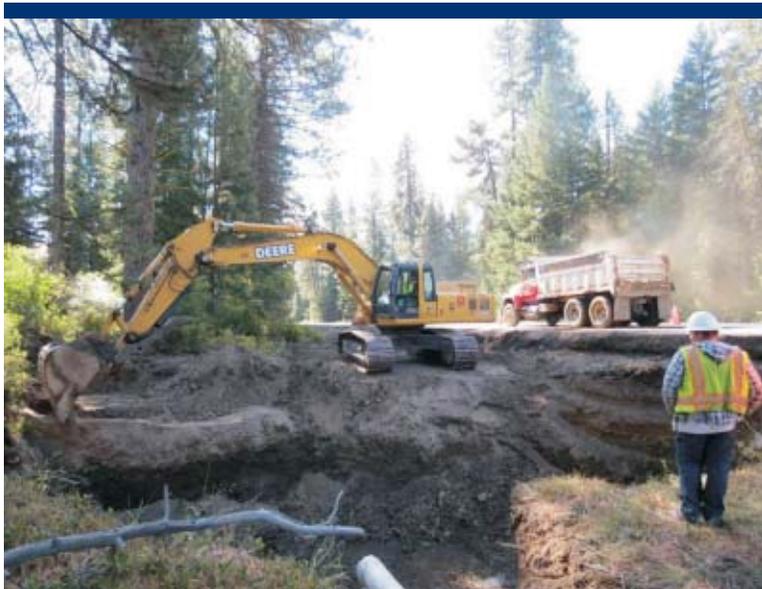


Photo 11 Excavating contaminated soil and placing into haul truck.

Direction: South *Date: 9/26/13* *Taken by: SMAF*



Photo 12 Initial stockpile location of petroleum contaminated soil.

Direction: Northeast *Date: 9/26/13* *Taken by: SMAF*



Photo 13 Pit characterization and vacuum truck operation.

Direction: North *Date: 9/26/13* *Taken by: SMAF*



Photo 14 Pit characterization of east wall.

Direction: East *Date: 9/26/13* *Taken by: SMAF*



Photo 15 Pit characterization and vacuum truck operation.

Direction: North *Date: 9/29/13* *Taken by: SMAF*



Photo 16 Expanded stockpile location of petroleum contaminated soil.

Direction: Southeast *Date: 9/29/13* *Taken by: SMAF*

WARM SPRINGS TANKER SPILL SITE
Warm Springs, Oregon

TDD Number: 13-09-0010
Photographed by: START, SMAF



Photo 17 Boom deployed in Beaver Creek near SW002 sample location.

Direction: West

Date: 9/26/13

Taken by: SMAF

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Attachment B
Table of Analytical Data for Surface Water Samples

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Attachment B: Table of Analytical Data for Surface Water Samples

EPA Sample ID	ODEQ RBC Groundwater Ingestion and Inhalation from Tapwater			ODEQ Level II Screening Level Values in Surface Water	13100014		13100015		13100017		13100019		13100021		13100027	
					SW001		SW002		SW002		SW002		SW002		SW002	
Sample Location	Residential	Urban Residential	Occupational	Aquatic ¹ Birds ² Mammals ³	9/26/2013		9/26/2013		9/27/2013		9/28/2013		9/29/2013		9/30/2013	
Sample Collection Date					EPA	SMAF	EPA	SMAF	EPA	SMAF	EPA	SMAF	EPA	SMAF	EPA	SMAF
Sampled By																
TPHs (µg/L)																
Gasoline Range Hydrocarbons					33 U	50 U	33 U	50 U	33 U	50 U	33 U	50 U	33 U	50 U	33 U	50 U
DRO (C10-C25) ^A					29 U	50 U	29 JQ	50 U	29 U	50 U	29 U	50 U	31 JQ	50 U	31 U	50 U
RRO (nC25-nC36) ^B					38 U	100 U	38 U	100 U	38 U	100 U	39 U	100 U	40 JQ	100 U	44 JQ	100 U
SVOCs (µg/L)																
Acenaphthene	220			520 ¹	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Acenaphthylene					0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Anthracene				13 ¹	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Benzo[a]anthracene	0.0029	0.0088	0.056	0.027 ¹	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Benzo[a]pyrene	0.00029	0.00088	0.0056	0.014 ¹ 8000 ³	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Benzo[b]fluoranthene	0.0011	0.0039	0.016		0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Benzo[g,h,i]perylene					0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Benzo[k]fluoranthene	0.029				0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Chrysene	0.016	0.066	0		0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Dibenz[a,h]anthracene	0.00029	0.00088	0.0056		0.096 U	0.1 U	0.095 U	0.1 U	0.098 U	0.1 U	0.099 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluoranthene				6.16 ¹	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Fluorene	150			3.9 ¹	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Indeno[1,2,3-cd]pyrene					0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Naphthalene	0.014	0.078	0.072	620 ¹ 284000 ³	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Phenanthrene				6.3 ¹	0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
Pyrene					0.048 U	0.1 U	0.048 U	0.1 U	0.049 U	0.1 U	0.049 U	0.1 U	0.051 U	0.1 U	0.052 U	0.1 U
VOCs (µg/L)																
1,2,4-Trimethylbenzene	1.5	2.9	6.1		0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U
1,2-Dibromoethane	0.00063	0.0031	0.0034		0.14 U	0.5 U	0.14 U	0.5 U	0.14 U	0.5 U	0.14 U	0.5 U	0.14 U	0.5 U	0.14 U	0.5 U
1,2-Dichloroethane	0.014	0.069	0.078	20000 ¹ 125000 ² 200000 ³	0.13 U	0.5 U	0.13 U	0.5 U	0.13 U	0.5 U	0.13 U	0.5 U	0.13 U	0.5 U	0.13 U	0.5 U
1,3,5-Trimethylbenzene	36	73	150	200000 ³	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U	0.16 U	0.5 U
Benzene	0.039	0.17	0.22	130 ¹ 200000 ³	0.06 U	0.35 U	0.06 U	0.35 U	0.06 U	0.35 U	0.06 U	0.35 U	0.06 U	0.35 U	0.06 U	0.35 U
Ethylbenzene	0.14	0.67	0.78	7.3 ¹	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.5 U
Isopropylbenzene	68	140	280		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether	1.2	5.3	6.7		0.18 U	0.5 U	0.18 U	0.5 U	0.18 U	0.5 U	0.18 U	0.5 U	0.18 U	0.5 U	0.18 U	0.5 U
N-Propylbenzene					0.2 U	0.5 U	0.2 U	0.5 U	0.2 U	0.5 U	0.2 U	0.5 U	0.2 U	0.5 U	0.2 U	0.5 U
Toluene	230	460	920	9.8 ¹ 104000 ³	0.11 U	0.5 U	0.11 U	0.5 U	0.21 JQ	0.5 U	0.11 U	0.5 U	0.11 U	0.5 U	0.11 U	0.5 U
Xylenes, Total	20	41	85	13 ¹ 8000 ³	0.33 U	1 U	0.33 U	1 U	0.33 U	1 U	0.33 U	1 U	0.33 U	1 U	0.33 U	1 U

Key for Groundwater Tables

Notes:

- = Greater than or equal to screening criteria.
- = Screening or cleanup criteria does not exist.
- Bold** = Result detected at or above limit of detection.
- A = SMAF DRO Range is C12 - C24.
- B = SMAF RRO Range is C24 - C40.

Abbreviations:

- DRO = Diesel range organics.
- EPA = Environmental Protection Agency.
- ID = Identification.
- JQ = The analyte was positively identified; the associated numerical value is the approximate concentration less than the reporting limit.
- µg/L = Micrograms per liter (parts per billion).
- ODEQ = Oregon Department of Environmental Quality.
- RBC = Risk-Based Concentrations developed by ODEQ.
- RRO = Residual range organics.
- SMAF = Responsible party's cleanup contractor.
- SLVs = Screening level values as defined by ODEQ for performing ecological risk assessments.
- SVOCs = Semivolatile organic compounds.
- TPHs = Total petroleum hydrocarbons.
- U = The analyte was analyzed for, but not detected above the reported sample quantitation limit.
- VOCs = Volatile organic compounds.

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Attachment C
Table of Analytical Data for Soil Samples

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Attachment C: Table of Analytical Data for Soil Samples

EPA Sample ID	ODEQ RBC Soil Leaching to Ground Water			ODEQ Level II Screening Level Values in Soil	13100001		13100002		13100003		13100004		13100005		13100006		13100007		13100008		13100009	
					SS001BG		SS002SL		SS003SL		SS004SL		SS005SL		SS006BG		SS007ST / ST101		SS008ST / ST102		SS009ST / ST103	
Sample Location	Residential	Urban Residential	Occupational	Plants ¹ Invertebrates ² Birds ³ Mammals ⁴	9/25/2013		9/25/2013		9/25/2013		9/25/2013		9/25/2013		9/25/2013		9/25/2013		9/25/2013		9/25/2013	
Sample Collection Date					1 inch		1 inch		1 - 2 inches		1 - 2 inches		1 - 2 inches		1 - 2 inches		2 - 4 inches		2 - 4 inches		2 - 4 inches	
Sample Collection Depth	EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA	
Sampled By	EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA	
TPHs (mg/kg)																						
Gasoline Range Hydrocarbons					1.5 U	2.91 U	1.5 U	2.75 U	8.4	10.5	43000	27100	11	9.14	1.4 U	2.55 U	1.5 U	2.68 U	3.3 U	9.22	1.5 U	4.38
DRO (C10-C25) ^A					9.3 JQ	14.9 U	14	14.1 U	34 JQ	18.4	12000	23000	40	21.2	22	13.2 U	17	13.8 U	98	59.3	150	30.8
RRO (nC25-nC36) ^B					110	41.8	150	66.7	530	293	480 JQ	1510 U	260	210	230	171	43	30.1	250	322	150	354
SVOCs (mg/kg)																						
Acenaphthene				20 ¹	0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	1.1	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Acenaphthylene					0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.67 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Anthracene					0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.67 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Benzo[a]anthracene	3.5	10			0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.011 JQ	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.016 U	0.029 U
Benzo[a]pyrene	0.9	2.7		125 ⁴	0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.011 JQ	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Benzo[b]fluoranthene					0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.014 JQ	0.131 U	0.033 U	3.07 U	0.0071 U	0.0266 U	0.0082 JQ	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Benzo[g,h,i]perylene					0.011 JQ	0.176	0.031 U	0.162	0.032	0.256	0.019 JQ	3.07 U	0.0093 JQ	0.0266 U	0.019 JQ	0.0389	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Benzo[k]fluoranthene	4				0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.033 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Chrysene					0.013 JQ	0.0298 U	0.0076 U	0.0279 U	0.019 JQ	0.131 U	0.031 JQ	3.07 U	0.0071 U	0.0266 U	0.012 JQ	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Dibenz[a,h]anthracene	3.4				0.0079 U	0.12	0.0076 U	0.129	0.0071 U	0.136	0.0082 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Fluoranthene					0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.16 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Fluorene				30 ²	0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	1.6 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.015 JQ	0.0286 U	0.0039 U	0.029 U
Indeno[1,2,3-cd]pyrene					0.0079 U	0.118	0.0076 U	0.123	0.0081 JQ	0.149	0.0082 U	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Naphthalene	0.087	0.47	0.44	10 ¹ 3900 ⁴	0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.028 JQ	0.131 U	110	196	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0076 JQ	0.0286 U	0.0039 U	0.029 U
Phenanthrene					0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.69	3.07 U	0.0071 U	0.0266 U	0.0072 U	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 U	0.029 U
Pyrene					0.0079 U	0.0298 U	0.0076 U	0.0279 U	0.0071 U	0.131 U	0.54	3.07 U	0.0071 U	0.0266 U	0.0088 JQ	0.0267 U	0.0039 U	0.0277 U	0.0042 U	0.0286 U	0.0039 JQ	0.029 U
VOCs (mg/kg)																						
1,2,4-Trimethylbenzene	16	33	68		0.055 U	0.0263 U	0.053 U	0.0234 U	0.43	0.36	1500	1300	0.049 U	0.391	0.05 U	0.0253 U	0.053 U	0.028 U	0.12 U	0.0574 U	0.054 U	0.0264 U
1,2-Dibromoethane	0.14	0.000081	0.44		0.02 U	0.0263 U	0.02 U	0.0234 U	0.018 U	0.0239 U	21 U	31 U	0.018 U	0.024 U	0.018 U	0.0253 U	0.02 U	0.028 U	0.043 U	0.0574 U	0.02 U	0.0264 U
1,2-Dichloroethane	0.0014	0.0068	0.0077	70 ³ 2780 ⁴	0.019 U	0.0263 U	0.018 U	0.0234 U	0.017 U	0.0239 U	20 U	31 U	0.017 U	0.024 U	0.017 U	0.0253 U	0.018 U	0.028 U	0.04 U	0.0574 U	0.019 U	0.0264 U
1,3,5-Trimethylbenzene	92	180			0.028 U	0.0263 U	0.028 U	0.0234 U	0.11	0.085	410	372	0.026 U	0.024 U	0.026 U	0.0253 U	0.028 U	0.028 U	0.06 U	0.0574 U	0.028 U	0.0264 U
Benzene	0.0093	0.042	0.053	330 ⁴	0.035 JQ	0.0184 U	0.028 JQ	0.0164 U	0.092 JQ	0.0349	160	145	0.041 JQ	0.0168 U	0.034 JQ	0.0177 U	0.023 U	0.0195 U	0.05 U	0.0402 U	0.038 JQ	0.0185 U
Ethylbenzene	0.16	0.77	0.9		0.021 U	0.0263 U	0.021 U	0.0234 U	0.23	0.128	1100	904	0.037 JQ	0.024 U	0.019 U	0.0253 U	0.021 U	0.028 U	0.045 U	0.0574 U	0.021 U	0.0264 U
Isopropylbenzene					0.043 U	0.0263 U	0.041 U	0.0234 U	0.038 U	0.0239 U	66 JQ	56.5	0.038 U	0.0533	0.039 U	0.0253 U	0.042 U	0.028 U	0.09 U	0.0574 U	0.042 U	0.0264 U
Methyl tert-butyl ether	0.092	0.41	0.52		0.015 U	0.0263 U	0.015 U	0.0234 U	0.014 U	0.0239 U	16 U	31 U	0.014 U	0.024 U	0.014 U	0.0253 U	0.015 U	0.028 U	0.033 U	0.0574 U	0.015 U	0.0264 U
N-Propylbenzene					0.025 U	0.0263 U	0.024 U	0.0234 U	0.061 JQ	0.0444	270	233	0.022 U	0.024 U	0.023 U	0.0253 U	0.024 U	0.028 U	0.053 U	0.0574 U	0.025 U	0.0264 U
Toluene	140	280		200 ¹ 1440 ⁴	0.26	0.0525 U	0.28	0.0469 U	1.7	0.72	4500	4120	0.47	0.0865	0.26	0.103	0.09 JQ	0.0558 U	0.26	0.115 U	0.23	0.0528 U
Xylenes, Total	25	50	100	100 ¹ 120 ⁴	0.07 U	0.0788 U	0.068 U	0.0703 U	1.2	0.715	5700	4740	0.14 JQ	0.0841	0.064 U	0.0759 U	0.068 U	0.0838 U	0.15 U	0.172 U	0.069 U	0.0793 U

Key for Soil Table

- Notes:
- = Greater than or equal to ODEQ RBC Soil Leaching to Ground Water Residential Values (most restrictive).
 - = Greater than or equal to ODEQ RBC Soil Leaching to Ground Water Urban Residential Values (moderately restrictive).
 - = Greater than or equal to ODEQ RBC Soil Leaching to Ground Water Urban Occupational and/or ODEQ Level II Screening Level Values (least restrictive).
 - = Screening or cleanup criteria does not exist.

- Bold** = Result detected at or above limit of detection.
- A** = SMAF DRO Range is C12 - C24.
- B** = SMAF RRO Range is C24 - C40.

Abbreviations:

- DRO = Diesel range organics.
- EPA = Environmental Protection Agency.
- ID = Identification.
- JQ = The analyte was positively identified; the associated numerical value is the approximate concentration less than the reporting limit.
- MCL = Federal Maximum Contaminant Level drinking water standards.
- mg/kg = Milligram per kilogram (parts per million).
- NA = Not analyzed.
- ODEQ = Oregon Department of Environmental Quality.
- RBC = Risk-Based Concentrations developed by ODEQ.
- RRO = Residual range organics.
- SLVs = Screening level values as defined by ODEQ for performing ecological risk assessments.
- SVOCS = Semivolatile organic compounds.
- TPHs = Total petroleum hydrocarbons.
- U = The analyte was analyzed for, but not detected above the reported sample quantitation limit.
- VOCs = Volatile organic compounds.

Attachment C: Table of Analytical Data for Soil Samples

EPA Sample ID	ODEQ RBC Soil Leaching to Ground Water			ODEQ Level II Screening Level Values in Soil	13100010		13100011		13100012		13100016		13100023		13100024		13100025		13100026	
					SS010ST / ST104		SS011ST / ST105		SS012ST / SST106		SS013ST		SS014ST		SS015ST		SS016ST		SS017ST	
Sample Location	Residential	Urban Residential	Occupational	Plants ¹ Invertebrates ² Birds ³ Mammals ⁴	9/25/2013		9/25/2013		9/26/2013		9/27/2013		9/30/2013		9/30/2013		9/30/2013		9/30/2013	
Sample Collection Date					2 - 4 inches		2 - 4 inches		2 - 4 inches		2 - 4 inches		2 - 4 inches		2 - 4 inches		2 - 4 inches		2 - 4 inches	
Sample Collection Depth	EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF	
Sampled By	EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF		EPA		SMAF	
TPHs (mg/kg)																				
Gasoline Range Hydrocarbons					2.8 JQ	2.96 U	1.6 U	3 U	1.6 JQ	2.87 U	1.4 JQ	3.36	1.8 UJL	3.36 U	1.8 U	3.28 U	1.9 U	3.82 U	1.7 U	3.38 U
DRO (C10-C25) ^A					18	31	48	24.4	39	14.4 U	48 JK	15.5	88 JK	25.5	20 JK	15.8 U	20 JK	17.4 U	6.6 JQ	15.5 U
RRO (nC25-nC36) ^B					55	266	150	186	94	46.7	100 JK	93.5	160 JK	191	52 JK	31.5 U	57 JK	124	24 JQ	30.9 U
SVOCs (mg/kg)																				
Acenaphthene				20 ¹	0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Acenaphthylene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Anthracene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Benzo[a]anthracene	3.5	10			0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Benzo[a]pyrene	0.9	2.7		125 ⁴	0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Benzo[b]fluoranthene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Benzo[g,h,i]perylene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Benzo[k]fluoranthene	4				0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Chrysene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Dibenz[a,h]anthracene	3.4				0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Fluoranthene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Fluorene				30 ²	0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Indeno[1,2,3-cd]pyrene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Naphthalene	0.087	0.47	0.44	10 ¹ 3900 ⁴	0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Phenanthrene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
Pyrene					0.004 U	0.0299 U	0.0041 U	0.0306 U	0.0039 U	0.281 U	0.0036 U	0.0273 U	0.0046 U	0.033 U	0.0045 U	0.0305 U	0.0048 U	0.035 U	0.0044 U	0.0317 U
VOCs (mg/kg)																				
1,2,4-Trimethylbenzene	16	33	68		0.055 U	0.0277 U	0.057 U	0.0315 U	0.054 U	0.0255 U	0.05 U	0.0267 U	0.064 U	0.0315 U	0.063 U	0.0288 U	0.066 U	0.0314 U	0.059 U	0.0256 U
1,2-Dibromoethane	0.14	0.000081	0.44		0.02 U	0.0277 U	0.021 U	0.0315 U	0.02 U	0.0255 U	0.018 U	0.0267 U	0.024 U	0.0315 U	0.023 U	0.0288 U	0.024 U	0.0314 U	0.022 U	0.0256 U
1,2-Dichloroethane	0.0014	0.0068	0.0077	70 ³ 2780 ⁴	0.019 U	0.0277 U	0.02 U	0.0315 U	0.019 U	0.0255 U	0.017 U	0.0267 U	0.022 U	0.0315 U	0.022 U	0.0288 U	0.023 U	0.0314 U	0.021 U	0.0256 U
1,3,5-Trimethylbenzene	92	180			0.029 U	0.0277 U	0.03 U	0.0315 U	0.028 U	0.0255 U	0.026 U	0.0267 U	0.033 U	0.0315 U	0.033 U	0.0288 U	0.034 U	0.0314 U	0.031 U	0.0256 U
Benzene	0.0093	0.042	0.053	330 ⁴	0.031 JQ	0.0195 U	0.038 JQ	0.0221 U	0.024 U	0.0179 U	0.022 U	0.0187 U	0.028 U	0.0221 U	0.027 U	0.0202 U	0.029 U	0.022 U	0.026 U	0.0179 U
Ethylbenzene	0.16	0.77	0.9		0.021 U	0.0277 U	0.022 U	0.0315 U	0.021 U	0.0255 U	0.02 U	0.0267 U	0.025 U	0.0315 U	0.025 U	0.0288 U	0.026 U	0.0314 U	0.023 U	0.0256 U
Isopropylbenzene					0.043 U	0.0277 U	0.045 U	0.0315 U	0.042 U	0.0255 U	0.039 U	0.0267 U	0.05 U	0.0315 U	0.049 U	0.0288 U	0.051 U	0.0314 U	0.046 U	0.0256 U
Methyl tert-butyl ether	0.092	0.41	0.52		0.015 U	0.0277 U	0.016 U	0.0315 U	0.015 U	0.0255 U	0.014 U	0.0267 U	0.018 U	0.0315 U	0.018 U	0.0288 U	0.019 U	0.0314 U	0.017 U	0.0256 U
N-Propylbenzene					0.025 U	0.0277 U	0.026 U	0.0315 U	0.025 U	0.0255 U	0.023 U	0.0267 U	0.029 U	0.0315 U	0.029 U	0.0288 U	0.03 U	0.0314 U	0.027 U	0.0256 U
Toluene	140	280		200 ¹ 1440 ⁴	0.16	0.0554 U	0.17	0.0629 U	0.041 JQ	0.0509 U	0.016 U	0.0534 U	0.021 U	0.063 U	0.02 U	0.0576 U	0.021 U	0.063 U	0.019 U	0.0512 U
Xylenes, Total	25	50	100	100 ¹ 120 ⁴	0.07 U	0.0833 U	0.074 U	0.0944 U	69000 U	0.0765 U	0.064 U	0.0801 U	0.082 U	0.0946 U	0.081 U	0.0866 U	0.084 U	0.0944 U	0.076 U	0.0767 U

Key for Soil Table

- Notes:
- = Greater than or equal to ODEQ RBC Soil Leaching to Ground Water Residential Values (most restrictive).
 - = Greater than or equal to ODEQ RBC Soil Leaching to Ground Water Urban Residential Values (moderately restrictive).
 - = Greater than or equal to ODEQ RBC Soil Leaching to Ground Water Urban Occupational and/or ODEQ Level II Screening Level Values (least restrictive).
 - = Screening or cleanup criteria does not exist.
 - Bold** = Result detected at or above limit of detection.
 - A = SMAF DRO Range is C12 - C24.
 - B = SMAF RRO Range is C24 - C40.

Abbreviations:

- DRO = Diesel range organics.
- EPA = Environmental Protection Agency.
- ID = Identification.
- JQ = The analyte was positively identified; the associated numerical value is the approximate concentration less than the reporting limit.
- MCL = Federal Maximum Contaminant Level drinking water standards.
- mg/kg = Milligram per kilogram (parts per million).
- NA = Not analyzed.
- ODEQ = Oregon Department of Environmental Quality.
- RBC = Risk-Based Concentrations developed by ODEQ.
- RRO = Residual range organics.
- SLVs = Screening level values as defined by ODEQ for performing ecological risk assessments.
- SVOCs = Semivolatile organic compounds.
- TPHs = Total petroleum hydrocarbons.
- U = The analyte was analyzed for, but not detected above the reported sample quantitation limit.
- VOCs = Volatile organic compounds.

Attachment D

Sampling Plan, Analytical Data and 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

October 18, 2013

Kathy Parker, On-Scene Coordinator
United States Environmental Protection Agency, Region 10
1200 Sixth Avenue, ECL-116
Seattle, Washington 98102

Re: Final Site-Specific Sampling Plan and Site-Specific Data Management Plan for the Warm Springs Tanker Spill Site
Contract Number EP-S7-13-07, Technical Direction Document Number 13-09-0010

Dear Ms. Parker:

Enclosed please find the final Site-Specific Sampling Plan and Site-Specific Data Management Plan for the Warm Springs Tanker Spill Site. If you have any questions regarding this submittal, please call Jake Moersen or me at (206) 624-9537.

Sincerely,

ECOLOGY AND ENVIRONMENT, INC.

Brad Martin
START-3 Project Leader

cc: Jake Moersen, START-3 Project Manager, Seattle, Washington

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Site Specific Sampling Plan

Project Name: Warm Springs Tanker Spill

Site ID: Z0DK

Author: Jake Moersen Company: Ecology & Environment (E&E) Date Completed: October 18, 2013

This Site Specific Sampling Plan (SSSP) is prepared and used in conjunction with the Quality Assurance Plan (QAP) for the Emergency Response Unit for collecting samples during this Removal Program project. The information contained herein is based on the information available at the time of preparation. As better information becomes available, this SSSP will be adjusted.

When inadequate time is available for preparing the SSSP in advance of the sampling event, a Field Sampling Form may be prepared on-site immediately prior to sampling. This full length version of the SSSP is written after the sampling event and the completed Field Sampling Form attached to it.

1. Approvals

Name, Title	Telephone, Email, Address	Signature
Kathy Parker On-Scene Coordinator	206-553-0062 parker.kathy@epa.gov USEPA , M/S: ECL-116 1200 Sixth Ave. Suite 900 Seattle, WA 98101	
Mike Boykin ERU Quality Assurance Coordinator	206-553-6362 boykin.michael@epa.gov USEPA , M/S: ECL-116 1200 Sixth Ave. Suite 900 Seattle, WA 98101	

1. Project Management and Organization

2. Personnel and Roles involved in the project:

Name	Telephone, Email, Company, Address	Project Role	Data Recipient
Kathy Parker	206 553-0062 parker.kathy@epa.gov USEPA , M/S: ECL-116, 1200 Sixth Ave. Suite 900, Seattle, WA 98101	On-Scene Coordinator	Yes
Jake Moersen	206-624-9537 jmoersen@ene.com E & E 720 Third Ave, Suite 1700 Seattle, WA 98104	Author of SSSP, START Project Manager	Yes
Mike Boykin	206-553-6362 boykin.michael@epa.gov USEPA , M/S: ECL-116 1200 Sixth Ave. Suite 900 Seattle, WA 98101	ERU Quality Assurance Coordinator	No

Mark Woodke	206-624-9537 mwoodke@ene.com E & E 720 Third Ave, Suite 1700 Seattle, WA 98104	START Quality Assurance Reviewer	Yes
Vanessa Berry	503-906-9200 Vanessa.Frahs@testamericainc.com Test America Portland 9405 SW Nimbus Ave Beaverton, OR 97008	Laboratory Contact	No

3. Physical Description and Site Contact Information:

Site Name	Warm Springs Tanker Spill		
Site Location	See Figure 1, Site Vicinity Map		
Property Size	See Figure 2, Site Location Map		
Site Contact	Tom Kichenmaster	Phone Number: 541-663-0385	
Nearest Residents	To be determined	Direction: To be determined	
Primary Land Uses Surrounding the Site	Grazing, hunting, fishing		

4. The proposed schedule of project work follows:

Activity	Estimated Start Date	Estimated Completion Date	Comments
SSSP Review/Approval	9/26/13	10/18/13	
Mobilize to / Demobilize from Site	9/25/13	10/25/13	EPA and START demobilized on 9/26, and START returned on 9/30 to retrieve additional samples. EPA intends remobilize to the site at a later date for the final site walkthrough with the Unified Command
Sample Collection	9/25/13	9/30/13	
Laboratory Sample Receipt	9/27/13	9/30/13	
Laboratory Analysis	9/27/13	10/8/13	TAT for EPA samples ranged from 24-hrs to 5 days.
Data Validation	10/2/13	10/25/13	

5. Historical and Background Information

Describe briefly what you know about the site that is relevant to sampling and analysis for this investigation.

At 2130 hours on September 24, 2013, a tanker carrying diesel and unleaded gas hit an elk on U.S. Highway 26 near Milepost 82. Approximately 1500 gallons of diesel and 3500 gallons of unleaded gasoline were released to soil northeast of the road approximately 250 yards from Beaver Creek, a tributary of the Warm Springs River, which flows to the Deschutes River and then to the Columbia River. Beaver Creek also feeds to a fish hatchery on the Warm Springs River, operated by the Confederated Tribes of the Warm Springs (Tribes), which is currently raising 1.3 million fry of Chinook salmon, bull trout and steelhead trout.

EPA, ODOT, ODEQ Gresham Hazmat, and representatives of the Confederated Tribes of the Warm Springs responded to the site. The responsible party (RP), Central Petro out of Bend, Oregon, hired SMAF Environmental to perform the clean-up and take preventative steps to prevent the fuel from reaching Beaver Creek. A Unified Command was formed in accordance with the incident command system; the Unified Command included the Tribes, EPA, and the RP.

The Tribes requested that EPA and the RP collect and analyze split samples of soil and surface water

from the dates of September 25 – 30. The purpose of the split samples is to perform a correlation of EPA data with the RP's data. This SSSP covers only the split samples that were collected between the aforementioned date range. The RP will follow their own sampling plan for any additional samples they collect beyond the scope of the split sampling arrangement with EPA.

6. Conceptual Site Model

Example: Contaminant: Mercury

Transport Mechanism: vapor moving on air currents

Receptors: people living in the house

Contaminants: 3500 gallons of gasoline, 1500 gallons of diesel

Transport Mechanisms:

1. Liquid migrating through the vadose (unsaturated) zone.
2. Liquid migrating into the water table and moving downgradient.
3. Liquid transporting to Beaver Creek via groundwater and/or vadose zone.

Receptors:

1. Plants and animals near the spill location.
2. Aquatic organisms in Beaver Creek, including Chinook salmon, steelhead trout and bull trout.
3. Human health (ingestion of fish).
4. Human health (drinking water).

7. Decision Statement

Examples: 1) Determine whether surface contamination exceeds the established action level;

2) Determine appropriate disposal options for contaminated materials.

The decision(s) to be made from this investigation is/are to:

1. Determine whether surface and/or subsurface soil contamination exceeds the established cleanup criteria to guide removal activities and/or establish the extent of contamination.
2. Determine whether surface water contamination is above method detection limits (i.e., indicating that contamination has reached Beaver Creek), and if so whether it exceeds the established action level(s).

8. Action Level

State the analyte, concentration, and units for each selected action level. Describe the rationale for choosing each action level and its source (i.e. MTCA, PRG, ATSDR, etc.) Example: The action level for total mercury in soil is 6.7 mg/kg (from Regional Screening Level residential).

The split samples of soil and surface water are targeted for analysis of diesel range organics, gasoline range organics, BTEX (benzene, toluene, ethylbenzene, and xylene) and select additional VOCs, and PAHs (polycyclic aromatic hydrocarbons). The EPA results will be correlated with the RP's results. The Unified Command will compare the concentrations to screening level values (SLVs) for ecological receptors and/or risk-based concentrations (RBCs) for soil leaching to groundwater and/or groundwater ingestion and inhalation, as established by the State of Oregon.

II. Data Acquisition and Measurement Objectives

9. Site Diagram and Sampling Areas

A Sampling Area is an area within in which a specific action will be performed.

Examples : 1) Each drum on the site is a Sampling Area;

2) Each section of sidewalk in front of the residence is a Sampling Area;

3) Each sampling grid section is a Sampling Area.

See Figure 2 for the spill location, stockpile location for excavated soil, background surface water sample location (SW001), and downstream surface water sample location (SW002).

10. The Decision Rules

These can be written as logical *If... Then...* statements. Describe how the decisions will be made and how to address results falling within the error range of the action level. Examples: 1) In the Old Furnace Sampling Area, the soil in the area around the furnace structure will be excavated until sample analysis with XRF shows no mercury concentrations in surface soil above the lower limit of the error associated with the action level, 18.4 mg/kg. 2) If the concentrations of contaminants in a SA are less than the lower limit of the error associated with the action level, then the area may be characterized as not posing an unacceptable risk to human health or the environment and may be dismissed from additional RP activities. The area may be referred to other Federal, State or Local government agencies.

The following statement(s) describe the decision rules to apply to this investigation:

1. If the data from the split samples is adequately correlated, then no additional EPA sampling is anticipated. If the data from the split samples is not sufficiently correlated, then further consultation with the Unified Command may be recommended.
2. If the concentrations of contaminants in soil exceed the RBCs or SLVs, additional soil will be excavated until the concentrations are either non-detect or below the site screening criteria.
3. If the concentrations of contaminants in water are above method detection limits, then it will be assumed that contamination from the spill release has migrated to surface water; the Unified Command will be notified and additional measures may be taken to mitigate the threat of contamination to ecological receptors in the creek.

11. Information Needed for the Decision Rule

What information needs to be collected to make the decisions – this includes non-sampling info as well: action levels, climate history, direction of water flow, etc. Examples: Current and future on-site and off-site land use; wind direction, humidity and ambient temperature; contaminant concentrations in surface soil.

The following inputs to the decision are necessary to interpret the analytical results:

1. Contaminant concentrations in soil.
2. Contaminant concentrations in surface water.

12. Sampling and Analysis

For each SA, describe:

1. sampling pattern (random, targeted, scheme for composite)
2. number of samples, how many to be collected from where, and why
3. sample type (grab, composite)
4. matrix (air, water, soil)
5. analytes and analytical methods
6. name and locations of off-site laboratories, if applicable.

1. Targeted sampling of soil and surface water.
2. Soil samples will be collected from the bottom and sides of the excavation to show cleanup levels are achieved. Soil samples will be collected from ground surface prior to using the stockpiling area for excavated soil. Water samples will be collected from Beaver Creek - upstream from the spill site and downstream at the first bridge.
3. Grab samples of soil and surface water.
4. Matrices include soil and surface water.
5. Analytes include gasoline range organics (NWTPH-Gx), diesel range organics (NWTPH-Dx), PAHs (EPA 8270), and BTEX plus select additional VOCs (MTBE, iso-propylbenzene; n-propylbenzene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; 1,2-dibromomethane; 1,2-dichloroethane; EPA 8260).
6. Test America, Portland, Oregon.

13. Applicability of Data (place an X in front of the data categories needed, explain with comments)

Do the decisions to be made from the data require that the analytical data be:

- 1) definitive data, 2) screening data (with definitive confirmation) or 3) screening data (without definitive confirmation)?

X **A) Definitive data** is analytical data of sufficient quality for final decision-making. To produce definitive data on-site or off-site, the field or lab analysis will have passed full Quality Control (QC) requirements (continuing calibration checks, Method Detection Limit (MDL) study, field duplicate samples, field blank, matrix spikes, lab duplicate samples, and other method-

specific QC such as surrogates) AND the analyst will have passed a Precision and Recovery (PAR) study AND the instrument will have a valid Performance Evaluation sample on file. This category of data is suitable for: **1) enforcement purposes, 2) determination of extent of contamination, 3) disposal, 4) RP verification or 5) cleanup confirmation.**
Comments: Fixed laboratory sample analyses will produce definitive data.

B) Screening data with definitive confirmation is analytical data that may be used to support preliminary or intermediate decision-making until confirmed by definitive data. However, even after confirmation, this data is often not as precise as definitive data. To produce this category of data, the analyst will have passed a PAR study to determine analytical error AND 10% of the samples are split and analyzed by a method that produced definitive data with a minimum of three samples above the action level and three samples below it.

Comments:

C) Screening data is analytical data which has not been confirmed by definitive data. The QC requirements are limited to an MDL study and continuing calibration checks. This data can be used for making decisions: **1) in emergencies, 2) for health and safety screening, 3) to supplement other analytical data, 4) to determine where to collect samples, 5) for waste profiling, and 6) for preliminary identification of pollutants.** This data is not of sufficient quality for final decision-making.

Comments:

14. Special Sampling or Analysis Directions

Describe any special directions for the planned sampling and analysis such as additional quality controls or sample preparation issues. Examples: 1) XRF and Lumex for sediment will be calibrated before each day of use and checked with a second source standard. 2) A field blank will be analyzed with each calibration to confirm the concentration of non-detection. 3) A Method Detection Limit determination will be performed prior to the start of analysis so that the lower quantitation limit can be determined. 4) If particle size is too large for accurate analyses, the samples will be ground prior to analysis. If the sample contains too much moisture for accurate analyses, the sample will be decanted and air dried prior to analysis.

The RP collected split samples of soil and surface water from the dates of September 25 – 30. START maintained custody of split samples collected from September 25 – 26. The RP and/or the Tribes maintained custody of samples collected from September 27 – 30. On September 30 a START representative arrived on site to retrieve the remaining samples for processing and delivery to the lab for analysis. The rate of confirmation sampling of the split samples is 100%.

15. Method Requirements

[Describe the restrictions to be considered in choosing an analytical method due to the need to meet specific regulations, policies, ARARs, and other analytical needs. Examples: 1) Methods must meet USEPA Drinking Water Program requirements. 2) Methods must achieve lower quantitation limits of less than 1/10 the action levels. 3) Methods must be performed exactly as written without modification by the analytical laboratory.]

1. Methods must meet screening level values (SLVs) for ecological receptors and risk-based concentrations (RBCs) established by the State of Oregon.
2. Methods must be performed as written without modification by the analytical laboratory unless approval is received from EPA and/or START.

16. Sample Collection Information

[Describe any activities that will be performed related to sample collection]

The applicable sample collection Standard Operating Procedures (SOPs) or methods will be followed and include:

- Field Activity Logbook SOP for START
- Sample Packaging and Shipping SOP for START
- Sampling Equipment Decontamination SOP for START

17. Optimization of Sampling Plan (Maximizing Data Quality While Minimizing Time and Cost)

[Describe what choices were made to reduce cost of sampling while meeting the needed level of data quality. Example: The XRF will be used in situ whenever possible to achieve accurate results. Reproducibility and accuracy of in situ XRF analyses will be checked by collecting, air drying, analyzing and comparing five in situ samples at the start of sampling. Where interferences are suspected, steps will be taken to eliminate the interferences by mechanisms such as drying, grinding or sieving the samples or analyzing them using the Lumex with soil attachment.]

EPA may reevaluate the number of samples submitted to the lab as well the analytical methods employed by the lab based on the quantity of samples collected and the identification of site contaminants of concern, respectively.

The format for sample number identification is summarized in Table 1. Sample collection and analysis information is summarized in Table 2.

**Table 1
SAMPLE CODING**

Project Name: Warm Springs Tanker Spill **Site ID:** Z0DK

SAMPLE NUMBER ⁽¹⁾		
Digits	Description	Code (Example)
1,2,3,4	Year and Month Code	1310 (YYMM)
5,6,7,8	Consecutive Sample Number (grouped by SA as appropriate)	0001 (First sample of SA)

SAMPLE NAME / LOCATION ID ⁽²⁾ (Optional)		
1,2	Sampling Identifier	CP – Composite MW – Monitoring Well RS – Rinsate SB – Subsurface Soil SS – Surface Soil SW – Surface Water TB – Trip Blank
3,4,5	Consecutive Sample Number	001 – First sample of Sampling Area
6,7	Secondary Sampling Identifier (Optional)	BG – Background SL – Spill Location ST – Stockpile Location

Notes:

(1) The Sample Number is a unique, 8-digit number assigned to each sample.

(2) The Sample Name or Location ID is an optional identifier that can be used to further describe each sample or sample location.

Table 2. Sampling and Analysis

Data Quality	Sampling Area	Matrix	Sampling Pattern	Sample Type	Data Quality	Number of EPA Split Samples	Analyte or Parameter	Method Number	Action Level	Method Quant. Limit	#/type of Sample Containers per Sample	Preservative	Hold Time (to analysis or to extraction/analysis)	Field QC
Lab Analysis	Spill Location / Stockpile Location	Soil	Targeted	Grab	Definitive	17	1.PAHs 2.BTEX 3.Gx 4.Dx	Sec 12	Se c8	See Attachment	Two 4 oz jars	NA	1.14/40 days 2.14 days 3.14 days 4.14/40 days	RP splits will act as duplicates
Lab Analysis	Surface Water (Beaver Creek)	Surface water	Targeted	Grab	Definitive	6	1.PAHs 2.BTEX 3.Gx 4.Dx	Sec 12	Se c8	See Attachment	1.2-1L 2.2-40ml 3.2-40ml 4.2-1L	1.NA 2.HCl 3.HCl 4.HCl	1.7/40 days 2.14 days 3.14 days 4.14/40 days	1 MS/MSD
Lab Analysis	Trip Blank	Distilled water	Targeted	Grab	Definitive	1	1.BTEX 2.Gx	Sec 12	NA	See Attachment	2-40ml VOAs	HCL	14 days	NA

Note: For matrix spike and/or duplicate samples, no extra volume is required for air (unless co-located samples are collected), oil, product, or soil samples except soil VOC or NWTPH-Gx samples (triple volume). Triple volume is also required for organic water samples (double volume for inorganic).

Table 3. Common Sample Handling Information

Analysis Type	Sub Analysis	Matrix	Analytical Method	Container Type	Minimum Volume	Preservative	Temperature/Storage	Hold Time	Source
Metals	Metals Not including Mercury or Hexachrome. Includes TAL, PP, RCRA lists)	Solid	EPA 6000 / 7000 Series	Glass Jar	200 g	n/a	None	6 months	SW-846 ch. 3
		Aqueous	EPA 6000 / 7000 Series	PTFE or HDPE	600 mL	HNO ₃ to pH < 2	Not listed	6 months	SW-846 ch. 3
	Mercury	Solid	EPA 7471B	Glass Jar	200 g	n/a	≤ 6° C	28 days	SW-846 ch. 3
		Aqueous	EPA 7470A	PTFE or HDPE	400 mL	HNO ₃ to pH < 2	Not listed	28 days	SW-846 ch. 3
	Hexavalent Chromium, (Hexachrome, Cr+6)	Solid	Lab-specific soil extraction modification, EPA 7196A	Glass Jar	100 g	n/a	≤ 6° C	28 days to extraction	SW-846 ch. 3
		Aqueous	EPA 218.6 (Drinking Water)	PTFE or HDPE	400 mL	n/a	≤ 6° C	24 hours	SW-846 ch. 3
	XRF	Solid (in situ; on the ground surface)	6200	none	n/a	none	none	Analyze Immediately	n/a
		Solid (ex situ)	6200	plastic bag	200 g	none	none	6 months	n/a
VOCs	VOCs / BTEX	Solid	EPA 5035 / 8260B	*	*	*	*	2 days to lab / 14 days	SW-846 ch. 4
		Aqueous	EPA 8260B	Amber Vial with Septa Lid	2 x 40 mL	HCl to pH < 2	≤ 6° C (headspace free)	14 days	SW-846 ch. 4
SVOCs	SVOCs / PAHs	Solid	EPA 8270D	Glass Jar	8 ounces	n/a	≤ 6° C	14 days	SW-846 ch. 4
		Aqueous	EPA 8270D	Amber Glass	2 x 1 L	n/a	≤ 6° C	7 days	SW-846 ch. 4
PCBs and Dioxins/Furans	PCBs	Solid	EPA 8082	Glass Jar	8 ounces	n/a	≤ 6° C	none	SW-846 ch. 4
		Aqueous	EPA 8082	Amber Glass	2 x 1 L	n/a	≤ 6° C	none	SW-846 ch. 4
	Dioxins/Furans	Solid	EPA 8280 or 8290	Glass Jar	8 ounces	n/a	≤ 6° C	none	SW-846 ch. 4
		Aqueous	EPA 8280 or 8290	Amber Glass	2 x 1 L	n/a	≤ 6° C	none	SW-846 ch. 4
Pesticides and Herbicides	Chlorinated Pesticides	Solid	EPA 8081	Glass Jar	8 ounces	n/a	≤ 6° C	14 days	SW-846 ch. 4
		Aqueous	EPA 8081	Amber Glass	2 x 1 L	n/a	≤ 6° C	7 days	SW-846 ch. 4
	Chlorinated Herbicides	Solid	EPA 8151	Glass Jar	8 ounces	n/a	≤ 6° C	14 days	SW-846 ch. 4
		Aqueous	EPA 8151	Amber Glass	2 x 1 L	n/a	≤ 6° C	7 days	SW-846 ch. 4
NWTPH	Gasoline-Range Organics	Solid	TPHs/NWTPH-Gx	Amber Glass Jar with Septa Lid	4 ounces	n/a	≤ 6° C (headspace free)	14 days	Method
		Aqueous	TPHs/NWTPH-Gx	Amber Vial with Septa Lid	2 x 40 mL	pH < 2 with HCl	≤ 6° C (headspace free)	7 days unpreserved 14 days preserved	Method
	Diesel-Range Organics	Solid	3510, 3540/3550, 8000	Glass Jar	8 ounces	n/a	≤ 6° C	14 days	Method
		Aqueous	3510,	Glass Amber	2 x 1 L	pH < 2 with HCl	≤ 6° C	7 days unpreserved	Method

Analysis Type	Sub Analysis	Matrix	Analytical Method	Container Type	Minimum Volume	Preservative	Temperature/ Storage	Hold Time	Source
			3540/3550, 8000					14 days preserved	
Geotechnical	Particle Size Analysis	Solid	ASTM D-422	Glass Jar or Plastic Bag	2 x 8 ounce	none	n/a	n/a	Method
Miscellaneous	pH	Solid	EPA 9045	Glass Jar	8 ounces	n/a	n/a	Analyze Immediately	SW-846 ch. 3
		Aqueous	EPA 9040	PTFE	25 mL	n/a	n/a	Analyze Immediately	SW-846 ch. 3
	Total Organic Carbon (TOC)	Solid	SW-846 9060	Glass Jar	100 mL	n/a	≤ 6° C	28 days	SW-846
		Aqueous	EPA 415.1	PTFE or HDPE	200 mL	store in dark HCL or H ₂ SO ₄ to pH <2	≤ 6° C	7 days unpreserved 28 days preserved	Method
	Cyanide	Solid	SW-846 9013	Glass Jar	5 g	n/a	≤ 6° C	14 days	SW-846 ch. 3
		Aqueous	SW-846 9010C	PTFE or HDPE	500 mL	NaOH to pH > 12	≤ 6° C	14 days	SW-846 ch. 3
	Conductivity	Aqueous	EPA 120.1	PTFE or HDPE	100 mL	n/a	n/a	Analyze Immediately	Method
	Hardness	Aqueous	EPA 130.1	PTFE or HDPE	1 x 1 L	HNO ₃ to pH<2	≤ 6° C	28 days	Method
	Total Suspended Solids	Aqueous	EPA 160.2	PTFE or HDPE	100 mL	n/a	≤ 6° C	7 days	Method
	Total Dissolved Solids	Aqueous	EPA 160.1	PTFE or HDPE	100 mL	n/a	≤ 6° C	7 days	Method
	Nitrate/nitrite	Aqueous	EPA 353.2	PTFE or HDPE	1 x 250 mL	H ₂ SO ₄ to pH <2	≤ 6° C	28 days	Method
	Nitrate	Aqueous	SW-846 9210A	PTFE or HDPE	1,000 mL	n/a	≤ 6° C	28 days	SW-846 ch. 3
	Nitrite	Aqueous	SW-846 9216	PTFE or HDPE	25 mL	n/a	≤ 6° C	48 hours	SW-846 ch. 3, Method
	Fluoride	Aqueous	SW-846 9214	PTFE or HDPE	300 mL	n/a	≤ 6° C	28 days	SW-846 ch. 3
	Chloride	Aqueous	SW-846 9250	PTFE or HDPE	50 mL	n/a	≤ 6° C	28 days	SW-846 ch. 3
Sulfate	Aqueous	SW-846 9035	PTFE or HDPE	50 mL	n/a	≤ 6° C	28 days	SW-846 ch. 3	
Sulfide	Solid	SW-846 9215	Glass Jar	1 x 4 ounces	Fill sample surface with 2N zinc acetate until moistened.	≤ 6° C (headspace free)	7 days	SW-846 ch. 3	
	Aqueous	SW-846 9031	PTFE or HDPE	100 mL	4 drops 2N zinc acetate/100 mL sample; NaOH to pH>9.	≤ 6° C (headspace free)	7 days	SW-846 ch. 3	

Key:

- * = See individual methods. We typically collect 3xEnCore-type samplers and 1x40 mL VOA vial per sample, keep at ≤ 6°C with no chemical preservative, and they must be at the lab within 48 hours of collection.
- C = Celsius
- Cr = chromium
- EPA = Environmental Protection Agency
- g = grams
- H₂SO₄ = sulfuric acid
- HCL = hydrochloric acid
- HDPE = high-density polyethylene
- Hg = mercury
- HNO₃ = nitric acid
- L = liter
- mL = milliliter
- n/a = not applicable
- NaOH = sodium hydroxide
- PCBs = polychlorinated biphenyls
- PTFE = polytetrafluoroethylene
- RCRA = Resource Conservation and Recovery Act
- SVOCs = semivolatile organic compounds
- SW-846 = EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods
- TAL = Target Analyte List
- TPH = total petroleum hydrocarbons
- VOA = Volatile Organic Analysis
- VOCs = Volatile Organic Compounds

III. Assessment and Response

A Sample Plan Alteration Form (SPAF) will be used to describe project discrepancies (if any) that occur between planned project activities listed in the final SSSP and actual project work. The completed SPAF will be approved by the OSC and QAC and appended to the original SSSP.

A Field Sampling Form (FSF) may be used to capture the sampling and analysis scheme for emergency responses in the field and then the FSF pages can be inserted into the appropriate areas of the final SSSP.

Corrective actions will be assessed by the sampling team and others involved in the sampling and a corrective action report describing the problem, solution, and recommendations will be forwarded to the OSC and the ERU QAC.

IV. Data Validation and Usability

The sample collection data will be entered into Scribe and Scribe will be used to print lab Chains of Custody. Results of field and lab analyses will be entered into Scribe as they are received and uploaded to Scibe.net when the sampling and analysis has been completed.

18. Data Validation or Verification will be performed by:

ERU's general recommendation on validation is that a minimum of CLP-equivalent stage IIA verification and validation be performed for every SSSP involving laboratory analyses. However, stage IIB is preferred if the lab can provide it. Dioxins should be validated at CLP-equivalent stage 4.

	Data Verification and Validation Stages						
Performed by:	I	IIA	IIB	III	IV	Verification	Other:
E and E QA Reviewer			100%		10%		
EPA Region 10 QA Office							
MEL staff							
Other:							

Source: Maptech, Inc. 2001.

OREGON




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

WARM SPRINGS TANKER SPILL SITE
Warm Springs, Oregon

0 1.5 3
Approximate Scale in Miles

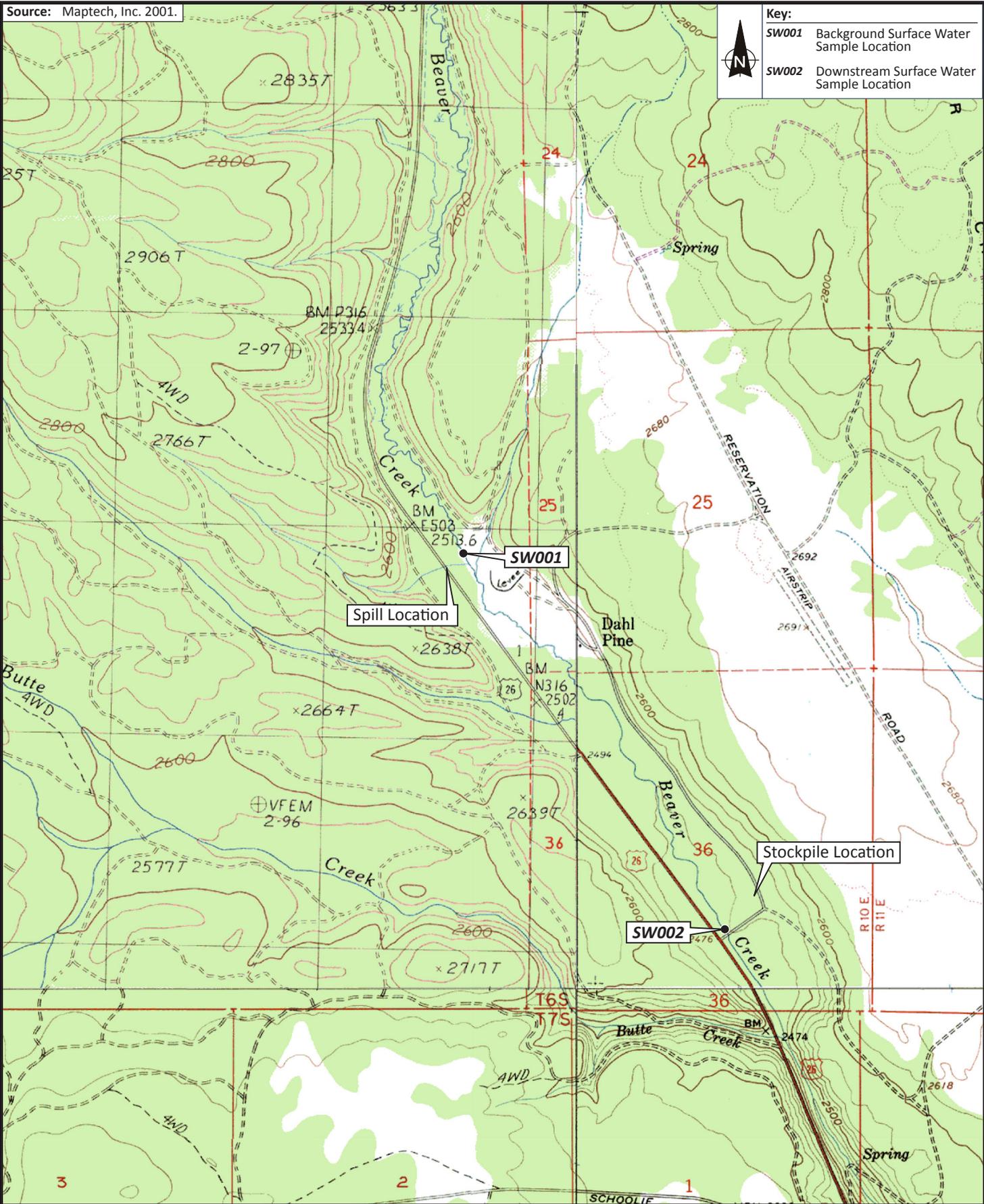
Figure 1
SITE VICINITY MAP

Date:	Drawn by:
9/30/13	AES

10:START-IV\13090010\fig 1

Source: Maptech, Inc. 2001.

	SW001	Background Surface Water Sample Location
	SW002	Downstream Surface Water Sample Location



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

WARM SPRINGS TANKER SPILL SITE
 Warm Springs, Oregon

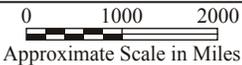


Figure 2
 SITE LOCATION MAP

Date:	Drawn by:	
10/18/13	AES	10:START-IV\13090010\fig 2

 <p>UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 10</p> <p>1200 Sixth Avenue, Suite 900 Seattle, Washington 98101-3140</p> <p>OFFICE OF ENVIRONMENTAL CLEANUP EMERGENCY RESPONSE UNIT</p>	Site-Specific Data Management Plan			
	Project Name:	Warm Springs Tanker Spill Site	TDD Number/Site ID:	13-09-0010
	Author:	Jacob Moersen	Company:	Ecology & Environment, Inc.
	Date Initiated:	October 18, 2013	Last Updated:	October 18, 2013

This data management plan (DMP) is intended to provide guidance for data collection by field personnel and subsequent data management activities. The data collection and management practices presented in this plan are designed to ensure data integrity and consistency for all data collection personnel and from operational period to the next. Listed in this DMP are data elements, data collection equipment, and data management processes, and end-use products appropriate for supporting the EPA On-Scene Coordinator (OSC). Electronic tools and files used during data management at the site may include a GPS with a data dictionary to gather site specific data, EDD files for laboratory results, field monitoring equipment (such as air monitoring equipment), a SCRIBE database to manage all field data and analytical results, and ArcGIS to manage geospatial data. Manual data entry or Excel spreadsheets will be used to incorporate field notes and historic data when electronic data is not available.

Data Processing

The following table outlines the specific requirements for various data types being collected during the project.

Data Source	Required Information	Processing Instructions	Processing Frequency	Processing Responsibility	Storage Location	Final Output [format]
Site Documents	Site files, SSSP, SSDMP, logbook	File hard copies and electronic copies in indicated storage location	Beginning of project, and as needed	Project Manager	Digital: Personal Laptop Hard Copy: Site Doc Box	Site file deliverable
Scribe	Scribe .mdb	Publish to scribe.net	Daily or as needed	Project Manager	<u>\02 Execution\SCRIBE</u>	scribe.net Project ID: TBD Scribe .mdb file
Camera	Date, time, direction, photographer, description	Information will be entered into an excel spreadsheet	Conclusion of project	Project Manager	<u>\02 Execution\Photos</u>	Photos [.jpg], Photographic log [.xls]
Sample Information	Sample No, Date, Time, Sampler, Location	Record into Scribe as needed	As Samples are added	Project Manager	Scribe	Chain-of-Custody forms, labels, tabular reports, and/or maps
GPS	Location, latitude, longitude	Data will be processed according to the GPS Data Processing SOP and uploaded into Scribe	Conclusion of project	Project Manager and GIS Analyst	Data: Scribe Raw: <u>\02 Execution\GIS</u>	Tabular reports [.xls] and/or maps [.pdf]
Fixed Laboratory Analysis	Location ID, sample number, sample date, sample time, analyte, result, qualifier, unit, MDL	Electronic data deliverables will be imported into Scribe	Upon receipt of validated data	Project Manager, START chemist	Data: Scribe Raw: <u>\03 Analytical & QALaboratory Data</u>	Tabular reports [.xls], Data Memoranda [.pdf]

All electronic files will be written to a CD-ROM or DVD and provided to the Task Monitor. Hard copy files will be assembled and provided to the Task Monitor. Hard copy files will include, but are not limited to logbooks and field forms.



MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 liquid and 12 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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:

13100001	13100002	13100003	13100004	13100005	13100006
13100007	13100008	13100009	13100010	13100011	13100012
13100013					

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of < 6°C. The samples were collected on September 25 or 26, 2013, and were analyzed by September 30, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Satisfactory.

All recoveries of the SMCs were greater than 10% and within QC criteria except the high recovery in sample 13100004; no action was taken based on the diluted outlier.

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Matrix and Blank Spikes: Acceptable.

Matrix and blank spike results were within laboratory QC limits.

9. Duplicates: Acceptable.

Laboratory duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.
- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100001							Lab Sample ID: 250-14421-1		
Date Collected: 09/25/13 09:40							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 83.0		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	4.7	1.5	µg/Kg	☒	09/27/13 13:42	09/27/13 17:25	1
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	99		50 - 150						
							Prepared	Analyzed	Dil Fac
							09/27/13 13:42	09/27/13 17:25	1
Client Sample ID: 13100002							Lab Sample ID: 250-14421-2		
Date Collected: 09/25/13 10:05							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 86.3		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	4.6	1.5	µg/Kg	☒	09/27/13 13:42	09/27/13 17:53	1
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	104		50 - 150						
							Prepared	Analyzed	Dil Fac
							09/27/13 13:42	09/27/13 17:53	1
Client Sample ID: 13100003							Lab Sample ID: 250-14421-3		
Date Collected: 09/25/13 10:16							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 91.9		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	8.4		4.3	1.4	mg/Kg	☒	09/27/13 13:42	09/27/13 18:21	1
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	102		50 - 150						
							Prepared	Analyzed	Dil Fac
							09/27/13 13:42	09/27/13 18:21	1
Client Sample ID: 13100004							Lab Sample ID: 250-14421-4		
Date Collected: 09/25/13 10:44							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 79.8		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	43000		4900	1600	mg/Kg	☒	09/27/13 13:42	09/30/13 12:07	1000
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	1684	X	50 - 150						
							Prepared	Analyzed	Dil Fac
							09/27/13 13:42	09/30/13 12:07	1000
Client Sample ID: 13100005							Lab Sample ID: 250-14421-5		
Date Collected: 09/25/13 11:00							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 93.1		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	11		4.3	1.4	mg/Kg	☒	09/27/13 13:42	09/27/13 18:49	1
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	105		50 - 150						
							Prepared	Analyzed	Dil Fac
							09/27/13 13:42	09/27/13 18:49	1
Client Sample ID: 13100006							Lab Sample ID: 250-14421-6		
Date Collected: 09/25/13 11:15							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 91.3		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	4.3	1.4	µg/Kg	☒	09/27/13 13:42	09/27/13 19:16	1
Surrogate	%Recovery	Qualifier	Limits						
a,a,a-Trifluorotoluene (fid)	103		50 - 150						
							Prepared	Analyzed	Dil Fac
							09/27/13 13:42	09/27/13 19:16	1

TestAmerica Portland

MW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100007							Lab Sample ID: 250-14421-7		
Date Collected: 09/25/13 12:45							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 85.5		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	4.6	1.5	mg/Kg	✱	09/27/13 13:42	09/27/13 19:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	106		50 - 150				09/27/13 13:42	09/27/13 19:44	1
Client Sample ID: 13100008							Lab Sample ID: 250-14421-8		
Date Collected: 09/25/13 12:55							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 78.0		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	10	3.3	mg/Kg	✱	09/27/13 13:42	09/27/13 21:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	96		50 - 150				09/27/13 13:42	09/27/13 21:36	1
Client Sample ID: 13100009							Lab Sample ID: 250-14421-9		
Date Collected: 09/25/13 13:05							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 84.4		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	4.7	1.5	mg/Kg	✱	09/27/13 13:42	09/27/13 22:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	96		50 - 150				09/27/13 13:42	09/27/13 22:04	1
Client Sample ID: 13100010							Lab Sample ID: 250-14421-10		
Date Collected: 09/25/13 13:20							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 83.2		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	2.8	J	4.8	1.5	mg/Kg	✱	09/27/13 13:42	09/27/13 20:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	98		50 - 150				09/27/13 13:42	09/27/13 20:40	1
Client Sample ID: 13100011							Lab Sample ID: 250-14421-11		
Date Collected: 09/25/13 13:30							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 79.8		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	5.0	1.6	mg/Kg	✱	09/27/13 13:42	09/27/13 22:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	99		50 - 150				09/27/13 13:42	09/27/13 22:32	1
Client Sample ID: 13100012							Lab Sample ID: 250-14421-12		
Date Collected: 09/26/13 08:45							Matrix: Solid		
Date Received: 09/27/13 09:45							Percent Solids: 84.3		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	1.6	J	4.7	1.5	mg/Kg	✱	09/27/13 13:42	09/27/13 23:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	102		50 - 150				09/27/13 13:42	09/27/13 23:28	1

TestAmerica Portland

JMW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100013						Lab Sample ID: 250-14421-13			
Date Collected: 09/26/13 10:18						Matrix: Water			
Date Received: 09/27/13 09:45									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U M	80	33	ug/L			09/27/13 13:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	98		50 - 150					09/27/13 13:19	1

6

MW 10-18-13

TestAmerica Portland



MEMORANDUM

DATE: October 18, 2013
TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA
FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*
SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**
REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 12 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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:

13100001 13100002 13100003 13100004 13100005 13100006
13100007 13100008 13100009 13100010 13100011 13100012

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of < 6°C. The samples were collected on September 25 and 26, 2013, were extracted by October 2, 2013, and were analyzed by October 3, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Satisfactory.

All SMC recoveries were within QC limits except fluorene in sample 13100004 with a high recovery; no actions were taken based on this diluted outlier.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Not Performed.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100001

Date Collected: 09/25/13 09:40

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-1

Matrix: Solid

Percent Solids: 83.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Acenaphthylene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Anthracene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Benzo[a]anthracene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Benzo[a]pyrene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Benzo[b]fluoranthene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Benzo[g,h,i]perylene	11	J	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Benzo[k]fluoranthene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Chrysene	13	J	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Dibenz(a,h)anthracene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Fluoranthene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Fluorene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Indeno[1,2,3-cd]pyrene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Naphthalene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Phenanthrene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2
Pyrene	ND	U	32	7.9	ug/Kg	*	10/02/13 12:42	10/03/13 11:46	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	86		25 - 125	10/02/13 12:42	10/03/13 11:46	2
Pyrene-d10 (Surr)	87		40 - 140	10/02/13 12:42	10/03/13 11:46	2
p-Terphenyl-d14 (Surr)	88		10 - 150	10/02/13 12:42	10/03/13 11:46	2

Client Sample ID: 13100002

Date Collected: 09/25/13 10:05

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-2

Matrix: Solid

Percent Solids: 86.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Acenaphthylene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Anthracene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Benzo[a]anthracene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Benzo[a]pyrene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Benzo[b]fluoranthene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Benzo[g,h,i]perylene	ND	U	31	31	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Benzo[k]fluoranthene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Chrysene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Dibenz(a,h)anthracene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Fluoranthene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Fluorene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Indeno[1,2,3-cd]pyrene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Naphthalene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Phenanthrene	ND	J	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2
Pyrene	ND	U	31	7.6	ug/Kg	*	10/02/13 12:42	10/03/13 12:23	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	86		25 - 125	10/02/13 12:42	10/03/13 12:23	2
Pyrene-d10 (Surr)	93		40 - 140	10/02/13 12:42	10/03/13 12:23	2
p-Terphenyl-d14 (Surr)	96		10 - 150	10/02/13 12:42	10/03/13 12:23	2

TestAmerica Portland

JW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100003
Date Collected: 09/25/13 10:16
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-3
Matrix: Solid

Percent Solids: 91.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Acenaphthylene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Anthracene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Benzo[a]anthracene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Benzo[a]pyrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Benzo[b]fluoranthene	14	J	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Benzo[g,h,i]perylene	32	J	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Benzo[k]fluoranthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Chrysene	19	J	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Dibenz(a,h)anthracene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Fluoranthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Fluorene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Indeno[1,2,3-cd]pyrene	8.1	J	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Naphthalene	28	J	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Phenanthrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Pyrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 12:53	2
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	97		25 - 125				10/02/13 12:42	10/03/13 12:53	2
Pyrene-d10 (Surr)	93		40 - 140				10/02/13 12:42	10/03/13 12:53	2
p-Terphenyl-d14 (Surr)	97		10 - 150				10/02/13 12:42	10/03/13 12:53	2

Client Sample ID: 13100004
Date Collected: 09/25/13 10:44
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-4
Matrix: Solid

Percent Solids: 79.8

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	1100		670	160	ug/Kg	*	10/02/13 12:42	10/04/13 11:53	40
Acenaphthylene	ND	U	670	670	ug/Kg	*	10/02/13 12:42	10/04/13 11:53	40
Anthracene	ND	U	670	670	ug/Kg	*	10/02/13 12:42	10/04/13 11:53	40
Benzo[a]anthracene	11	J	33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Benzo[a]pyrene	11	J	33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Benzo[b]fluoranthene	ND	U	33	33	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Benzo[g,h,i]perylene	19	J	33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Benzo[k]fluoranthene	ND	U	33	33	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Chrysene	31	J	33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Dibenz(a,h)anthracene	ND	U	33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Fluoranthene	ND	U	670	160	ug/Kg	*	10/02/13 12:42	10/04/13 11:53	40
Fluorene	ND	U	6700	1600	ug/Kg	*	10/02/13 12:42	10/04/13 12:23	400
Indeno[1,2,3-cd]pyrene	ND	U	33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Naphthalene	110000		6700	1600	ug/Kg	*	10/02/13 12:42	10/04/13 12:23	400
Phenanthrene	690		33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Pyrene	540		33	8.2	ug/Kg	*	10/02/13 12:42	10/03/13 13:22	2
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	199	X	25 - 125				10/02/13 12:42	10/04/13 11:53	40
Pyrene-d10 (Surr)	93		40 - 140				10/02/13 12:42	10/03/13 13:22	2
p-Terphenyl-d14 (Surr)	98		10 - 150				10/02/13 12:42	10/03/13 13:22	2

JW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100005

Lab Sample ID: 250-14421-5

Date Collected: 09/25/13 11:00

Matrix: Solid

Date Received: 09/27/13 09:45

Percent Solids: 93.1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Acenaphthylene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Anthracene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Benzo[a]anthracene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Benzo[a]pyrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Benzo[b]fluoranthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Benzo[g,h,i]perylene	9.3	J	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Benzo[k]fluoranthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Chrysene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Dibenz(a,h)anthracene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Fluoranthene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Fluorene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Indeno[1,2,3-cd]pyrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Naphthalene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Phenanthrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2
Pyrene	ND	U	29	7.1	ug/Kg	*	10/02/13 12:42	10/03/13 18:47	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	85		25 - 125	10/02/13 12:42	10/03/13 18:47	2
Pyrene-d10 (Surr)	88		40 - 140	10/02/13 12:42	10/03/13 18:47	2
p-Terphenyl-d14 (Surr)	97		10 - 150	10/02/13 12:42	10/03/13 18:47	2

Client Sample ID: 13100006

Lab Sample ID: 250-14421-6

Date Collected: 09/25/13 11:15

Matrix: Solid

Date Received: 09/27/13 09:45

Percent Solids: 91.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Acenaphthylene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Anthracene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Benzo[a]anthracene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Benzo[a]pyrene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Benzo[b]fluoranthene	8.2	J	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Benzo[g,h,i]perylene	19	J	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Benzo[k]fluoranthene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Chrysene	12	J	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Dibenz(a,h)anthracene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Fluoranthene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Fluorene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Indeno[1,2,3-cd]pyrene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Naphthalene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Phenanthrene	ND	U	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2
Pyrene	8.8	J	29	7.2	ug/Kg	*	10/02/13 12:42	10/03/13 19:16	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	101		25 - 125	10/02/13 12:42	10/03/13 19:16	2
Pyrene-d10 (Surr)	94		40 - 140	10/02/13 12:42	10/03/13 19:16	2
p-Terphenyl-d14 (Surr)	98		10 - 150	10/02/13 12:42	10/03/13 19:16	2

MW 10-18-13

TestAmerica Portland

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100007
Date Collected: 09/25/13 12:45
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-7
Matrix: Solid
Percent Solids: 85.5

Analyte	Result	Qualifier	RL	MGL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Acenaphthylene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Anthracene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Benzo[a]anthracene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Benzo[a]pyrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Benzo[b]fluoranthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Benzo[g,h,i]perylene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Benzo[k]fluoranthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Chrysene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Dibenz(a,h)anthracene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Fluoranthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Fluorene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Indeno[1,2,3-cd]pyrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Naphthalene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Phenanthrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Pyrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/03/13 19:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	64		25 - 125				10/02/13 12:42	10/03/13 19:46	1
Pyrene-d10 (Surr)	72		40 - 140				10/02/13 12:42	10/03/13 19:46	1
p-Terphenyl-d14 (Surr)	76		10 - 150				10/02/13 12:42	10/03/13 19:46	1

Client Sample ID: 13100008
Date Collected: 09/25/13 12:55
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-8
Matrix: Solid
Percent Solids: 78.0

Analyte	Result	Qualifier	RL	MGL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Acenaphthylene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Anthracene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Benzo[a]anthracene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Benzo[a]pyrene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Benzo[b]fluoranthene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Benzo[g,h,i]perylene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Benzo[k]fluoranthene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Chrysene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Dibenz(a,h)anthracene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Fluoranthene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Fluorene	15	J	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Indeno[1,2,3-cd]pyrene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Naphthalene	7.6	J	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Phenanthrene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Pyrene	ND	U	17	4.2	ug/Kg	*	10/02/13 12:42	10/03/13 20:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	73		25 - 125				10/02/13 12:42	10/03/13 20:16	1
Pyrene-d10 (Surr)	80		40 - 140				10/02/13 12:42	10/03/13 20:16	1
p-Terphenyl-d14 (Surr)	91		10 - 150				10/02/13 12:42	10/03/13 20:16	1

mw 10-18-13

TestAmerica Portland

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100009

Lab Sample ID: 250-14421-9

Date Collected: 09/25/13 13:05

Matrix: Solid

Date Received: 09/27/13 09:45

Percent Solids: 84.4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Acenaphthylene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Anthracene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Benzo[a]anthracene	ND	U	16	16	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Benzo[a]pyrene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Benzo[b]fluoranthene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Benzo[g,h,i]perylene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Benzo[k]fluoranthene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Chrysene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Dibenz(a,h)anthracene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Fluoranthene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Fluorene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Indeno[1,2,3-cd]pyrene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Naphthalene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Phenanthrene	ND	U	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1
Pyrene	3.9	J	16	3.9	ug/Kg	☼	10/02/13 12:42	10/03/13 20:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	88		25 - 125	10/02/13 12:42	10/03/13 20:46	1
Pyrene-d10 (Surr)	71		40 - 140	10/02/13 12:42	10/03/13 20:46	1
p-Terphenyl-d14 (Surr)	78		10 - 150	10/02/13 12:42	10/03/13 20:46	1

Client Sample ID: 13100010

Lab Sample ID: 250-14421-10

Date Collected: 09/25/13 13:20

Matrix: Solid

Date Received: 09/27/13 09:45

Percent Solids: 83.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Acenaphthylene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Anthracene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Benzo[a]anthracene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Benzo[a]pyrene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Benzo[b]fluoranthene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Benzo[g,h,i]perylene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Benzo[k]fluoranthene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Chrysene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Dibenz(a,h)anthracene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Fluoranthene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Fluorene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Indeno[1,2,3-cd]pyrene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Naphthalene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Phenanthrene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1
Pyrene	ND	U	16	4.0	ug/Kg	☼	10/02/13 12:42	10/03/13 21:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	70		25 - 125	10/02/13 12:42	10/03/13 21:16	1
Pyrene-d10 (Surr)	77		40 - 140	10/02/13 12:42	10/03/13 21:16	1
p-Terphenyl-d14 (Surr)	83		10 - 150	10/02/13 12:42	10/03/13 21:16	1

TestAmerica Portland

MW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100011

Date Collected: 09/25/13 13:30

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-11

Matrix: Solid

Percent Solids: 79.8

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Acenaphthylene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Anthracene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Benzo[a]anthracene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Benzo[a]pyrene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Benzo[b]fluoranthene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Benzo[g,h,i]perylene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Benzo[k]fluoranthene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Chrysene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Dibenz(a,h)anthracene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Fluoranthene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Fluorene	4.2	J	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Indeno[1,2,3-cd]pyrene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Naphthalene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Phenanthrene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1
Pyrene	ND	U	17	4.1	ug/Kg	*	10/02/13 12:42	10/03/13 21:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	89		25 - 125	10/02/13 12:42	10/03/13 21:46	1
Pyrene-d10 (Surr)	81		40 - 140	10/02/13 12:42	10/03/13 21:46	1
p-Terphenyl-d14 (Surr)	86		10 - 150	10/02/13 12:42	10/03/13 21:46	1

Client Sample ID: 13100012

Date Collected: 09/26/13 08:45

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-12

Matrix: Solid

Percent Solids: 84.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Acenaphthylene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Anthracene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Benzo[a]anthracene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Benzo[a]pyrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Benzo[b]fluoranthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Benzo[g,h,i]perylene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Benzo[k]fluoranthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Chrysene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Dibenz(a,h)anthracene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Fluoranthene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Fluorene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Indeno[1,2,3-cd]pyrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Naphthalene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Phenanthrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1
Pyrene	ND	U	16	3.9	ug/Kg	*	10/02/13 12:42	10/04/13 11:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	77		25 - 125	10/02/13 12:42	10/04/13 11:24	1
Pyrene-d10 (Surr)	77		40 - 140	10/02/13 12:42	10/04/13 11:24	1
p-Terphenyl-d14 (Surr)	83		10 - 150	10/02/13 12:42	10/04/13 11:24	1

TestAmerica Portland

MW 10-18-13



ecology and environment, inc.

Global Environmental Specialists

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MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water and 12 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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:

13100001	13100002	13100003	13100004	13100005	13100006
13100007	13100008	13100009	13100010	13100011	13100012
13100013					

Data Qualifications:

1. **Sample Holding Times: Acceptable.**

The samples were maintained and received within the QC limits of < 6°C. The samples were collected on September 25 or 26, 2013, and were analyzed by October 4, 2013, 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. All water Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Matrix Spike (MS)/MS Duplicate (MSD)/Blank Spike (BS) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100001
Date Collected: 09/25/13 09:40
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-1
Matrix: Solid
Percent Solids: 83.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	19	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Benzene	35	J	120	24	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Ethylbenzene	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Xylenes, Total	ND	U	360	70	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Methyl tert-butyl ether	ND	U	120	15	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
1,2,4-Trimethylbenzene	ND	U	120	55	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
1,3,5-Trimethylbenzene	ND	U	120	28	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Isopropylbenzene	ND	U	240	43	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
N-Propylbenzene	ND	U	120	25	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
1,2-Dibromoethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Toluene	260		120	18	ug/Kg	*	09/27/13 15:22	09/30/13 13:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		75 - 125				09/27/13 15:22	09/30/13 13:01	1
4-Bromofluorobenzene (Surr)	100		75 - 125				09/27/13 15:22	09/30/13 13:01	1
Dibromofluoromethane (Surr)	104		75 - 125				09/27/13 15:22	09/30/13 13:01	1
Toluene-d8 (Surr)	103		75 - 125				09/27/13 15:22	09/30/13 13:01	1

Client Sample ID: 13100002
Date Collected: 09/25/13 10:05
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-2
Matrix: Solid
Percent Solids: 86.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	18	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Benzene	28	J	120	23	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Ethylbenzene	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Xylenes, Total	ND	U	350	58	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Methyl tert-butyl ether	ND	U	120	15	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
1,2,4-Trimethylbenzene	ND	U	120	53	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
1,3,5-Trimethylbenzene	ND	U	120	28	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Isopropylbenzene	ND	U	230	41	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
N-Propylbenzene	ND	U	120	24	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
1,2-Dibromoethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Toluene	280		120	17	ug/Kg	*	09/27/13 15:22	09/30/13 13:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		75 - 125				09/27/13 15:22	09/30/13 13:25	1
4-Bromofluorobenzene (Surr)	102		75 - 125				09/27/13 15:22	09/30/13 13:25	1
Dibromofluoromethane (Surr)	102		75 - 125				09/27/13 15:22	09/30/13 13:25	1
Toluene-d8 (Surr)	101		75 - 125				09/27/13 15:22	09/30/13 13:25	1

Client Sample ID: 13100003
Date Collected: 09/25/13 10:16
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-3
Matrix: Solid
Percent Solids: 91.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	110	17	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Benzene	92	J	110	21	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Ethylbenzene	230		110	19	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Xylenes, Total	1200		320	63	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Methyl tert-butyl ether	ND	U	110	14	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
1,2,4-Trimethylbenzene	430		110	49	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1

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Mw 10 AB-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100003						Lab Sample ID: 250-14421-3			
Date Collected: 09/25/13 10:16						Matrix: Solid			
Date Received: 09/27/13 09:45						Percent Solids: 91.9			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	110		110	26	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Isopropylbenzene	ND	U <i>mu</i>	210	38	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
N-Propylbenzene	61	J <i>Q</i>	110	22	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
1,2-Dibromoethane	ND	U <i>mu</i>	110	18	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Toluene	1700		110	16	ug/Kg	*	09/27/13 15:22	09/30/13 13:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		75 - 125				09/27/13 15:22	09/30/13 13:49	1
4-Bromofluorobenzene (Surr)	99		75 - 125				09/27/13 15:22	09/30/13 13:49	1
Dibromofluoromethane (Surr)	98		75 - 125				09/27/13 15:22	09/30/13 13:49	1
Toluene-d8 (Surr)	100		75 - 125				09/27/13 15:22	09/30/13 13:49	1

Client Sample ID: 13100004						Lab Sample ID: 250-14421-4			
Date Collected: 09/25/13 10:44						Matrix: Solid			
Date Received: 09/27/13 09:45						Percent Solids: 79.8			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U <i>mu</i>	120000	20000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Benzene	160000		120000	25000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Ethylbenzene	1100000		120000	22000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Xylenes, Total	5700000		370000	73000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Methyl tert-butyl ether	ND	U <i>mu</i>	120000	16000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
1,2,4-Trimethylbenzene	1500000		120000	57000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
1,3,5-Trimethylbenzene	410000		120000	30000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Isopropylbenzene	66000	J <i>Q</i>	250000	44000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
N-Propylbenzene	270000		120000	26000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
1,2-Dibromoethane	ND	U <i>mu</i>	120000	21000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Toluene	4500000		120000	19000	ug/Kg	*	09/27/13 15:22	09/30/13 17:28	1000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		75 - 125				09/27/13 15:22	09/30/13 17:28	1000
4-Bromofluorobenzene (Surr)	102		75 - 125				09/27/13 15:22	09/30/13 17:28	1000
Dibromofluoromethane (Surr)	99		75 - 125				09/27/13 15:22	09/30/13 17:28	1000
Toluene-d8 (Surr)	104		75 - 125				09/27/13 15:22	09/30/13 17:28	1000

Client Sample ID: 13100005						Lab Sample ID: 250-14421-5			
Date Collected: 09/25/13 11:00						Matrix: Solid			
Date Received: 09/27/13 09:45						Percent Solids: 93.1			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U <i>mu</i>	110	17	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
Benzene	41	J <i>Q</i>	110	21	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
Ethylbenzene	37	J <i>Q</i>	110	19	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
Xylenes, Total	140	J <i>Q</i>	320	63	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
Methyl tert-butyl ether	ND	U	110	14	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
1,2,4-Trimethylbenzene	ND	U	110	49	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
1,3,5-Trimethylbenzene	ND	U	110	26	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
Isopropylbenzene	ND	U	210	38	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
N-Propylbenzene	ND	U	110	22	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
1,2-Dibromoethane	ND	U <i>mu</i>	110	18	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1
Toluene	470		110	16	ug/Kg	*	09/27/13 15:22	09/30/13 14:14	1

TestAmerica Portland

mm 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		75 - 125	09/27/13 15:22	09/30/13 14:14	1
4-Bromofluorobenzene (Surr)	102		75 - 125	09/27/13 15:22	09/30/13 14:14	1
Dibromofluoromethane (Surr)	101		75 - 125	09/27/13 15:22	09/30/13 14:14	1
Toluene-d8 (Surr)	104		75 - 125	09/27/13 15:22	09/30/13 14:14	1

Client Sample ID: 13100006

Lab Sample ID: 250-14421-6

Date Collected: 09/25/13 11:15

Matrix: Solid

Date Received: 09/27/13 09:45

Percent Solids: 91.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	110	17	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
Benzene	34	J	110	22	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
Ethylbenzene	ND	U	110	19	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
Xylenes, Total	ND	U	320	64	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
Methyl tert-butyl ether	ND	U	110	14	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
1,2,4-Trimethylbenzene	ND	U	110	50	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
1,3,5-Trimethylbenzene	ND	U	110	26	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
Isopropylbenzene	ND	U	220	39	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
N-Propylbenzene	ND	U	110	23	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
1,2-Dibromoethane	ND	U	110	18	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1
Toluene	260		110	16	ug/Kg	*	09/27/13 15:22	09/30/13 14:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		75 - 125	09/27/13 15:22	09/30/13 14:38	1
4-Bromofluorobenzene (Surr)	103		75 - 125	09/27/13 15:22	09/30/13 14:38	1
Dibromofluoromethane (Surr)	101		75 - 125	09/27/13 15:22	09/30/13 14:38	1
Toluene-d8 (Surr)	103		75 - 125	09/27/13 15:22	09/30/13 14:38	1

Client Sample ID: 13100007

Lab Sample ID: 250-14421-7

Date Collected: 09/25/13 12:45

Matrix: Solid

Date Received: 09/27/13 09:45

Percent Solids: 85.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	18	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
Benzene	ND	U	120	23	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
Ethylbenzene	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
Xylenes, Total	ND	U	350	68	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
Methyl tert-butyl ether	ND	U	120	15	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
1,2,4-Trimethylbenzene	ND	U	120	53	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
1,3,5-Trimethylbenzene	ND	U	120	28	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
Isopropylbenzene	ND	U	230	42	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
N-Propylbenzene	ND	U	120	24	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
1,2-Dibromoethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1
Toluene	90	J	120	17	ug/Kg	*	09/27/13 15:22	09/30/13 15:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		75 - 125	09/27/13 15:22	09/30/13 15:02	1
4-Bromofluorobenzene (Surr)	104		75 - 125	09/27/13 15:22	09/30/13 15:02	1
Dibromofluoromethane (Surr)	98		75 - 125	09/27/13 15:22	09/30/13 15:02	1
Toluene-d8 (Surr)	102		75 - 125	09/27/13 15:22	09/30/13 15:02	1

JMW 10-18-13

TestAmerica Portland

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100008
Date Collected: 09/25/13 12:55
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-8
Matrix: Solid

Percent Solids: 78.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	250	40	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
Benzene	ND	U	250	50	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
Ethylbenzene	ND	U	250	45	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
Xylenes, Total	ND	U	750	150	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
Methyl tert-butyl ether	ND	U	250	33	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
1,2,4-Trimethylbenzene	ND	U	250	120	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
1,3,5-Trimethylbenzene	ND	U	250	60	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
Isopropylbenzene	ND	U	500	90	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
N-Propylbenzene	ND	U	250	53	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
1,2-Dibromoethane	ND	U	250	43	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1
Toluene	260		250	38	ug/Kg	*	09/27/13 15:22	09/30/13 15:27	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		75 - 125	09/27/13 15:22	09/30/13 15:27	1
4-Bromofluorobenzene (Surr)	100		75 - 125	09/27/13 15:22	09/30/13 15:27	1
Dibromofluoromethane (Surr)	101		75 - 125	09/27/13 15:22	09/30/13 15:27	1
Toluene-d8 (Surr)	105		75 - 125	09/27/13 15:22	09/30/13 15:27	1

Client Sample ID: 13100009
Date Collected: 09/25/13 13:05
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-9
Matrix: Solid

Percent Solids: 84.4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	19	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
Benzene	38	J	120	23	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
Ethylbenzene	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
Xylenes, Total	ND	U	350	69	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
Methyl tert-butyl ether	ND	U	120	15	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
1,2,4-Trimethylbenzene	ND	U	120	54	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
1,3,5-Trimethylbenzene	ND	U	120	28	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
Isopropylbenzene	ND	U	230	42	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
N-Propylbenzene	ND	U	120	25	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
1,2-Dibromoethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1
Toluene	230		120	18	ug/Kg	*	09/27/13 15:22	09/30/13 15:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		75 - 125	09/27/13 15:22	09/30/13 15:51	1
4-Bromofluorobenzene (Surr)	98		75 - 125	09/27/13 15:22	09/30/13 15:51	1
Dibromofluoromethane (Surr)	96		75 - 125	09/27/13 15:22	09/30/13 15:51	1
Toluene-d8 (Surr)	99		75 - 125	09/27/13 15:22	09/30/13 15:51	1

Client Sample ID: 13100010
Date Collected: 09/25/13 13:20
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-10
Matrix: Solid

Percent Solids: 83.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	19	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
Benzene	31	J	120	24	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
Ethylbenzene	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
Xylenes, Total	ND	U	360	70	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
Methyl tert-butyl ether	ND	U	120	15	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
1,2,4-Trimethylbenzene	ND	U	120	55	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1

TestAmerica Portland

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Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100010
Date Collected: 09/25/13 13:20
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-10
Matrix: Solid
Percent Solids: 83.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND	U	120	29	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
Isopropylbenzene	ND	U	240	43	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
N-Propylbenzene	ND	U	120	25	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
1,2-Dibromoethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1
Toluene	160		120	18	ug/Kg	*	09/27/13 15:22	09/30/13 16:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		75 - 125	09/27/13 15:22	09/30/13 16:15	1
4-Bromofluorobenzene (Surr)	101		75 - 125	09/27/13 15:22	09/30/13 16:15	1
Dibromofluoromethane (Surr)	103		75 - 125	09/27/13 15:22	09/30/13 16:15	1
Toluene-d8 (Surr)	101		75 - 125	09/27/13 15:22	09/30/13 16:15	1

Client Sample ID: 13100011
Date Collected: 09/25/13 13:30
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-11
Matrix: Solid
Percent Solids: 79.8

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
Benzene	38	J	120	25	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
Ethylbenzene	ND	U	120	22	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
Xylenes, Total	ND	U	370	74	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
Methyl tert-butyl ether	ND	U	120	16	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
1,2,4-Trimethylbenzene	ND	U	120	57	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
1,3,5-Trimethylbenzene	ND	U	120	30	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
Isopropylbenzene	ND	U	250	45	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
N-Propylbenzene	ND	U	120	26	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
1,2-Dibromoethane	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1
Toluene	170		120	19	ug/Kg	*	09/27/13 15:22	09/30/13 16:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		75 - 125	09/27/13 15:22	09/30/13 16:40	1
4-Bromofluorobenzene (Surr)	105		75 - 125	09/27/13 15:22	09/30/13 16:40	1
Dibromofluoromethane (Surr)	101		75 - 125	09/27/13 15:22	09/30/13 16:40	1
Toluene-d8 (Surr)	102		75 - 125	09/27/13 15:22	09/30/13 16:40	1

Client Sample ID: 13100012
Date Collected: 09/26/13 08:45
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-12
Matrix: Solid
Percent Solids: 84.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	120	19	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
Benzene	ND	U	120	24	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
Ethylbenzene	ND	U	120	21	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
Xylenes, Total	ND	U	350	69	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
Methyl tert-butyl ether	ND	U	120	15	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
1,2,4-Trimethylbenzene	ND	U	120	54	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
1,3,5-Trimethylbenzene	ND	U	120	28	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
Isopropylbenzene	ND	U	240	42	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
N-Propylbenzene	ND	U	120	25	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
1,2-Dibromoethane	ND	U	120	20	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1
Toluene	41	J	120	18	ug/Kg	*	09/27/13 15:22	09/30/13 17:04	1

TestAmerica Portland

JMW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		75 - 125	09/27/13 15:22	09/30/13 17:04	1
4-Bromofluorobenzene (Surr)	96		75 - 125	09/27/13 15:22	09/30/13 17:04	1
Dibromofluoromethane (Surr)	95		75 - 125	09/27/13 15:22	09/30/13 17:04	1
Toluene-d8 (Surr)	94		75 - 125	09/27/13 15:22	09/30/13 17:04	1

Client Sample ID: 13100013
Date Collected: 09/26/13 10:18
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-13
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND	U	0.20	0.060	ug/L			09/27/13 12:15	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			09/27/13 12:15	1
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			09/27/13 12:15	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			09/27/13 12:15	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			09/27/13 12:15	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			09/27/13 12:15	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			09/27/13 12:15	1
Toluene	ND	U	0.50	0.11	ug/L			09/27/13 12:15	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			09/27/13 12:15	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			09/27/13 12:15	1
m,p-Xylene	ND	U	1.0	0.25	ug/L			09/27/13 12:15	1
o-Xylene	ND	U	0.50	0.13	ug/L			09/27/13 12:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		80 - 120		09/27/13 12:15	1
4-Bromofluorobenzene (Surr)	101		80 - 120		09/27/13 12:15	1
Dibromofluoromethane (Surr)	106		80 - 120		09/27/13 12:15	1
Toluene-d8 (Surr)	101		80 - 120		09/27/13 12:15	1

MW 10-18-13



MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 12 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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:

13100001	13100002	13100003	13100004	13100005	13100006
13100007	13100008	13100009	13100010	13100011	13100012

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C. The samples were collected on September 25 or 26, 2013, extracted by October 2, 2013, and analyzed by October 3, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Satisfactory.

All recoveries of the SMCs were greater than 10% and within QC criteria except the high recovery in sample 1310004; no action was taken based on this diluted outlier.

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS): Acceptable.

BS results were within QC limits.

9. Duplicates: Acceptable.

Spike duplicate results were acceptable.

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.
- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100001

Date Collected: 09/25/13 09:40

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-1

Matrix: Solid

Percent Solids: 83.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	9.3	J	15	1.4	mg/Kg	*	10/02/13 09:45	10/02/13 20:19	1
RRO (nC25-nC36)	110		30	3.2	mg/Kg	*	10/02/13 09:45	10/02/13 20:19	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	76		50 - 150				10/02/13 09:45	10/02/13 20:19	1

Client Sample ID: 13100002

Date Collected: 09/25/13 10:05

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-2

Matrix: Solid

Percent Solids: 86.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	14		14	1.4	mg/Kg	*	10/02/13 09:45	10/02/13 20:38	1
RRO (nC25-nC36)	150		29	3.1	mg/Kg	*	10/02/13 09:45	10/02/13 20:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	79		50 - 150				10/02/13 09:45	10/02/13 20:38	1

Client Sample ID: 13100003

Date Collected: 09/25/13 10:16

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-3

Matrix: Solid

Percent Solids: 91.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	34	J	140	13	mg/Kg	*	10/02/13 09:45	10/02/13 20:57	10
RRO (nC25-nC36)	530		270	29	mg/Kg	*	10/02/13 09:45	10/02/13 20:57	10
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	85		50 - 150				10/02/13 09:45	10/02/13 20:57	10

Client Sample ID: 13100004

Date Collected: 09/25/13 10:44

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-4

Matrix: Solid

Percent Solids: 79.8

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	12000		310	30	mg/Kg	*	10/02/13 09:45	10/03/13 11:37	20
RRO (nC25-nC36)	480	J	620	67	mg/Kg	*	10/02/13 09:45	10/03/13 11:37	20
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	3361	X	50 - 150				10/02/13 09:45	10/03/13 11:37	20

Client Sample ID: 13100005

Date Collected: 09/25/13 11:00

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-5

Matrix: Solid

Percent Solids: 93.1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	40		13	1.3	mg/Kg	*	10/02/13 09:45	10/02/13 21:35	1
RRO (nC25-nC36)	260		27	2.9	mg/Kg	*	10/02/13 09:45	10/02/13 21:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	91		50 - 150				10/02/13 09:45	10/02/13 21:35	1

Client Sample ID: 13100006

Date Collected: 09/25/13 11:15

Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-6

Matrix: Solid

Percent Solids: 91.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	22		14	1.3	mg/Kg	*	10/02/13 09:45	10/02/13 21:54	1
RRO (nC25-nC36)	230		27	2.9	mg/Kg	*	10/02/13 09:45	10/02/13 21:54	1

TestAmerica Portland

MW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	86		50 - 150	10/02/13 09:45	10/02/13 21:54	1

Client Sample ID: 13100007				Lab Sample ID: 250-14421-7					
Date Collected: 09/25/13 12:45				Matrix: Solid					
Date Received: 09/27/13 09:45				Percent Solids: 85.5					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	17		14	1.4	mg/Kg	✱	10/02/13 09:45	10/02/13 22:13	1
RRO (nC25-nC36)	43		29	3.1	mg/Kg	✱	10/02/13 09:45	10/02/13 22:13	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
1-Chlorooctadecane	86		50 - 150	10/02/13 09:45	10/02/13 22:13	1			

Client Sample ID: 13100008				Lab Sample ID: 250-14421-8					
Date Collected: 09/25/13 12:55				Matrix: Solid					
Date Received: 09/27/13 09:45				Percent Solids: 78.0					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	98		16	1.5	mg/Kg	✱	10/02/13 09:45	10/02/13 22:32	1
RRO (nC25-nC36)	250		32	3.5	mg/Kg	✱	10/02/13 09:45	10/02/13 22:32	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
1-Chlorooctadecane	105		50 - 150	10/02/13 09:45	10/02/13 22:32	1			

Client Sample ID: 13100009				Lab Sample ID: 250-14421-9					
Date Collected: 09/25/13 13:05				Matrix: Solid					
Date Received: 09/27/13 09:45				Percent Solids: 84.4					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	150		15	1.4	mg/Kg	✱	10/02/13 09:45	10/02/13 23:28	1
RRO (nC25-nC36)	150		29	3.2	mg/Kg	✱	10/02/13 09:45	10/02/13 23:28	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
1-Chlorooctadecane	79		50 - 150	10/02/13 09:45	10/02/13 23:28	1			

Client Sample ID: 13100010				Lab Sample ID: 250-14421-10					
Date Collected: 09/25/13 13:30				Matrix: Solid					
Date Received: 09/27/13 09:45				Percent Solids: 83.2					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	18		15	1.4	mg/Kg	✱	10/02/13 09:45	10/02/13 23:47	1
RRO (nC25-nC36)	55		30	3.2	mg/Kg	✱	10/02/13 09:45	10/02/13 23:47	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
1-Chlorooctadecane	73		50 - 150	10/02/13 09:45	10/02/13 23:47	1			

Client Sample ID: 13100011				Lab Sample ID: 250-14421-11					
Date Collected: 09/25/13 13:30				Matrix: Solid					
Date Received: 09/27/13 09:45				Percent Solids: 79.8					
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	48		16	1.5	mg/Kg	✱	10/02/13 09:45	10/03/13 00:06	1
RRO (nC25-nC36)	150		31	3.4	mg/Kg	✱	10/02/13 09:45	10/03/13 00:06	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
1-Chlorooctadecane	75		50 - 150	10/02/13 09:45	10/03/13 00:06	1			

MW 10-18-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-1

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

Client Sample ID: 13100012
Date Collected: 09/26/13 08:45
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-12
Matrix: Solid
Percent Solids: 84.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	39		15	1.4	mg/Kg	*	10/02/13 09:45	10/03/13 00:25	1
RRO (nC25-nC36)	94		30	3.2	mg/Kg	*	10/02/13 09:45	10/03/13 00:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	93		50 - 150				10/02/13 09:45	10/03/13 00:25	1



MW 10-18-13



ecology and environment, inc.

Global Environmental Specialists

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Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 2 water samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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: 13100014 13100015

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C. The samples were collected on September 26, 2013, extracted by September 27, 2013, and analyzed by September 28, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

All spike results were within QC limits.

9. Duplicates: Acceptable.

Spike duplicate results were within QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.
- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-2

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

Client Sample ID: 13100014
Date Collected: 09/26/13 10:35
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-14
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	ND	U	0.096	0.029	mg/L		09/27/13 11:48	09/28/13 18:15	1
RRO (nC25-nC36)	ND	U	0.24	0.038	mg/L		09/27/13 11:48	09/28/13 18:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	107		50 - 150				09/27/13 11:48	09/28/13 18:15	1

Client Sample ID: 13100015
Date Collected: 09/26/13 11:30
Date Received: 09/27/13 09:45

Lab Sample ID: 250-14421-15
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	0.029	J B Q	0.095	0.029	mg/L		09/27/13 11:48	09/28/13 18:33	1
RRO (nC25-nC36)	ND	U	0.24	0.038	mg/L		09/27/13 11:48	09/28/13 18:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	103		50 - 150				09/27/13 11:48	09/28/13 18:33	1

TestAmerica Portland

MW 12-21-13



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 2 water samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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: 13100014 13100014

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The samples were collected on September 26, 2013, and were analyzed by September 27, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spikes: Acceptable.

Blank spike results were within laboratory QC limits.

9. Duplicates: Acceptable.

Laboratory duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-2

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

Client Sample ID: 13100014							Lab Sample ID: 250-14421-14		
Date Collected: 09/26/13 10:35							Matrix: Water		
Date Received: 09/27/13 09:45									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	80	33	µg/L	-		09/27/13 13:50	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		50 - 150					09/27/13 13:50	1

Client Sample ID: 13100015							Lab Sample ID: 250-14421-15		
Date Collected: 09/26/13 11:30							Matrix: Water		
Date Received: 09/27/13 09:45									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	80	33	µg/L	-		09/27/13 14:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	96		50 - 150					09/27/13 14:20	1

TestAmerica Portland

MW 10-21-13



ecology and environment, inc.

Global Environmental Specialists

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MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 2 water samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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: 13100014 13100015

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of < 6°C. The samples were collected on September 26, 2013, and were analyzed by October 4, 2013, 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. All Relative Standard Deviations (RSDs) were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Matrix Spike (MS)/MS Duplicate (MSD)/Blank Spike (BS) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Laboratory duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ – The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-2

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

Client Sample ID: 13100014

Lab Sample ID: 250-14421-14

Date Collected: 09/26/13 10:35

Matrix: Water

Date Received: 09/27/13 09:45

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			09/27/13 12:39	1
Benzene	ND	U	0.20	0.060	ug/L			09/27/13 12:39	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			09/27/13 12:39	1
Xylenes, Total	ND	U	1.0	0.33	ug/L			09/27/13 12:39	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			09/27/13 12:39	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			09/27/13 12:39	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			09/27/13 12:39	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			09/27/13 12:39	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			09/27/13 12:39	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			09/27/13 12:39	1
Toluene	ND	U	0.50	0.11	ug/L			09/27/13 12:39	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		80 - 120		09/27/13 12:39	1
4-Bromofluorobenzene (Surr)	97		80 - 120		09/27/13 12:39	1
Dibromofluoromethane (Surr)	108		80 - 120		09/27/13 12:39	1
Toluene-d8 (Surr)	100		80 - 120		09/27/13 12:39	1

Client Sample ID: 13100015

Lab Sample ID: 250-14421-15

Date Collected: 09/26/13 11:30

Matrix: Water

Date Received: 09/27/13 09:45

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			09/27/13 13:35	1
Benzene	ND	U	0.20	0.060	ug/L			09/27/13 13:35	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			09/27/13 13:35	1
Xylenes, Total	ND	U	1.0	0.33	ug/L			09/27/13 13:35	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			09/27/13 13:35	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			09/27/13 13:35	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			09/27/13 13:35	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			09/27/13 13:35	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			09/27/13 13:35	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			09/27/13 13:35	1
Toluene	ND	U	0.50	0.11	ug/L			09/27/13 13:35	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		80 - 120		09/27/13 13:35	1
4-Bromofluorobenzene (Surr)	102		80 - 120		09/27/13 13:35	1
Dibromofluoromethane (Surr)	108		80 - 120		09/27/13 13:35	1
Toluene-d8 (Surr)	104		80 - 120		09/27/13 13:35	1

TestAmerica Portland

MW 10-2-13



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 2 water samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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: 13100014 13100015

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The samples were collected on September 26, 2013, were extracted by October 2, 2013, and were analyzed by October 3, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: B.004532

TestAmerica Job ID: 250-14421-2

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

Client Sample ID: 13100014						Lab Sample ID: 250-14421-14			
Date Collected: 09/26/13 10:35						Matrix: Water			
Date Received: 09/27/13 09:45									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Acenaphthylene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Anthracene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Benzo[a]anthracene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Benzo[a]pyrene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Benzo[b]fluoranthene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Benzo[g,h,i]perylene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Benzo[k]fluoranthene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Chrysene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Dibenz(a,h)anthracene	ND	U	0.19	0.096	ug/L		09/27/13 13:26	09/28/13 15:47	1
Fluoranthene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Fluorene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Indeno[1,2,3-cd]pyrene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Naphthalene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Phenanthrene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Pyrene	ND	U	0.096	0.048	ug/L		09/27/13 13:26	09/28/13 15:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	112		25 - 125				09/27/13 13:26	09/28/13 15:47	1
Pyrene-d10 (Surr)	106		25 - 150				09/27/13 13:26	09/28/13 15:47	1
p-Terphenyl-d14 (Surr)	108		10 - 150				09/27/13 13:26	09/28/13 15:47	1

Client Sample ID: 13100015						Lab Sample ID: 250-14421-15			
Date Collected: 09/26/13 11:30						Matrix: Water			
Date Received: 09/27/13 09:45									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Acenaphthylene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Anthracene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Benzo[a]anthracene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Benzo[a]pyrene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Benzo[b]fluoranthene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Benzo[g,h,i]perylene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Benzo[k]fluoranthene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Chrysene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Dibenz(a,h)anthracene	ND	U	0.19	0.095	ug/L		09/27/13 13:26	09/28/13 16:17	1
Fluoranthene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Fluorene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Indeno[1,2,3-cd]pyrene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Naphthalene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Phenanthrene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Pyrene	ND	U	0.095	0.048	ug/L		09/27/13 13:26	09/28/13 16:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	101		25 - 125				09/27/13 13:26	09/28/13 16:17	1
Pyrene-d10 (Surr)	99		25 - 150				09/27/13 13:26	09/28/13 16:17	1
p-Terphenyl-d14 (Surr)	102		10 - 150				09/27/13 13:26	09/28/13 16:17	1

TestAmerica Portland

MW 10-21-13



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 solid sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100016

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of < 6°C. The sample was collected on September 27, 2013, was extracted on October 2, 2013, and was analyzed on October 4, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Blank spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14508-1

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

Client Sample ID: 13100016
Date Collected: 09/27/13 08:45
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14508-1
Matrix: Solid

Percent Solids: 90.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Acenaphthylene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Anthracene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Benzo[a]anthracene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Benzo[a]pyrene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Benzo[b]fluoranthene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Benzo[g,h,i]perylene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Benzo[k]fluoranthene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Chrysene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Dibenz(a,h)anthracene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Fluoranthene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Fluorene	5.4	J	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Indeno[1,2,3-cd]pyrene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Naphthalene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Phenanthrene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Pyrene	ND	U	15	3.6	ug/Kg	*	10/02/13 12:42	10/04/13 14:35	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	74		25 - 125				10/02/13 12:42	10/04/13 14:35	1
Pyrene-d10 (Surr)	74		40 - 140				10/02/13 12:42	10/04/13 14:35	1
p-Terphenyl-d14 (Surr)	79		10 - 150				10/02/13 12:42	10/04/13 14:35	1

10-21-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 solid sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100016

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 27, 2013, and was analyzed by October 3, 2013, 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. All water Relative Standard Deviations (RSDs) 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.

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. Duplicate Analysis: Acceptable.

Laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ – The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14508-1

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

Client Sample ID: 13100016

Date Collected: 09/27/13 08:45

Date Received: 09/30/13 17:30

Lab Sample ID: 250-14508-1

Matrix: Solid

Percent Solids: 90.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	110	17	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
Benzene	ND	U	110	22	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
Ethylbenzene	ND	U	110	20	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
Xylenes, Total	ND	U	330	64	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
Methyl tert-butyl ether	ND	U	110	14	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
1,2,4-Trimethylbenzene	ND	U	110	50	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
1,3,5-Trimethylbenzene	ND	U	110	26	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
Isopropylbenzene	ND	U	220	39	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
N-Propylbenzene	ND	U	110	23	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
1,2-Dibromoethane	ND	U	110	18	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1
Toluene	ND	U	110	16	ug/Kg	*	10/01/13 21:03	10/03/13 19:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		75 - 125	10/01/13 21:03	10/03/13 19:42	1
4-Bromofluorobenzene (Surr)	91		75 - 125	10/01/13 21:03	10/03/13 19:42	1
Dibromofluoromethane (Surr)	93		75 - 125	10/01/13 21:03	10/03/13 19:42	1
Toluene-d8 (Surr)	94		75 - 125	10/01/13 21:03	10/03/13 19:42	1

mw 10-21-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 solid sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100016

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 27, 2013, and was analyzed by October 4, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS) Analyses: Acceptable.

BS results were within laboratory QC limits.

9. Duplicates: Acceptable.

Laboratory spike duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
 Project/Site: Central Petro

TestAmerica Job ID: 250-14508-1

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

Client Sample ID: 13100016
 Date Collected: 09/27/13 08:45
 Date Received: 09/30/13 17:30

Lab Sample ID: 250-14508-1
 Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Percent Solids: 90.6		
							Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	1.4	JQ	4.4	1.4	mg/Kg	*	10/04/13 10:11	10/04/13 15:16	1
Surrogate	%Recovery	Qualifier	Limits						
a, a, a-Trifluorotoluene (fid)	99		50 - 150						

MW 10-20-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 solid sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100016

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained at $< 6^{\circ}\text{C}$. The sample was collected on September 27, 2013, extracted on October 2, 2013, and analyzed on October 2, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS) Analyses: Acceptable.

BS results were within QC limits.

9. Duplicates: Satisfactory.

Duplicate results were outside of QC limits for DRO and RRO; associated sample results were qualified as estimated quantities with an unknown bias (JK or UJK).

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14508-1

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

Client Sample ID: 13100016

Date Collected: 09/27/13 08:45

Date Received: 09/30/13 17:30

Lab Sample ID: 250-14508-1

Matrix: Solid

Percent Solids: 90.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	48	JK	14	1.3	mg/Kg	*	10/02/13 09:45	10/02/13 17:08	1
RRO (nC25-nC36)	100	JK	27	3.0	mg/Kg	*	10/02/13 09:45	10/02/13 17:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	99		50 - 150				10/02/13 09:45	10/02/13 17:08	1

JMW 10-28-13

TestAmerica Portland



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100017

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of < 6°C. The sample was collected on September 27, 2013, was extracted on October 1, 2013, and was analyzed on October 2, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Blank spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14507-1

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

Client Sample ID: 13100017

Lab Sample ID: 250-14507-1

Date Collected: 09/27/13 09:30

Matrix: Water

Date Received: 09/30/13 17:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Acenaphthylene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Anthracene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Benzo[a]anthracene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Benzo[a]pyrene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Benzo[b]fluoranthene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Benzo[g,h,i]perylene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Benzo[k]fluoranthene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Chrysene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Dibenz(a,h)anthracene	ND	U	0.20	0.098	ug/L		10/01/13 13:01	10/02/13 19:33	1
Fluoranthene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Fluorene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Indeno[1,2,3-cd]pyrene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Naphthalene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Phenanthrene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Pyrene	ND	U	0.098	0.049	ug/L		10/01/13 13:01	10/02/13 19:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	98		25 - 125				10/01/13 13:01	10/02/13 19:33	1
Pyrene-d10 (Surr)	97		25 - 150				10/01/13 13:01	10/02/13 19:33	1
p-Terphenyl-d14 (Surr)	103		10 - 150				10/01/13 13:01	10/02/13 19:33	1

MW 10-18-13

TestAmerica Portland



MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100017

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of < 6°C. The sample was collected on September 27, 2013, and was analyzed by October 1, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

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

BS and BSD results were within QC limits.

9. Duplicates: Acceptable.

Laboratory spike duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14507-1

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

Client Sample ID: 13100017						Lab Sample ID: 250-14507-1			
Date Collected: 09/27/13 09:30						Matrix: Water			
Date Received: 09/30/13 17:30									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	M	80	33	ug/L			10/01/13 13:41	1
Surrogate	%Recovery	Qualifier	Limits		Prepared	Analyzed	Dil Fac		
4-Bromofluorobenzene (Surr)	100		50 - 150			10/01/13 13:41	1		

MW 10-18-13

TestAmerica Portland



MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100017

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained at < 6°C. The sample was collected on September 27, 2013, extracted on September 30, 2013, and analyzed on October 1, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS) and BS Duplicate (BSD): Acceptable.

BS and BSD results were within QC limits.

9. Duplicates: Acceptable.

Blank spike duplicate results were acceptable.

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14507-1

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

Client Sample ID: 13100017
Date Collected: 09/27/13 09:30
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14507-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	ND	U	0.096	0.029	µg/L		09/30/13 19:48	10/01/13 16:24	1
RRO (nC25-nC36)	ND	U	0.24	0.038	µg/L		09/30/13 19:48	10/01/13 16:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	96		50 - 150				09/30/13 19:48	10/01/13 16:24	1

mmw 10-18-13

TestAmerica Portland



MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100017

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of < 6°C. The sample was collected on September 27, 2013, and was analyzed by October 3, 2013, 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. All water Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analyses: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Laboratory duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ – The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14507-1

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

Client Sample ID: 13100017

Lab Sample ID: 250-14507-1

Date Collected: 09/27/13 09:30

Matrix: Water

Date Received: 09/30/13 17:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			10/03/13 13:40	1
Benzene	ND	U	0.20	0.060	ug/L			10/03/13 13:40	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			10/03/13 13:40	1
Xylenes, Total	ND	U	1.0	0.33	ug/L			10/03/13 13:40	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			10/03/13 13:40	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			10/03/13 13:40	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			10/03/13 13:40	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			10/03/13 13:40	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			10/03/13 13:40	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			10/03/13 13:40	1
Toluene	0.21	JQ	0.50	0.11	ug/L			10/03/13 13:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		80 - 120		10/03/13 13:40	1
4-Bromofluorobenzene (Surr)	93		80 - 120		10/03/13 13:40	1
Dibromofluoromethane (Surr)	98		80 - 120		10/03/13 13:40	1
Toluene-d8 (Surr)	98		80 - 120		10/03/13 13:40	1

mw 10-18-13

TestAmerica Portland



MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100019

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained at < 6°C. The sample was collected on September 28, 2013, extracted on September 30, 2013, and analyzed on October 1, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS) and BS Duplicate: Acceptable.

BS and BSD results were within QC limits.

9. Duplicates: Acceptable.

Spike duplicate results were acceptable.

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14506-1
SDG: 13-0924

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

Client Sample ID: 13100019
Date Collected: 09/28/13 08:30
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14506-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	ND	U	0.098	0.029	µg/L	-	09/30/13 19:48	10/01/13 16:05	1
RRO (nC25-nC36)	ND	<i>[Signature]</i>	0.24	0.039	µg/L	-	09/30/13 19:48	10/01/13 16:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	98		50 - 150				09/30/13 19:48	10/01/13 16:05	1

[Handwritten Signature] 10-18-13



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100019

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 28, 2013, and was analyzed by October 3, 2013, 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. All water Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analyses: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ – The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14506-1
SDG: 13-0924

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

Client Sample ID: 13100019
Date Collected: 09/28/13 08:30
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14506-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			10/03/13 13:16	1
Benzene	ND	U	0.20	0.060	ug/L			10/03/13 13:16	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			10/03/13 13:16	1
Xylenes, Total	ND	U	1.0	0.33	ug/L			10/03/13 13:16	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			10/03/13 13:16	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			10/03/13 13:16	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			10/03/13 13:16	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			10/03/13 13:16	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			10/03/13 13:16	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			10/03/13 13:16	1
Toluene	ND	U	0.50	0.11	ug/L			10/03/13 13:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	104		80 - 120					10/03/13 13:16	1
4-Bromofluorobenzene (Surr)	94		80 - 120					10/03/13 13:16	1
Dibromofluoromethane (Surr)	101		80 - 120					10/03/13 13:16	1
Toluene-d8 (Surr)	99		80 - 120					10/03/13 13:16	1

JWB 10-13-13

TestAmerica Portland



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100019

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 28, 2013, was extracted on October 1, 2013, and was analyzed on October 2, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits except some outliers with a high response; no actions were taken based on these outliers as there were no detections in the sample.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Blank spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14506-1
SDG: 13-0924

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

Client Sample ID: 13100019
Date Collected: 09/28/13 08:30
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14506-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Acenaphthylene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Anthracene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Benzo[a]anthracene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Benzo[a]pyrene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Benzo[b]fluoranthene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Benzo[g,h,i]perylene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Benzo[k]fluoranthene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Chrysene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Dibenz(a,h)anthracene	ND	U	0.20	0.099	ug/L		10/01/13 13:01	10/02/13 19:07	1
Fluoranthene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Fluorene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Indeno[1,2,3-cd]pyrene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Naphthalene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Phenanthrene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Pyrene	ND	U	0.099	0.049	ug/L		10/01/13 13:01	10/02/13 19:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	105		25 - 125				10/01/13 13:01	10/02/13 19:07	1
Pyrene-d10 (Surr)	108		25 - 150				10/01/13 13:01	10/02/13 19:07	1
p-Terphenyl-d14 (Surr)	109		10 - 150				10/01/13 13:01	10/02/13 19:07	1

mmw 10-18-13



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 18, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100019

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of < 6°C. The sample was collected on September 28, 2013, and was analyzed by October 1, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

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

BS and BSD results were within laboratory QC limits.

9. Duplicates: Acceptable.

Laboratory spike duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
 Project/Site: Central Petro

TestAmerica Job ID: 250-14506-1
 SDG: 13-0924

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

Client Sample ID: 13100019
 Date Collected: 09/28/13 08:30
 Date Received: 09/30/13 17:30

Lab Sample ID: 250-14506-1
 Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	80	33	ug/L			10/01/13 13:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		50 - 150					10/01/13 13:11	1

JW 10-18-13



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100021

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 29, 2013, and was analyzed by October 3, 2013, 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. All water Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ – The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14505-1
SDG: 13-0924

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

Client Sample ID: 13100021		Lab Sample ID: 250-14505-1							
Date Collected: 09/29/13 08:00		Matrix: Water							
Date Received: 09/30/13 17:30									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			10/03/13 12:52	1
Benzene	ND	U	0.20	0.060	ug/L			10/03/13 12:52	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			10/03/13 12:52	1
Xylenes, Total	ND	U	1.0	0.33	ug/L			10/03/13 12:52	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			10/03/13 12:52	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			10/03/13 12:52	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			10/03/13 12:52	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			10/03/13 12:52	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			10/03/13 12:52	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			10/03/13 12:52	1
Toluene	ND	U	0.50	0.11	ug/L			10/03/13 12:52	1
<i>mw</i>									
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
1,2-Dichloroethane-d4 (Surr)	110		80 - 120				10/03/13 12:52	1	
4-Bromofluorobenzene (Surr)	102		80 - 120				10/03/13 12:52	1	
Dibromofluoromethane (Surr)	106		80 - 120				10/03/13 12:52	1	
Toluene-d8 (Surr)	102		80 - 120				10/03/13 12:52	1	

mw 10-21-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100021

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 29, 2013, was extracted on October 1, 2013, and was analyzed on October 2, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Blank spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14505-1
SDG: 13-0924

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

Client Sample ID: 13100021

Lab Sample ID: 250-14505-1

Date Collected: 09/29/13 08:00

Matrix: Water

Date Received: 09/30/13 17:30

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Acenaphthylene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Anthracene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Benzo[a]anthracene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Benzo[a]pyrene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Benzo[b]fluoranthene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Benzo[g,h,i]perylene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Benzo[k]fluoranthene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Chrysene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Dibenz(a,h)anthracene	ND	U	0.20	0.10	ug/L		10/01/13 13:01	10/02/13 18:42	1
Fluoranthene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Fluorene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Indeno[1,2,3-cd]pyrene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Naphthalene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Phenanthrene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1
Pyrene	ND	U	0.10	0.051	ug/L		10/01/13 13:01	10/02/13 18:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	94		25 - 125	10/01/13 13:01	10/02/13 18:42	1
Pyrene-d10 (Surr)	97		25 - 150	10/01/13 13:01	10/02/13 18:42	1
p-Terphenyl-d14 (Surr)	96		10 - 150	10/01/13 13:01	10/02/13 18:42	1

MW 10-21-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100021

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The sample was collected on September 29, 2013, and was analyzed on October 1, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

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

BS and BSD results were within laboratory QC limits.

9. Duplicates: Acceptable.

Laboratory spike duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
 Project/Site: Central Petro

TestAmerica Job ID: 250-14505-1
 SDG: 13-0924

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

Client Sample ID: 13100021
 Date Collected: 09/29/13 08:00
 Date Received: 09/30/13 17:30

Lab Sample ID: 250-14505-1
 Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	<i>U</i>	80	33	ug/L	-		10/01/13 12:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	100		50 - 150					10/01/13 12:40	1

Mw 10-21-13

TestAmerica Portland



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water sample collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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 sample was numbered: 13100021

Data Qualifications:

1. Sample Holding Times: Acceptable.

The sample was maintained at < 6°C. The sample was collected on September 29, 2013, extracted on September 30, 2013, and analyzed by October 1, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Blank Spike (BS) and BS Duplicate: Acceptable.

BS and BSD results were within QC limits.

9. Duplicates: Acceptable.

Spike duplicate results were acceptable.

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14505-1
SDG: 13-0924

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

Client Sample ID: 13100021

Date Collected: 09/29/13 08:00

Date Received: 09/30/13 17:30

Lab Sample ID: 250-14505-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	0.031	J	0.097	0.029	mg/L		09/30/13 19:48	10/01/13 15:46	1
RRO (nC25-nC36)	0.040	J	0.24	0.039	mg/L		09/30/13 19:48	10/01/13 15:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	97		50 - 150				09/30/13 19:48	10/01/13 15:46	1

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MW 10-21-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water and 4 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Diesel Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Dx) was performed by Test America, Inc., Portland, 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:

13100023 13100024 13100025 13100026 13100027

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained at < 6°C. The samples were collected on September 30, 2013, extracted by October 2, 2013, and analyzed by October 2, 2013, therefore meeting QC criteria of less than 14 days between collection and extraction for soil samples and less than 40 days between extraction and analysis.

2. Initial Calibration: Acceptable.

Calculations were verified as correct. All relative percent differences (RPDs) were within the laboratory control limits.

3. Continuing Calibration: Acceptable.

Calculations were verified as correct. All percent differences (%Ds) were within 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 Ts.

5. Blanks: Acceptable.

A method blank was analyzed for each extraction batch for each matrix and analysis system. Diesel- and motor oil-range TPHs were not detected in any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

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

BS and BSD results were within QC limits.

9. Duplicates: Satisfactory.

Spike duplicate results were acceptable except the DRO and RRO results for the soil sample 13100023; associated sample results were qualified as estimated quantities with an unknown bias (JK or UJK).

10. Quantitation and Quantitation Limits: Acceptable.

Sample concentrations were correctly calculated. Detected hydrocarbons appear to be due to biogenic interference in samples 13100023, 13100024, 13100025, and 13100026; associated positive results were qualified as estimated quantities with a high bias (JH).

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. 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 OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.
- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100023						Lab Sample ID: 250-14509-1			
Date Collected: 09/30/13 08:30						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 70.9			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	88	JK	17	1.7	mg/Kg	✱	10/02/13 09:45	10/02/13 17:27	1
RRO (nC25-nC36)	160	JK	35	3.8	mg/Kg	✱	10/02/13 09:45	10/02/13 17:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	81		50 - 150				10/02/13 09:45	10/02/13 17:27	1

Client Sample ID: 13100024						Lab Sample ID: 250-14509-2			
Date Collected: 09/30/13 08:45						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 72.4			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	20	JK	17	1.6	mg/Kg	✱	10/02/13 09:45	10/02/13 17:46	1
RRO (nC25-nC36)	52	JK	34	3.7	mg/Kg	✱	10/02/13 09:45	10/02/13 17:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	75		50 - 150				10/02/13 09:45	10/02/13 17:46	1

Client Sample ID: 13100025						Lab Sample ID: 250-14509-3			
Date Collected: 09/30/13 08:55						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 68.7			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	20	JK	18	1.7	mg/Kg	✱	10/02/13 09:45	10/02/13 18:05	1
RRO (nC25-nC36)	57	JK	36	3.9	mg/Kg	✱	10/02/13 09:45	10/02/13 18:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	75		50 - 150				10/02/13 09:45	10/02/13 18:05	1

Client Sample ID: 13100026						Lab Sample ID: 250-14509-4			
Date Collected: 09/30/13 09:10						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 73.9			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	6.6	JQ	17	1.6	mg/Kg	✱	10/02/13 09:45	10/02/13 18:24	1
RRO (nC25-nC36)	24	JQ	34	3.6	mg/Kg	✱	10/02/13 09:45	10/02/13 18:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	62		50 - 150				10/02/13 09:45	10/02/13 18:24	1

Client Sample ID: 13100027						Lab Sample ID: 250-14509-5			
Date Collected: 09/30/13 10:15						Matrix: Water			
Date Received: 09/30/13 17:30									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (C10-C25)	ND	U/M	0.10	0.031	mg/L		09/30/13 19:48	10/01/13 16:44	1
RRO (nC25-nC36)	0.044	JQ	0.26	0.042	mg/L		09/30/13 19:48	10/01/13 16:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1-Chlorooctadecane	94		50 - 150				09/30/13 19:48	10/01/13 16:44	1

MW 10-21-13

TestAmerica Portland



MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water and 4 soil samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Extended Gasoline Range Total Petroleum Hydrocarbons (Ecology Method NWTPH-Gx) was performed by Test America, Inc., Portland, 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:

13100023 13100024 13100025 13100026 13100027

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of < 6°C. The samples were collected on September 30, 2013, and were analyzed by October 4, 2013, 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. 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 any blank.

6. System Monitoring Compounds (SMC): Acceptable.

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

7. Performance Evaluation Samples: Not Provided.

Performance evaluation samples were not provided to the laboratory.

8. Matrix Spike (MS), MS Duplicate (MSD), Blank Spike (BS) and BS Duplicate (BSD) Analyses: Satisfactory.

Spike results were within QC limits except the low soil (sample 13100023) MS recovery; the associated sample result was qualified as an estimated quantity with a low bias (JL).

9. Duplicates: Acceptable.

Laboratory duplicate results were within laboratory QC limits.

10. Quantitation and Quantitation Limits: Acceptable.

Sample quantitation and sample quantitation limits were correctly calculated.

11. Laboratory Contact: Not Required.

No laboratory contact was required.

12. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the site-specific sampling plan Site-Specific Sampling Plan and/or Sampling and Quality Assurance Plan, the OSWER Directive "Quality Assurance/Quality Control Guidance for Removal Activities, Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.
- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
- NJ - The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100023						Lab Sample ID: 250-14509-1			
Date Collected: 09/30/13 08:30						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 70.9			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	5.6	1.8	µg/Kg	⊛	10/04/13 10:11	10/04/13 12:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	93		50 - 150				10/04/13 10:11	10/04/13 12:55	1
Client Sample ID: 13100024						Lab Sample ID: 250-14509-2			
Date Collected: 09/30/13 08:45						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 72.4			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	5.5	1.8	µg/Kg	⊛	10/04/13 10:11	10/04/13 13:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	90		50 - 150				10/04/13 10:11	10/04/13 13:51	1
Client Sample ID: 13100025						Lab Sample ID: 250-14509-3			
Date Collected: 09/30/13 08:55						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 68.7			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	5.7	1.9	µg/Kg	⊛	10/04/13 10:11	10/04/13 14:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	87		50 - 150				10/04/13 10:11	10/04/13 14:20	1
Client Sample ID: 13100026						Lab Sample ID: 250-14509-4			
Date Collected: 09/30/13 09:10						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 73.9			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	5.2	1.7	µg/Kg	⊛	10/04/13 10:11	10/04/13 14:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene (fid)	95		50 - 150				10/04/13 10:11	10/04/13 14:48	1
Client Sample ID: 13100027						Lab Sample ID: 250-14509-5			
Date Collected: 09/30/13 10:15						Matrix: Water			
Date Received: 09/30/13 17:30									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Hydrocarbons	ND	U	80	33	µg/L			10/01/13 14:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	97		50 - 150					10/01/13 14:42	1

JMW 10-21-13

TestAmerica Portland



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water and 4 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Semivolatile Organic Compounds-Selected Ion Monitoring (SVOC-SIM) (EPA Method 8270-SIM) was performed by Test America, Inc., Portland, 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:

13100023 13100024 13100025 13100026 13100027

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The samples were collected on September 30, 2013, were extracted by October 2, 2013, and were analyzed by October 4, 2013, therefore meeting holding time criteria of less than 14 days between collection and extraction and less than 40 days between extraction and analysis.

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. All Relative Standard Deviations (RSDs) were within the QC limits.

4. Continuing Calibration: Acceptable.

All RRFs were within the QC limits. All % differences were within the QC limits except some high recovery outliers; no actions were taken as there were no positive results in the associated samples.

5. Blanks: Acceptable.

A method blank was analyzed for each 20 sample batch per matrix. There were no detections in any method blank.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Matrix Spike (MS)/MS Duplicate (MSD)/Blank Spike (BS)/BS Duplicate (BSD) Analysis: Acceptable.

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

8. Duplicate Analysis: Acceptable.

Blank spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All spike duplicate results were within QC limits.

9. Internal Standards: Acceptable.

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

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

- JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.
- JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.
- JQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100023

Date Collected: 09/30/13 08:30

Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-1

Matrix: Solid

Percent Solids: 70.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Acenaphthylene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Anthracene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Benzo[a]anthracene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Benzo[a]pyrene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Benzo[b]fluoranthene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Benzo[g,h,i]perylene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Benzo[k]fluoranthene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Chrysene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Dibenz(a,h)anthracene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Fluoranthene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Fluorene	9.3	J	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Indeno[1,2,3-cd]pyrene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Naphthalene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Phenanthrene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Pyrene	ND	U	19	4.6	ug/Kg	*	10/02/13 12:42	10/04/13 15:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	66		25 - 125				10/02/13 12:42	10/04/13 15:04	1
Pyrene-d10 (Surr)	76		40 - 140				10/02/13 12:42	10/04/13 15:04	1
p-Terphenyl-d14 (Surr)	83		10 - 150				10/02/13 12:42	10/04/13 15:04	1

Client Sample ID: 13100024

Date Collected: 09/30/13 08:45

Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-2

Matrix: Solid

Percent Solids: 72.4

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Acenaphthylene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Anthracene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Benzo[a]anthracene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Benzo[a]pyrene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Benzo[b]fluoranthene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Benzo[g,h,i]perylene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Benzo[k]fluoranthene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Chrysene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Dibenz(a,h)anthracene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Fluoranthene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Fluorene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Indeno[1,2,3-cd]pyrene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Naphthalene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Phenanthrene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Pyrene	ND	U	18	4.5	ug/Kg	*	10/02/13 12:42	10/03/13 11:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	87		25 - 125				10/02/13 12:42	10/03/13 11:17	1
Pyrene-d10 (Surr)	84		40 - 140				10/02/13 12:42	10/03/13 11:17	1
p-Terphenyl-d14 (Surr)	85		10 - 150				10/02/13 12:42	10/03/13 11:17	1

Mw 10-7-13

TestAmerica Portland

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100025
Date Collected: 09/30/13 08:55
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-3
Matrix: Solid
Percent Solids: 68.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Acenaphthylene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Anthracene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Benzo[a]anthracene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Benzo[a]pyrene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Benzo[b]fluoranthene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Benzo[g,h,i]perylene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Benzo[k]fluoranthene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Chrysene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Dibenz(a,h)anthracene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Fluoranthene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Fluorene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Indeno[1,2,3-cd]pyrene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Naphthalene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Phenanthrene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Pyrene	ND	U	19	4.8	ug/Kg	*	10/02/13 12:42	10/04/13 15:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	68		25 - 125				10/02/13 12:42	10/04/13 15:34	1
Pyrene-d10 (Surr)	72		40 - 140				10/02/13 12:42	10/04/13 15:34	1
p-Terphenyl-d14 (Surr)	77		10 - 150				10/02/13 12:42	10/04/13 15:34	1

Client Sample ID: 13100026
Date Collected: 09/30/13 09:10
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-4
Matrix: Solid
Percent Solids: 73.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Acenaphthylene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Anthracene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Benzo[a]anthracene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Benzo[a]pyrene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Benzo[b]fluoranthene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Benzo[g,h,i]perylene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Benzo[k]fluoranthene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Chrysene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Dibenz(a,h)anthracene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Fluoranthene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Fluorene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Indeno[1,2,3-cd]pyrene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Naphthalene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Phenanthrene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Pyrene	ND	U	18	4.4	ug/Kg	*	10/02/13 12:42	10/04/13 16:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	76		25 - 125				10/02/13 12:42	10/04/13 16:04	1
Pyrene-d10 (Surr)	82		40 - 140				10/02/13 12:42	10/04/13 16:04	1
p-Terphenyl-d14 (Surr)	84		10 - 150				10/02/13 12:42	10/04/13 16:04	1

MW 10-21-13

TestAmerica Portland

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100027
Date Collected: 09/30/13 10:15
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Acenaphthylene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Anthracene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Benzo[a]anthracene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Benzo[a]pyrene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Benzo[b]fluoranthene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Benzo[g,h,i]perylene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Benzo[k]fluoranthene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Chrysene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Dibenz(a,h)anthracene	ND	U	0.21	0.10	ug/L		10/01/13 13:01	10/02/13 19:58	1
Fluoranthene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Fluorene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Indeno[1,2,3-cd]pyrene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Naphthalene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Phenanthrene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Pyrene	ND	U	0.10	0.052	ug/L		10/01/13 13:01	10/02/13 19:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Fluorene-d10 (Surr)	93		25 - 125				10/01/13 13:01	10/02/13 19:58	1
Pyrene-d10 (Surr)	100		25 - 150				10/01/13 13:01	10/02/13 19:58	1
p-Terphenyl-d14 (Surr)	92		10 - 150				10/01/13 13:01	10/02/13 19:58	1

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TestAmerica Portland



ecology and environment, inc.

Global Environmental Specialists

720 Third Avenue, Suite 1700, Seattle, WA 98104
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 21, 2013

TO: Jake Moersen, START-4 Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-4 Chemist, E & E, Seattle, Washington *MW*

SUBJ: **Organic Data Quality Assurance Review,
Warm Springs Tanker Spill Site, Warm Springs, Oregon**

REF: TDD: 13-09-0010 PAN: EE-004532-0002-01TTO

The data quality assurance review of 1 water and 4 solid samples collected from the Warm Springs Tanker Spill site located near Warm Springs, Oregon, has been completed. Analysis for Volatile Organic Compounds (EPA Method 8260) was performed by Test America, Inc., Portland, 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:

13100023 13100024 13100025 13100026 13100027

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples were maintained and received within the QC limits of $< 6^{\circ}\text{C}$. The samples were collected on September 30, 2013, and were analyzed by October 4, 2013, 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. All water Relative Standard Deviations (RSDs) 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.

6. System Monitoring Compounds (SMCs): Acceptable.

All SMC recoveries were within QC limits.

7. Blank Spike (BS) and BS Duplicate (BSD) Analyses: Acceptable.

BS and BSD results were within QC limits.

8. Duplicate Analysis: Acceptable.

Laboratory spike duplicate analysis was performed per SDG or per matrix per concentration level, whichever was more frequent. All duplicate results were within QC limits.

9. 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.

10. Precision and Bias Determination: Not Performed.

Samples necessary to determine precision and bias were not provided to the laboratory. All results were flagged "PND" (Precision Not Determined) and "RND" (Recovery Not Determined), although the flags do not appear on the data sheets.

11. Performance Evaluation Sample Analysis: Not Provided.

Performance evaluation samples were not provided to the laboratory.

12. Overall Assessment of Data for Use

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 OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004), the analytical method, and, when applicable, the Office of Emergency and Remedial Response Publication "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review". Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

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

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

JH - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a high bias.

JL - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with a low bias.

JK - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias.

- JQ – The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample with an unknown direction of bias and falls between the MDL and the Minimum (or Practical) Quantitation Limit (MQL, PQL).
- N - The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.
- NJ - The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
- UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100023						Lab Sample ID: 250-14509-1			
Date Collected: 09/30/13 08:30						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 70.9			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	140	22	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Benzene	ND	U	140	28	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Ethylbenzene	ND	U	140	25	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Xylenes, Total	ND	U	420	82	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Methyl tert-butyl ether	ND	U	140	18	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
1,2,4-Trimethylbenzene	ND	U	140	64	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
1,3,5-Trimethylbenzene	ND	U	140	33	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Isopropylbenzene	ND	U	280	50	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
N-Propylbenzene	ND	U	140	29	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
1,2-Dibromoethane	ND	U	140	24	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Toluene	ND	U	140	21	ug/Kg	*	10/01/13 21:03	10/03/13 20:06	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		75 - 125				10/01/13 21:03	10/03/13 20:06	1
4-Bromofluorobenzene (Surr)	92		75 - 125				10/01/13 21:03	10/03/13 20:06	1
Dibromofluoromethane (Surr)	93		75 - 125				10/01/13 21:03	10/03/13 20:06	1
Toluene-d8 (Surr)	95		75 - 125				10/01/13 21:03	10/03/13 20:06	1

Client Sample ID: 13100024						Lab Sample ID: 250-14509-2			
Date Collected: 09/30/13 08:45						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 72.4			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	140	22	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Benzene	ND	U	140	27	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Ethylbenzene	ND	U	140	25	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Xylenes, Total	ND	U	410	81	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Methyl tert-butyl ether	ND	U	140	18	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
1,2,4-Trimethylbenzene	ND	U	140	63	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
1,3,5-Trimethylbenzene	ND	U	140	33	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Isopropylbenzene	ND	U	270	49	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
N-Propylbenzene	ND	U	140	29	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
1,2-Dibromoethane	ND	U	140	23	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Toluene	ND	U	140	20	ug/Kg	*	10/01/13 21:03	10/03/13 20:30	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		75 - 125				10/01/13 21:03	10/03/13 20:30	1
4-Bromofluorobenzene (Surr)	91		75 - 125				10/01/13 21:03	10/03/13 20:30	1
Dibromofluoromethane (Surr)	92		75 - 125				10/01/13 21:03	10/03/13 20:30	1
Toluene-d8 (Surr)	93		75 - 125				10/01/13 21:03	10/03/13 20:30	1

Client Sample ID: 13100025						Lab Sample ID: 250-14509-3			
Date Collected: 09/30/13 08:55						Matrix: Solid			
Date Received: 09/30/13 17:30						Percent Solids: 68.7			
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	140	23	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Benzene	ND	U	140	29	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Ethylbenzene	ND	U	140	26	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Xylenes, Total	ND	U	430	84	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Methyl tert-butyl ether	ND	U	140	19	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
1,2,4-Trimethylbenzene	ND	U	140	66	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1

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Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Client Sample ID: 13100025
Date Collected: 09/30/13 08:55
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-3
Matrix: Solid
Percent Solids: 68.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3,5-Trimethylbenzene	ND	U	140	34	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Isopropylbenzene	ND	U	290	51	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
N-Propylbenzene	ND	U	140	30	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
1,2-Dibromoethane	ND	U	140	24	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Toluene	ND	U	140	21	ug/Kg	*	10/01/13 21:03	10/03/13 20:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		75 - 125				10/01/13 21:03	10/03/13 20:54	1
4-Bromofluorobenzene (Surr)	93		75 - 125				10/01/13 21:03	10/03/13 20:54	1
Dibromofluoromethane (Surr)	93		75 - 125				10/01/13 21:03	10/03/13 20:54	1
Toluene-d8 (Surr)	94		75 - 125				10/01/13 21:03	10/03/13 20:54	1

Client Sample ID: 13100026
Date Collected: 09/30/13 09:10
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-4
Matrix: Solid
Percent Solids: 73.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	130	21	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Benzene	ND	U	130	26	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Ethylbenzene	ND	U	130	23	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Xylenes, Total	ND	U	380	76	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Methyl tert-butyl ether	ND	U	130	17	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
1,2,4-Trimethylbenzene	ND	U	130	59	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
1,3,5-Trimethylbenzene	ND	U	130	31	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Isopropylbenzene	ND	U	260	46	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
N-Propylbenzene	ND	U	130	27	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
1,2-Dibromoethane	ND	U	130	22	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Toluene	ND	U	130	19	ug/Kg	*	10/01/13 21:03	10/03/13 21:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	97		75 - 125				10/01/13 21:03	10/03/13 21:18	1
4-Bromofluorobenzene (Surr)	89		75 - 125				10/01/13 21:03	10/03/13 21:18	1
Dibromofluoromethane (Surr)	90		75 - 125				10/01/13 21:03	10/03/13 21:18	1
Toluene-d8 (Surr)	94		75 - 125				10/01/13 21:03	10/03/13 21:18	1

Client Sample ID: 13100027
Date Collected: 09/30/13 10:15
Date Received: 09/30/13 17:30

Lab Sample ID: 250-14509-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane	ND	U	0.50	0.13	ug/L			10/04/13 12:34	1
Benzene	ND	U	0.20	0.060	ug/L			10/04/13 12:34	1
Ethylbenzene	ND	U	0.50	0.10	ug/L			10/04/13 12:34	1
Xylenes, Total	ND	U	1.0	0.33	ug/L			10/04/13 12:34	1
Methyl tert-butyl ether	ND	U	1.0	0.18	ug/L			10/04/13 12:34	1
1,2,4-Trimethylbenzene	ND	U	1.0	0.16	ug/L			10/04/13 12:34	1
1,3,5-Trimethylbenzene	ND	U	0.50	0.16	ug/L			10/04/13 12:34	1
Isopropylbenzene	ND	U	2.0	0.50	ug/L			10/04/13 12:34	1
N-Propylbenzene	ND	U	0.50	0.20	ug/L			10/04/13 12:34	1
1,2-Dibromoethane	ND	U	0.50	0.14	ug/L			10/04/13 12:34	1
Toluene	ND	U	0.50	0.11	ug/L			10/04/13 12:34	1

TestAmerica Portland

MW 10-21-13

Client Sample Results

Client: Ecology and Environment, Inc.
Project/Site: Central Petro

TestAmerica Job ID: 250-14509-1

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

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		80 - 120		10/04/13 12:34	1
4-Bromofluorobenzene (Surr)	90		80 - 120		10/04/13 12:34	1
Dibromofluoromethane (Surr)	97		80 - 120		10/04/13 12:34	1
Toluene-d8 (Surr)	98		80 - 120		10/04/13 12:34	1

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