

Memorandum

To:	Adam Harris, Washington State Department of Ecology
Copies:	Tom Lovejoy, Puget Sound Truck Lines
From:	Brett Beaulieu, LHG
Date:	December 8, 2017
Project No:	PSTL Longview
Re:	Puget Sound Truck Lines Longview Site—VCP SW1429 2017 Groundwater Monitoring Results

OVERVIEW

This data report has been prepared to summarize the groundwater monitoring results for the Puget Sound Truck Lines Longview site (Site) in Longview, Washington (Figure 1) and to address comments regarding cleanup standards posed by the Washington State Department of Ecology (Ecology) in the opinion letter dated January 27, 2017. *No opinion is requested from Ecology at this time.* Groundwater monitoring will continue until compliance can be demonstrated for groundwater.

The Site is an approximately 3.3-acre parcel located at 146 Industrial Way in Longview, Washington, in an industrial area between the Columbia and Cowlitz Rivers (Figure 1). The Site is currently used by a shipping company with truck storage and maintenance activities. A site investigation in late 2011 confirmed diesel impacts in soil and groundwater that were likely due to surface spills, leaks, and overfilling associated with a former 10,000-gallon diesel aboveground storage tank (AST). The AST was removed, and soil contaminated with diesel-range organics (DRO) at concentrations greater than Model Toxics Control Act (MTCA) Method A cleanup level (CUL) was excavated in 2012. Approximately 2,850 tons of soil was excavated and disposed of at a landfill (3 Kings Environmental 2012).

The Site was entered into the VCP in October 2014 under the identifier SW1429. Groundwater impacted with DRO was detected following soil cleanup activities. The Site is currently undergoing groundwater monitoring. Four monitoring wells were installed at the edges of the previously excavated area, and a total of twelve quarterly groundwater monitoring events have been completed in accordance with the Groundwater Compliance Sampling and Analysis Plan (SAP; Floyd|Snider 2014a).

The objective of groundwater monitoring is to provide data for establishing compliance with the MTCA Method A groundwater standard for DRO, so that Ecology can issue a "No Further Action" (NFA) letter indicating that the groundwater cleanup has been completed. This report summarizes groundwater sampling and analysis activities and results from the first, second, and third quarter sampling events in 2017. The results of the 2014, 2015, and 2016 quarterly events were presented in previous reports (Floyd|Snider 2014b, 2015, 2016).

WORK COMPLETED

Three quarterly groundwater sampling events were conducted during this reporting period. These sampling events took place on March 8, 2017, June 14, 2017, and September 14, 2017. Monitoring wells were buried beneath frozen gravel and ice in December 2016, and were not accessible for sampling. Work was completed in accordance with the SAP, except where noted below.

Water Level Measurement

During groundwater sampling events, water level measurements were collected from all four wells prior to well purging to provide an indication of the potentiometric surface. During the March 2017 sampling event, the MW-1 well monument was submerged beneath ponded stormwater, and the well was inaccessible for water level measurements or sampling.

Groundwater Sampling and Analysis

Groundwater samples were collected from all four monitoring wells for each sampling event, except as noted above in March 2017, when MW-1 was inaccessible. In accordance with the SAP, groundwater samples and field duplicates were collected using standard low-flow sampling methods, submitted to Friedman and Bruya, Inc. (FBI) under standard chain-of-custody procedures, and analyzed by NWTPH-Dx for total petroleum hydrocarbons (TPH).

Investigation-Derived Waste

All water generated during groundwater sampling was collected and transferred to a U.S. Department of Transportation—approved 55-gallon steel drum. The lidded, sealed, and labelled drum is being stored on-site until it is full and must be disposed of off-site or until all groundwater monitoring has concluded.

On September 12, 2017, one drum of purge water generated during previous sampling was transported off-site for disposal at PRS Group, in Tacoma, Washington. A bill of lading is included as Attachment 1.

COMPLIANCE MONITORING RESULTS

Data Validation

For each sampling event in the reporting period, a Compliance Screening (Stages 1 & 2A) data quality review was performed on total petroleum hydrocarbons (TPH) data resulting from laboratory analysis. The analytical data were validated in accordance with the U.S. Environmental Protection Agency's (USEPA's) National Functional Guidelines for Superfund Organic Data Review (USEPA 2016).

A total of 14 groundwater samples were submitted in three sample delivery groups (SDGs), FB703146, FB706234, and FB709236, to Friedman & Bruya, Inc., in Seattle, Washington for chemical analysis by NWTPH-Dx for TPH. The analytical holding times were met and the method blanks had no detections. The surrogate, matrix spike (MS), matrix spike duplicate (MSD), laboratory control sample (LCS), and laboratory control sample duplicate (LCSD) recoveries and MS/MSD and LCS/LCSD relative percent differences all met USEPA requirements.

As part of the validation of TPH data, the detectable hydrocarbons and/or organics within the diesel, gasoline, or residual hydrocarbon chromatogram ranges were reviewed relative to the appropriate laboratory standard. The laboratory noted that the chromatographic pattern for all detected DRO results did not resemble the fuel standard used for quantitation for SDG FB709236. Because a free product sample was used as the standard consistent with the method, the match to the standard is poor and the sample has been flagged as a poor match (MPAD1). However, because the laboratory followed the method correctly and the poor match is due to the known physical process of dissolution into water, the result is deemed acceptable and not qualified (the final qualifier is left blank).

Data are determined to be of acceptable quality for use as reported by the laboratory.

Water Level Measurements and Potentiometric Surface

Water level measurements, elevations, and horizontal hydraulic gradients are reported in Table 1. Groundwater elevations and potentiometric surface contours for each event are illustrated in Figures 2, 3, and 4. Average water levels for each event are plotted on Figures 5, 6, 7, and 8. Water level elevations fluctuated by approximately 3 feet over the three monitoring events, from a high of greater than 12 feet relative to the North American Vertical Datum of 1988 (NAVD 88) in March to a low of approximately 9 feet NAVD 88 in September, which is consistent with groundwater elevations from previous monitoring years.

Potentiometric contours indicate a southerly groundwater flow direction. Water level data indicate low horizontal gradients ranging from approximately 0.001 to 0.003 feet per foot (ft/ft), which is consistent with the flat topography in the vicinity.

Groundwater Analytical Results

Analytical results for DRO in groundwater are shown in Table 2 and as time-concentration plots in Figures 5, 6, 7, and 8. The complete analytical data packages are presented in Attachment 2. Analytical results presented in this data report have been submitted to Ecology's Environmental Information Management (EIM) system.

Groundwater results for the reporting period are generally consistent with the previous year. Results for all four monitoring wells have fluctuated at concentrations close to the MTCA Method A CUL for DRO of 500 micrograms per liter (μ g/L) since the wells were first sampled in March 2014. In the most recent event, September 2017, the result for only one of the four monitoring wells sampled exceeded the CUL, and the DRO concentrations in the four wells ranged from 320 to 560 μ g/L.

The overall trend in all four wells is stable or decreasing concentrations. The following is a summary of observations for each well:

- **MW-1:** It was noted in the field that this monitoring well has sediment that has built up in the bottom of the well casing. Redevelopment to remove the sediment may improve sample quality for subsequent monitoring events.
- MW-2: DRO concentrations at MW-2 continue to show a decreasing trend with minor seasonal fluctuations. The September 2017 quarterly monitoring result presents the fourth consecutive monitoring event showing the well in compliance with the MTCA Method A CUL of 500 μg/L.
- **MW-3:** DRO concentrations in MW-3 continue to show a decreasing trend and have been less than the CUL for 6 consecutive monitoring events and 10 out of 12 events total.
- **MW-4:** The concentrations of DRO at MW-4 have been relatively stable at less than 600 μ g/L since 2014 with minor variability. Stable concentrations with an apparent decreasing trend in recent events suggest attenuation is occurring but at a relatively slow rate in this location.

ESTABLISHMENT OF SOIL CLEANUP STANDARDS AND TERRESTRIAL ECOLOGICAL EVALUATION

Ecology provided an opinion letter in January 2017 stating that the establishment of cleanup standards at the Site may not meet the substantive requirements of MTCA, because the MTCA Method A soil CULs used have not been shown to be appropriate for use through a terrestrial ecological evaluation (TEE).

Based on a review of site data relative to the rules for TEE, the MTCA Method A soil CUL for industrial properties of 2,000 mg/kg for DRO is protective of potential terrestrial wildlife exposures and applicable to the Site.

According to the Washington Administrative Code (WAC) § 173-340-7490(3)(b), a TEE for industrial properties must evaluate protectiveness for terrestrial wildlife only, not plants or soil

biota. Following excavation activities at the Site, soil DRO concentrations do not exceed the TEE CULs protective of terrestrial wildlife (6,000 mg/kg) listed in WAC 173-340-900, Table 749-3. The maximum concentration of DRO measured in soil remaining at the Site is 1,810 mg/kg DRO. No other constituents in site soil exceed criteria for wildlife protection given in Table 749-3.

To further confirm the protectiveness of MTCA Method A CULs, procedures for conducting a TEE appropriate to the Site were followed. The Site meets the criteria for a simplified TEE given in WAC 173-340-7491(2)(a) and (b) as summarized here:

- The Site is not located on or directly adjacent to an area where management will maintain or restore native or semi-native vegetation.
- The Site is not used by threatened or endangered species. None of these species have been observed to live, feed, or breed at the Site, and none are mapped in this area by the Washington Department of Fish and Wildlife.
- The Site does not include 10 acres of native vegetation within the property boundaries.
- Ecology has not determined that the Site may present a risk to significant wildlife populations.

A simplified TEE was conducted for the Site in accordance with WAC 173-340-7492. Table 749-1 was used to evaluate exposure analysis. The Site is almost entirely covered in gravel roadway or buildings and is surrounded by similar properties. The Site was scored with a nine relative to an area score of five, based on the evaluation method given in Table 749-1. Table 749-2 was used to evaluate contaminant analysis. No contaminant listed in Table 749-2 is present in the upper 15 feet at concentrations that exceed the values listed in this table. The evaluation form and scoring worksheet from Table 749-1 are included as Attachment 3. No further TEE analysis is required based on these results, and MTCA Method A CULs for DRO in soil remain protective of terrestrial wildlife and applicable for the site.

NEXT STEPS

Quarterly groundwater monitoring will continue. When groundwater monitoring data are sufficient to demonstrate compliance, a request for opinion will be submitted to Ecology.

REFERENCES

- 3 Kings Environmental, Inc. 2012. *Remedial Investigation and Cleanup Report, Puget Sound Freight Lines Facility—146 Industrial Way, Longview, Washington*. Prepared for Puget Sound Freight Lines. 24 December.
- Adapt Engineering, Inc. 2011. *Limited Phase II Environmental Site Assessment, 146 Industrial Way, Longview, Washington*. Prepared for Puget Sound Freight Lines. 29 December.

- Floyd|Snider. 2014a. *Puget Sound Truck Lines, Longview, Groundwater Compliance Sampling and Analysis Plan*. Memorandum to Tom Lovejoy, Puget Sound Freight Lines, from Brett Beaulieu, Floyd|Snider. 13 January.
- _____. 2014b. Puget Sound Truck Lines Longview Site—Groundwater Compliance Well Installation and Monitoring Results. Memorandum to Scott Rose, VCP Unit Manager, Washington State Department of Ecology, from Brett Beaulieu, Floyd|Snider. 3 September.
- _____. 2015. Puget Sound Truck Lines Longview Site—VCP SW1429, 2014–2015 Groundwater Monitoring Results. Memorandum to Eugene Radcliff, VCP Unit Manager, Washington State Department of Ecology, from Brett Beaulieu, Floyd|Snider. 14 October.
- _____. 2016. Puget Sound Truck Lines Longview Site—VCP SW1429, 2016 Groundwater Monitoring Results. Memorandum to Adam Harris, Washington State Department of Ecology, from Brett Beaulieu, Floyd|Snider. 30 November.
- U.S. Environmental Protection Agency USEPA. 2016a. *National Functional Guidelines for Superfund Organic Methods Data Review*. Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-540-R-2016-002/OLEM 9355.0-134. September.
- Washington State Department of Ecology (Ecology). 2013. Initial Investigation Field Report for ERTS 635466, Parcels 10132, 10134, 10137, Cowlitz County. Report investigator: Chris Matthews. Submitted 17 January.

LIST OF ATTACHMENTS

Table 1	Water Level Elevations and Horizontal Gradients
Table 2	Groundwater Analytical Results for Diesel-Range Organics
Figure 1	Vicinity Map
Figure 2	Potentiometric Surface and Groundwater Elevations, March 8, 2017
Figure 3	Potentiometric Surface and Groundwater Elevations, June 14, 2017
Figure 4	Potentiometric Surface and Groundwater Elevations, September 14, 2017
Figure 5	MW-1 Time Concentration Plot of Diesel-Range Organics in Groundwater
Figure 6	MW-2 Time Concentration Plot of Diesel-Range Organics in Groundwater
Figure 7	MW-3 Time Concentration Plot of Diesel-Range Organics in Groundwater
Figure 8	MW-4 Time Concentration Plot of Diesel-Range Organics in Groundwater
Attachment 1	Bill of Lading for Investigation-Derived Waste
Attachment 2	Laboratory Analytical Data (provided on disc)
Attachment 3	Terrestrial Ecological Evaluation Form and Exposure Analysis (Table 749-1)

Geologist Certification

This document was prepared by Floyd|Snider under the professional supervision of Brett Beaulieu.



Name: Brett Beaulieu, LHG Title: Hydrogeologist

Tables

FLOYDISNIDER

Well	Top of Well Casing (feet NAVD 88)	Depth to Water (feet)	Groundwater Elevation (feet NAVD 88)	Horizontal Gradient (feet/foot)
September	14, 2017	(1001)	(100111112 00)	(1001) 1001)
MW-1	14.24	5.25	8.99	
MW-2	14.08	5.18	8.90	0.000
MW-3	14.05	5.24	8.81	0.003
MW-4	14.24	5.32	8.92	
June 14, 20	17			
MW-1	14.24	2.85	11.39	
MW-2	14.08	2.74	11.34	0.001
MW-3	14.05	2.77	11.28	0.001
MW-4	14.24	2.90	11.34	
March 8, 20	017			
MW-1	14.24	NM^1	NM ¹	
MW-2	14.08	2.02	12.06	0.002
MW-3	14.05	2.08	11.97	0.002
MW-4	14.24	2.16	12.08	1
September	8, 2016			
MW-1	14.24	NM^1	NM ¹	
MW-2	14.08	5.85	8.23	0.002
MW-3	14.05	5.81	8.24	0.005
MW-4	14.24	5.86	8.38	
June 23, 20	16			•
MW-1	14.24	4.33	9.91	
MW-2	14.08	4.20	9.88	0.001
MW-3	14.05	4.25	9.80	0.001
MW-4	14.24	4.30	9.94	
March 30, 2	2016			
MW-1	14.24	2.13	12.11	
MW-2	14.08	2.01	12.07	0.001
MW-3	14.05	2.08	11.97	0.001
MW-4	14.24	2.17	12.07	
June 9, 201	5			•
MW-1	14.24	4.65	9.59	
MW-2	14.08	4.54	9.54	0.001
MW-3	14.05	4.56	9.49	5.001
MW-4	14.24	4.67	9.57	
March 17, 2	2015			
MW-1	14.24	2.46	11.78	Į
MW-2	14.08	2.37	11.71	0.002
MW-3	14.05	2.41	11.64	
MW-4	14.24	2.49	11.75	

Table 1Water Level Elevations and Horizontal Gradients

FLOYDISNIDER

Well	Top of Well Casing (feet NAVD 88)	Depth to Water (feet)	Groundwater Elevation (feet NAVD 88)	Horizontal Gradient (feet/foot)
December	22, 2014			
MW-1	14.24	1.75	12.49	
MW-2	14.08	1.64	12.44	0.002
MW-3	14.05	1.76	12.29	0.005
MW-4	14.24	1.84	12.40	
September	24, 2014			
MW-1	14.24	5.92	8.32	
MW-2	14.08	5.74	8.34	0.001
MW-3	14.05	5.76	8.29	0.001
MW-4	14.24	5.99	8.25	
June 24, 20	14			
MW-1	14.24	3.85	10.39	
MW-2	14.08	3.76	10.32	0.002
MW-3	14.05	3.80	10.25	0.002
MW-4	14.24	3.93	10.31	
March 19, 2	2014			
MW-1	14.24	1.14	13.10	
MW-2	14.08	1.06	13.02	0.004
MW-3	14.05	1.20	12.85	0.004
MW-4	14.24	1.23	13.01	

Table 1Water Level Elevations and Horizontal Gradients

Note:

1 Unable to measure. Monitoring well was inaccessible.

Abbreviations:

NAVD 88 North American Vertical Datum of 1988

NM Not measured

		Diesel-Range	Organics (μg/L)	Oil-Range Or	ganics (µg/L)
			by NWTPH-Dx		by NWTPH-Dx
			, with Silica Gel		, with Silica Gel
Well	Date	by NWTPH-Dx	Cleanup	by NWTPH-Dx	Cleanup
	3/19/2014	390	250	na	na
	3/19/2014 (Duplicate)	490	220	na	na
	6/24/2014	390 JM	210	250 U	250 U
	9/24/2014	380 J	230	na	na
	9/24/2014 (Duplicate)	430 J	230	na	na
	12/22/2014	410	210	na	na
	3/17/2015	350	na	na	na
	6/9/2015	530	na	na	na
MW-1	3/30/2016	280	na	na	na
	3/30/2016 (Duplicate)	300	na	na	na
	6/23/2016	760	na	na	na
	9/8/2016 ¹	na	na	na	na
	3/8/2017 ¹	na	na	na	na
	6/1//2017	670	na	na	na
	6/11/2017 (Duplicate)	610	na	na	na
	0/14/2017 (Duplicate)	200 ²	IId	250.11	lid
	9/14/2017	380	na	250 0	na
	3/19/2014	700	370	na 250 H	
	6/24/2014	540 JM	270	250 0	250 0
	6/24/2014 (Duplicate)	540 JM	270	250 0	250 0
	9/24/2014	620 J	340	na	na
	12/22/2014	480	280	na	na
	12/22/2014 (Duplicate)	520	310	na	na
	3/1//2015	390	na	na	na
	3/1//2015 (Duplicate)	390	na	na	na
MW-2	6/9/2015	660	na	na	na
	6/9/2015 (Duplicate)	670	na	na	na
	3/30/2016	300	na	na	na
	6/23/2016	590	na	na	na
	9/8/2016	440	na	na	na
	9/8/2016 (Duplicate)	380	na	na	na
	3/8/2017	500	na	na	na
	6/14/2017	280	na	na	na
	9/14/2017	400 -	na	250 U	na
	9/14/2017 (Duplicate)	350 ²	na	250 U	na
	3/19/2014	560	180	na	na
	6/24/2014	470 JM	170	250 U	250 U
	9/24/2014	420 J	170	na	na
	12/22/2014	480	200	na	na
	3/17/2015	310	na	na	na
MW-3	6/9/2015	530	na	na	na
	3/30/2016	370	na	na	na
	6/23/2016	400	na	na	na
	9/8/2016	400	na	na	na
	3/8/2017	370	na	na	na
	6/14/2017	280	na	na	na
	9/14/2017	320 ²	na	250 U	na
	3/19/2014	680	450	na	na
	6/24/2014	560 JM	360 JM	250 U	250 U
	9/24/2014	550 J	380	na	na
	12/22/2014	440	220		

Table 2Groundwater Analytical Results for Diesel-Range Organics

	12/22/2014	440	320	na	na
	3/17/2015	460	na	na	na
	6/9/2015	580	na	na	na
MW-4	3/30/2016	480	na	na	na
	6/23/2016	600	na	na	na
	9/8/2016	510	na	na	na
	3/8/2017	470	na	na	na
	3/8/2017 (Duplicate)	590	na	na	na
	6/14/2017	490	na	na	na
	9/14/2017	560	na	250 U	na

Notes:

1 Unable to sample, well was underwater.

2 Laboratory noted that the sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Abbreviations

 μ g/L Micrograms per liter

na Not analyzed

Qualifiers:

J Analyte was detected, the concentration is considered an estimate.

JM Analyte was detected, the concentration is considered an estimate due to poor chromatographic match to standard.

U Analyte was not detected at the given reporting limit.

F:\projects\PSTL Longview\Compliance Monitoring Report\2017\02 Tables\

Table 2- Groundwater Analytical Results for Diesel-Range Organics(A)

December 2017

2017 Groundwater Monitoring Results

Table 2

Groundwater Analytical Results for Diesel-Range Organics

Figures



I:\GIS\Projects\PSTL-Longview\MXD\Figure 1 Vicinity Map.mxd 10/13/2015





Attachment 1 Bill of Lading for Investigation-Derived Waste

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Attachment 2 Laboratory Analytical Data

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

March 15, 2017

Brett Beaulieu, Project Manager Floyd-Snider Two Union Square, Suite 600 601 Union St Seattle, WA 98101

Dear Mr Beaulieu:

Included are the results from the testing of material submitted on March 8, 2017 from the PSTL-Longview, F&BI 703146 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Cale

Michael Erdahl Project Manager

Enclosures FDS0315R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 8, 2017 by Friedman & Bruya, Inc. from the Floyd-Snider PSTL-Longview, F&BI 703146 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	<u>Floyd-Snider</u>
703146 -01	MW-2-GW-4-14
703146 -02	MW-4-GW-4-14
703146 -03	MW-13-GW-4-14
703146 -04	MW-3-GW-4-14

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/15/17 Date Received: 03/08/17 Project: PSTL-Longview, F&BI 703146 Date Extracted: 03/09/17 Date Analyzed: 03/09/17

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx

		Surrogate
<u>Sample ID</u>	<u>Diesel Range</u>	<u>(% Recovery)</u>
Laboratory ID	(C ₁₀ -C ₂₅)	(Limit 47-140)
MW-2-GW-4-14 703146-01	500	96
MW-4-GW-4-14 703146-02	470	86
MW-13-GW-4-14 703146-03	590	100
MW-3-GW-4-14 703146-04	370	96
Method Blank 07-487 MB	<50	92

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 03/15/17 Date Received: 03/08/17 Project: PSTL-Longview, F&BI 703146

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx

Laboratory Code:	703146-04 (Matri	x Spike)					
-		-	Sample	Percent	Percent		
	Reporting	Spike	Result	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level		MS	MSD	Criteria	(Limit 20)
Diesel	ug/L (ppb)	2,500	370	97	82	64-141	17
Laboratory Code:	Laboratory Contr	ol Sampl	e				
			Percent	Percent			
	Reporting	Spike	Recovery	Recovery	Acceptance	RPD	
Analyte	Units	Level	LCS	LCSD	Criteria	(Limit 20))
Diesel	ug/L (ppb)	2,500	97	95	61-133	2	

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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ARI Client Company Tack Si	MIDON Phone:			Date:	lce Present	~	Tukwila, WA	134th Place, suite Iou 98168
Client Contact: Ret Be	raelucy			No of 1 Coolers	Cooler Temps:	2°C	200-020-020 www.arilabs	,COM
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Mw-13-6w-4-14	38/17 1250	3	tiponae:	$\boldsymbol{\times}$				8
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Limits of Liability: ARI will perform all meets standards for the industry. The to said services. The acceptance by the cli	requested services in accol stal liability of ARI, its officer ient of a proposal for service	dance with ap s, agents, emp s by ARI relea	propriate met ployees, or su ase ARI from	thodology following cccessors, arising any liability in exce	7 ARI Standard out of or in conn ess thereof, not	Operating Procedures and nection with the requested withstanding any provision	<i>f the ARI Quality Assurance Pr</i> <i>services, shall not exceed the</i> <i>n to the contrary in any contrac.</i>	rogram. This program Invoiced amount for t, purchase order or co-

signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sconer than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

June 20, 2017

Brett Beaulieu, Project Manager Floyd-Snider Two Union Square, Suite 600 601 Union St Seattle, WA 98101

Dear Mr Beaulieu:

Included are the results from the testing of material submitted on June 14, 2017 from the PSTL-Longview, F&BI 706234 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Cale

Michael Erdahl Project Manager

Enclosures FDS0620R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on June 14, 2017 by Friedman & Bruya, Inc. from the Floyd-Snider PSTL-Longview, F&BI 706234 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	<u>Floyd-Snider</u>
706234 -01	MW-3-061417
706234 -02	MW-1-061417
706234 -03	MW-2-061417
706234 -04	MW-4-061417
706234 -05	MW-13-061417

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/20/17 Date Received: 06/14/17 Project: PSTL-Longview, F&BI 706234 Date Extracted: 06/15/17 Date Analyzed: 06/15/17

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx

Surrogate (% Recovery) Sample ID Diesel Range (Limit 41-152) Laboratory ID $(C_{10}-C_{25})$ MW-3-061417 280 85 706234-01 670 81 MW-1-061417 706234-02 MW-2-061417 280 78 706234-03 490 83 MW-4-061417 706234-04 MW-13-061417 610 74 706234-05 Method Blank <50 85 07-1296 MB2

Results Reported as ug/L (ppb)

ENVIRONMENTAL CHEMISTS

Date of Report: 06/20/17 Date Received: 06/14/17 Project: PSTL-Longview, F&BI 706234

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL USING METHOD NWTPH-Dx

Laboratory Code:	706234-05 (Matri	ix Spike)					
				Percent	Percent		
	Reporting	Spike	Sample	Recovery	Recovery	Acceptance	RPD
Analyte	Units	Level	Result	MS	MSD	Criteria	(Limit 20)
Diesel	ug/L (ppb)	9,500	610	112	103	50-150	8
Laboratory Code:	Laboratory Contr	rol Sampl	e				
			Percent	Percer	nt		
	Reporting	Spike	Recovery	y Recove	ry Accep	otance l	RPD
Analyte	Units	Level	LCS	LCSE	O Crit	teria (Lii	mit 20)
Diesel	ug/L (ppb)	2,500	100	101	63-	142	1

3

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

 ${\bf b}$ - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

 ${\rm d}$ - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

· .

Friedman & Bruya, Inc.Relinquis3012 16 th Avenue WestReceivedSeattle, WA 98119-2029RefinquisPh. (206) 285-8282Received			MW-13-061417 6	MW-H-DUHIT	MW-2-001417 6	0 ETHIORO-I-MW	MW-3-061417 0	Sample ID		City, State, ZIP_Seattle, WF Phone 206-292-2076 mail	Address 601 Union St	Company Floyd Shider	Report To Kett Beaulieus	T 22904
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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D. Yelena Aravkina, M.S. Michael Erdahl, B.S. Arina Podnozova, B.S. Eric Young, B.S. 3012 16th Avenue West Seattle, WA 98119-2029 (206) 285-8282 fbi@isomedia.com www.friedmanandbruya.com

September 20, 2017

Brett Beaulieu, Project Manager Floyd-Snider Two Union Square, Suite 600 601 Union St Seattle, WA 98101

Dear Mr Beaulieu:

Included are the results from the testing of material submitted on September 15, 2017 from the PSTL-Longview, F&BI 709236 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Cale

Michael Erdahl Project Manager

Enclosures FDS0920R.DOC

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 15, 2017 by Friedman & Bruya, Inc. from the Floyd-Snider PSTL-Longview, F&BI 709236 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	<u>Floyd-Snider</u>
709236 -01	MW-3-GW-4-14
709236 -02	MW-21-GW-4-14
709236 -03	MW-2-GW-4-14
709236 -04	MW-1-GW-4-14
709236 -05	MW-4-GW-5-15

All quality control requirements were acceptable.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/20/17 Date Received: 09/15/17 Project: PSTL-Longview, F&BI 709236 Date Extracted: 09/15/17 Date Analyzed: 09/15/17

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	Diesel Range (C10-C25)	Motor Oil Range (C25-C36)	Surrogate <u>(% Recovery)</u> (Limit 41-152)
MW-3-GW-4-14 709236-01	320 x	<250	117
MW-21-GW-4-14 709236-02	350 x	<250	100
MW-2-GW-4-14 709236-03	400 x	<250	120
MW-1-GW-4-14 709236-04	380 x	<250	116
MW-4-GW-5-15 709236-05	560 x	<250	116
Method Blank 07-2032 MB	<50	<250	116

ENVIRONMENTAL CHEMISTS

Date of Report: 09/20/17 Date Received: 09/15/17 Project: PSTL-Longview, F&BI 709236

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code:	709236-01 (Matri	x Spike)						
				Percent	Percent			
	Reporting	Spike	Sample	Recovery	Recovery	Accep	tance	RPD
Analyte	Units	Level	Result	MS	MSD	Crit	eria	(Limit 20)
Diesel Extended	ug/L (ppb)	2,500	330	115	128	50-1	150	11
Laboratory Code:	Laboratory Contr	ol Sampl	e					
			Percent	Percent	t			
	Reporting	Spike	Recovery	y Recover	y Accepta	ance	RPD)
Analyte	Units	Level	LCS	LCSD	Crite	ria	(Limit	20)
Diesel Extended	ug/L (ppb)	2,500	88	100	63-14	12	13	

3

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

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c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

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dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

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hs - Headspace was present in the container used for analysis.

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ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

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pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Friedman & Bruya, Inc. 3012 16 th Avenue West Seattle, WA 98119-2029 Ph. (206) 285-8282 Rece	MW-4-6W-5-15	MW-1-GW-H-14	MW-2-6W-4-14	MW-21-6W-4-14	MW-3-6W-4-14	Sample ID		Phone 212-2078 Email	City. State. ZIP Savtha	Company Flayd Snuder Address LOU Winter St	Report To Brett Beauli	262bat
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Attachment 3 Terrestrial Ecological Evaluation Form and Exposure Analysis (Table 749-1)

Voluntary Cleanup Program

Washington State Department of Ecology Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

- 1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
- 2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
- 3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are documenting an evaluation.

Facility/Site Name: Puget Sound Truck Lines

Facility/Site Address: 146 Industrial Way, Longview, WA

Facility/Site No: 74481279

VCP Project No.: SW1429

Title: Sr. Hydrogeologist

Step 2: IDENTIFY EVALUATOR

Please identify below the person who conducted the evaluation and their contact information.

Name: Brett	Beaulieu
-------------	----------

Organization: Floyd Snider, Inc.

Mailing address: 601 Union Street, Suite 600

City: Seattle			te:WA	Zip code: 98101		
Phone: 206 292 2078	Fax:		E-mail: brett.	beaulieu@floydsnider.com		

Step 3: DOO	CUMENT EVALUATION TYPE AND RESULTS										
A. Exclusion	A. Exclusion from further evaluation.										
1. Does the	1. Does the Site qualify for an exclusion from further evaluation?										
	fes If you answered "YES," then answer Question 2.										
Unki	No or If you answered " NO" or "UKNOWN," then skip to Step 3B of this form.										
2. What is th	2. What is the basis for the exclusion? Check all that apply. Then skip to Step 4 of this form.										
Point of C	ompliance: WAC 173-340-7491(1)(a)										
	All soil contamination is, or will be,* at least 15 feet below the surface.										
	All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.										
Barriers to	Exposure: WAC 173-340-7491(1)(b)										
	All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.										
Undevelop	bed Land: WAC 173-340-7491(1)(c)										
	There is less than 0.25 acres of contiguous [#] undeveloped [±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.										
	For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous [#] undeveloped [±] land on or within 500 feet of any area of the Site.										
Backgrour	nd Concentrations: WAC 173-340-7491(1)(d)										
	Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.										
* An exclusion acceptable to E [±] "Undevelope prevent wildlife # "Contiguous" highways, exte	based on future land use must have a completion date for future development that is Ecology. d land" is land that is not covered by building, roads, paved areas, or other barriers that would from feeding on plants, earthworms, insects, or other food in or on the soil. undeveloped land is an area of undeveloped land that is not divided into smaller areas of nsive paving, or similar structures that are likely to reduce the potential use of the overall area										

В	. Simplified	l evaluation.
1	. Does the	Site qualify for a simplified evaluation?
	I Y	es If you answered "YES," then answer Question 2 below.
	🔲 N Unkr	No or If you answered " NO" or " UNKNOWN ," then skip to Step 3C of this form.
2	. Did you co	onduct a simplified evaluation?
	I Y	es If you answered "YES," then answer Question 3 below.
		No If you answered " NO ," then skip to Step 3C of this form.
3	. Was furth	er evaluation necessary?
	ר 🗌 א	es If you answered "YES," then answer Question 4 below.
		No If you answered " NO ," then answer Question 5 below.
4	. If further e	evaluation was necessary, what did you do?
		Used the concentrations listed in Table 749-2 as cleanup levels. If so, then skip to Step 4 of this form.
		Conducted a site-specific evaluation. If so, then skip to Step 3C of this form.
5	. If no furth to Step 4 c	er evaluation was necessary, what was the reason? Check all that apply. Then skip of this form.
	Exposure	Analysis: WAC 173-340-7492(2)(a)
		Area of soil contamination at the Site is not more than 350 square feet.
		Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.
	Pathway A	nalysis: WAC 173-340-7492(2)(b)
		No potential exposure pathways from soil contamination to ecological receptors.
	Contamina	ant Analysis: WAC 173-340-7492(2)(c)
		No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.
		No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.
		No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.
		No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C.	Site-speci the probler require cor	fic evaluation. A site-specific evaluation process consists of two parts: (1) formulating n, and (2) selecting the methods for addressing the identified problem. Both steps isultation with and approval by Ecology. <i>See</i> WAC 173-340-7493(1)(c).								
1.	. Was there a problem? See WAC 173-340-7493(2).									
	□ Y	Yes If you answered " YES ," then answer Question 2 below.								
	□ N	If you answered " NO ," then identify the reason here and then skip to Question 5 below:								
		No issues were identified during the problem formulation step.								
		While issues were identified, those issues were addressed by the cleanup actions for protecting human health.								
2.	What did y	you do to resolve the problem? See WAC 173-340-7493(3).								
		Used the concentrations listed in Table 749-3 as cleanup levels. If so, then skip to Question 5 below.								
		Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. <i>If so, then answer Questions 3 and 4 below.</i>								
3.	If you con Check all th	ducted further site-specific evaluations, what methods did you use? nat apply. See WAC 173-340-7493(3).								
		Literature surveys.								
		Soil bioassays.								
		Wildlife exposure model.								
		Biomarkers.								
		Site-specific field studies.								
		Weight of evidence.								
		Other methods approved by Ecology. If so, please specify:								
4.	What was	the result of those evaluations?								
		Confirmed there was no problem.								
		Confirmed there was a problem and established site-specific cleanup levels.								
5.	Have you problem re	already obtained Ecology's approval of both your problem formulation and esolution steps?								
	□ Y	es If so, please identify the Ecology staff who approved those steps:								
	□ N	0								

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.

Northwest Region:	Central Region:
Attn: VCP Coordinator	Attn: VCP Coordinator
3190 160 th Ave. SE	1250 West Alder St.
Bellevue, WA 98008-5452	Union Gap, WA 98903-0009
Southwest Region:	Eastern Region:
Attn: VCP Coordinator	Attn: VCP Coordinator
P.O. Box 47775	N. 4601 Monroe
Olympia, WA 98504-7775	Spokane WA 99205-1295

ECY 090-300 (07/2015) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Toxic Cleanup Program 360-407-7170. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) <u>undeveloped land</u> on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).

1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.	
Area (acres) Points	
0.25 or less 4	
0.5 5	
1.5 7	
2.0 8	
2.5 9	
3.0 10	
3.5 11	
4.0 or more 12	
2) Is this an <u>industrial</u> or <u>commercial</u> property? If yes, enter a score of 3. If no, enter a score of 1	
3) ^a Enter a score in the box to the right for the habitat quality of the site, using the following rating system ^b . High=1, Intermediate=2, Low=3	
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2° .	
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.	

Notes for Table 749-1

^a It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

^b **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

Low: Early <u>successional</u> vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.