DATA VALIDATION REPORT

Boeing Field Chevron

Prepared for:

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Approved for Release:

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PROJECT NARRATIVE

Basis for the Data Validation

This report summarizes the results of the summary level validation (Stage 2A) performed on soil, sediment, catch basin, and ground water samples and the associated laboratory and field quality control samples for the Boeing Field Chevron project sampling. A complete list of samples is provided in the Sample Index.

Samples were analyzed by Fremont Analytical, Inc., Seattle, Washington. The analytical methods and EcoChem project chemists are listed in the following table:

ANALYSIS	METHOD OF ANALYSIS	PRIMARY REVIEW	SECONDARY REVIEW
Volatile Organic Compounds (VOC)	SW8260C	E. Clayton	C. Frans
Semivolatile Organic Compounds (SVOC)	SW8270D-SIM	A. Bodkin	
Ethylene Dibromide	SW8011	B. Frans	
Total Petroleum Hydrocarbons – Diesel Range	NWTPH-Dx	B. Frans	
Total Petroleum Hydrocarbons – Gasoline Range	NWTPH-Gx & NWVPH	B. Frans	
Total & Dissolved Lead	SW6020A, EPA 200.8	E. Clayton	

The data were reviewed using guidance and quality control criteria documented in the analytical methods; Appendix D of Agency Review Draft Work Plan for Remedial Investigation Boeing Field Chevron, Terracon, May 24, 2016; *USEPA National Functional Guidelines for Organic Data Review* (EPA, 1999 & 2008); and *USEPA National Functional Guidelines for Inorganic Data Review* (EPA, 2010 & 2014).

EcoChem's goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

Data qualifier definitions, reason codes, and validation criteria are included as Appendix A. A Qualified Data Summary Table is included in Appendix B. Data Validation Worksheets will be kept on file at EcoChem, Inc. A qualified laboratory electronic data deliverable (EDD) is also submitted with this report.

Sample Index
Boeing Field Chevron

SDG	Sample ID	Lab Sample ID	NWTPH-Gx	NWTPH-Dx	NWVPH	VOCs	SVOCs	EDB	Lead
1610356	GLB-12-20161021-6	1610356-004A	✓	✓		✓	✓		✓
	GLB-8-20161024-15	1610356-008A	✓	✓					
	GLB-8-20161024-18	1610356-009A	✓	✓					
	GLB-8-20161024-25	1610356-010A	✓	✓		✓			
	GLB-10-20161024-12	1610356-012A	✓	✓		✓	✓		✓
	GLB-10-20161024-20	1610356-013A	✓	✓		✓	✓		✓
	GLB-10-20161024-25	1610356-014A	✓	✓		✓	✓		
	GLB-10-20161024-30	1610356-015B				✓	✓		
	GLB-12-20161024-10	1610356-016A	✓	✓		✓	✓		✓
	GLB-12-20161024-14	1610356-017A	✓	✓		✓	✓		
	GLB-12-20161024-18	1610356-018A	✓	✓		✓	✓		
	GLB-12-20161024-25	1610356-019A	✓	✓		✓	✓		
	GLB-12-20161024-30	1610356-020B				✓	✓		
	GLB-14-20161024-12.5	1610356-024A	✓	✓					
	GLB-14-20161024-17	1610356-025A	✓	✓	✓	✓	✓		✓
	GLB-14-20161024-22	1610356-026A	✓	✓		✓	✓		✓
	GLB-14-20161024-25	1610356-027A	✓	✓					
	GLB-15-20161024-9	1610356-030A	✓	✓	✓	✓	✓		✓
	GLB-15-20161024-12	1610356-031A	✓	✓		✓	✓		✓
	GLB-15-20161024-18	1610356-032A	✓	✓	✓	✓	✓		✓
	GLB-15-20161024-25	1610356-033A	✓	✓		✓	✓		✓
	GLB-15-20161024-30	1610356-034A	✓	✓					
	GLB-16-20161024-12	1610356-037A	✓	✓		✓	✓		✓
	GLB-16-20161024-16	1610356-038A	✓	✓	✓	✓	✓		✓
	GLB-16-20161024-20	1610356-039A	✓	✓		✓	✓		✓
	GLB-16-102416-25	1610356-040A	✓	✓		✓	✓		
	GLB-7-102416-3	1610356-045A	✓	✓		✓	✓		✓
	GLB-FD-102416-1	1610356-050A	✓	✓		✓	✓		✓
1610374	GLB-13-102516-11	1610374-001A	✓	✓					
	GLB-13-102516-15	1610374-002A	✓	✓		✓			
	GLB-13-102516-20	1610374-003A	✓	✓		✓			
	GLB-13-102516-25	1610374-004A	✓	✓					
	GLB-4-102516-20	1610374-008A	✓	✓					
	GLB-4-102516-21	1610374-009A	✓	✓					
	GLB-4-102516-30	1610374-011A	✓	✓					
	GLB-3-102516-20	1610374-015A	✓	✓					
	GLB-3-102516-25	1610374-016A	✓	✓					
	GLB-3-102516-35	1610374-018A	✓	✓					
	GLB-2-102516-20	1610374-021A	✓	✓					
	GLB-2-102516-25	1610374-022A	✓	✓					
	GLB-1-102516-20	1610374-026A	✓	✓					
	GLB-1-102516-30	1610374-028A	✓	✓					
	GLVP-2-102516-7.5	1610374-029A	✓	✓					
1610395	GLB-11-102616-18	1610395-003A	✓	✓					
	GLB-11-102616-30	1610395-005A	✓	✓					
	GLB-9-102616-10	1610395-006A	✓	✓		✓	✓		✓
	GLB-9-102616-23	1610395-007A	✓	✓		✓	✓		✓
	GLB-9-102616-25	1610395-008A	✓	✓		✓	✓		✓
	GLB-9-102616-30	1610395-009A	✓	✓		✓	✓		
	GLB-9-102616-35	1610395-010A	✓	✓		✓	✓		
	GLB-7-102616-20	1610395-011A	✓	✓		✓	✓		✓
	GLB-7-102616-22	1610395-012A	✓	✓		✓	✓		
	GLB-7-102616-30	1610395-013A	✓	✓		✓	✓		
	GLB-7-102616-35	1610395-014A	✓	✓		✓	✓		
	GLVP-1-102616-7	1610395-015A	✓	✓					
1610416	GLB-6-102716-10	1610416-002A	✓	✓					
	GLB-6-102716-15	1610416-003A	✓	✓					
	GLB-6-102716-20	1610416-004A	✓	✓					

Sample Index
Boeing Field Chevron

SDG	Sample ID	Lab Sample ID	NWTPH-Gx	NWTPH-Dx	NWVPH	VOCs	SVOCs	EDB	Lead
1610416	GLB-6-102716-25	1610416-005A	✓	✓		✓			
	GLB-6-102716-30	1610416-006A	✓	✓		✓			
	GLB-5-102716-12	1610416-008A	✓	✓					
	GLB-5-102716-15	1610416-009A	✓	✓					
	GLB-5-102716-20	1610416-010A	✓	✓		✓			
	GLB-5-102716-25	1610416-011A	✓	✓		✓			
1610417	CB-1002	1610417-001A	✓	✓					
	CB-1068	1610417-002A	✓	✓					
	CB-1002-W	1610417-003B	✓	✓					
	CB-5-W	1610417-004B	✓	✓					
	CB-1001-W	1610417-005B	✓	✓					
	CB-1068-W	1610417-006B	✓	✓					
1611186	MW-22-11	1611186-001A	✓	✓		✓	✓		
	MW-23-16	1611186-002A	✓	✓		✓	✓		✓
	MW-23-20	1611186-003A	✓	✓		✓	✓		✓
	MW-26D-5	1611186-004A	✓	✓		✓	✓		✓
	MW-26D-10	1611186-005A	✓	✓		✓	✓		✓
	MW-26D-16.5	1611186-006A	✓	✓		✓	✓		✓
	MW-26D-20	1611186-007A	✓	✓		✓	✓		✓
	MW-26D-25	1611186-008A	✓	✓		✓	✓		✓
	MW-26D-30	1611186-009A	✓	✓		✓	✓		✓
	MW-Z-16	1611186-010A	✓	✓		✓	✓		✓
1611204	GLB-18-14	1611204-003A	✓	✓		✓	✓		
	GLB-18-17	1611204-004A	✓	✓		✓	✓		
	GLB-18-22	1611204-005A	✓	✓		✓	✓		
	GLB-18-30	1611204-006A	✓	✓		✓	✓		
	GLB-18-35	1611204-007A	✓	✓		✓	✓		
	GLB-19-10	1611204-009A	✓	✓		✓	✓		
	GLB-19-15	1611204-010A	✓	✓		✓	✓		
	GLB-19-16	1611204-011A	✓	✓		✓	✓		
	GLB-19-18	1611204-012A	✓	✓		✓	✓		
	GLB-19-25	1611204-013A	✓	✓		✓	✓		
	GLB-19-30	1611204-014A	✓			✓			
	GLB-X	1611204-015A	✓	✓		✓	✓		
	MW-25-11	1611204-016A	✓	✓		✓	✓		
	MW-28D-5	1611204-017B	✓			✓			
	MW-28D-10	1611204-018A	✓	✓		✓	✓		
	MW-28D-15	1611204-019A	✓	✓		✓	✓		
	MW-28D-20	1611204-020A	✓	✓		✓	✓		
	MW-28D-30	1611204-021A	✓	✓		✓	✓		
	MW-Y	1611204-022A	✓	✓		✓	✓		
1611227	MW-24-12	1611227-001A	✓	✓		✓	✓		
	MW-27D-15	1611227-004A	✓	✓		✓	✓		✓
	MW-27D-20	1611227-005A	✓	✓		✓	✓		✓
	MW-27D-25	1611227-006A	✓	✓		✓	✓		✓
	GLB-17-5	1611227-008B	✓			✓			
	GLB-17-10	1611227-009A	✓	✓		✓	✓		
	GLB-17-15	1611227-010A	✓	✓		✓	✓		
	GLB-17-18	1611227-011A	✓	✓		✓	✓		
	GLB-17-23	1611227-012A	✓	✓		✓	✓		
	MW-V	1611227-014A	✓	✓		✓	✓		✓
	MW-W	1611227-015A	✓	✓		✓	✓		
1611301	MW 28D	1611301-001A	✓	✓		✓	✓	✓	✓
	MW 28S	1611301-002A	✓	✓		✓	✓	✓	✓
	MW 27D	1611301-003A	✓	✓		✓	✓	✓	✓
	MW 27S	1611301-004A	✓	✓		✓	✓	✓	✓
	MW 13	1611301-005A	✓	✓		✓	✓	✓	✓
	MW 14	1611301-006A	✓	✓		✓	✓	✓	✓

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SDG	Sample ID	Lab Sample ID	NWTPH-Gx	NWTPH-Dx	NWVPH	VOCs	SVOCs	EDB	Lead
1611301	MW 16	1611301-007A	✓	✓		✓	✓	✓	✓
1611301	MW 11	1611301-008A	✓	✓		✓	✓	✓	✓
	MW 12	1611301-009A	✓	✓		✓	✓	✓	✓
	MW A	1611301-010A	✓	✓		✓	✓	✓	✓
	IP-4	1611301-011A	✓	✓		✓	✓	✓	✓
	IP-5	1611301-012A	✓	✓		✓	✓	✓	✓
	MW-B	1611301-013A	✓	✓		✓	✓	✓	✓
	MW-21	1611301-014A	✓	✓		✓	✓	✓	✓
	MW-18	1611301-015A	✓	✓		✓	✓	✓	✓
	MW-20	1611301-016A	✓	✓		✓	✓	✓	✓
	MW-19	1611301-017A	✓	✓		✓	✓	✓	✓
	MW-26	1611301-018A	✓	✓		✓	✓	✓	✓
	MW-26D	1611301-019A	✓	✓		✓	✓	✓	✓
1612063	MW-17	1612063-001B	✓	✓		✓	✓	✓	✓
	MW-24	1612063-002B	✓	✓		✓	✓	✓	✓
	MW-25	1612063-003B	✓	✓		✓	✓	✓	✓
	MW-23	1612063-004B	✓	✓		✓	✓	✓	✓
	MW-22	1612063-005B	✓	✓		✓	✓	✓	✓
	MW-C	1612063-006B	✓	✓		✓	✓	✓	✓
	IDW-1	1612063-007B	✓	✓		✓	✓		✓
	IDW-2	1612063-008B	✓	✓		✓	✓		✓

DATA VALIDATION REPORT
G-Logics, Inc. – Boeing Field Chevron
Volatile Organic Compounds - Method SW8260C

This report documents the review of analytical data from the analyses of soil and groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Fremont Analytical, Inc., Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1610356	23 Soil	Stage 2A
1610374	2 Soil	
1610395	9 Soil	
1610416	4 Soil	
1611186	10 Soil	
1611204	19 Soil	
1611227	11 Soil	
1611301	19 Groundwater	
1612063	8 Groundwater	

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (10% verification) by comparing the EDD to the laboratory data package. Ten percent (10%) of the laboratory QC results were also verified.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

2	Sample Receipt, Preservation, and Holding Times	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
✓	Laboratory Blanks	2	Field Duplicates
1	Field Blanks	✓	Target Analyte List
1	Surrogate Compounds	✓	Reporting Limits
✓	Laboratory Control Samples (LCS)	✓	Reported Results

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 0° to 6°C. For volatiles analysis, no action is taken if the cooler temperature is <10°C. If the cooler temperature is >10°C, associated sample results are estimated (J/UJ-1). With the exceptions noted below, the laboratory received the sample coolers within the advisory temperature range.

SDG 1610356: The sample cooler temperature was greater than the upper control limit at 12.8°C. All results were estimated (J/UJ-1).

Sample GLB-FD-102416-1 has an identification (ID) on the chain-of-custody (COC) of GLB-FD-20161024-1.

SDGs 1610395, 1611186, 1611227, 1611301, and 1612063: The laboratory received the sample coolers with temperatures greater than the upper control limit of 6°C. The coolers were received within several hours after the samples were collected preventing sufficient time for cooling; no results qualified.

SDG 1611204: Sample GLB-19-30 was analyzed past the 14-day holding time at 20 days. No positive results were detected; results were estimated (UJ-1).

SDG 1611227: Sample GLB-17-5 was analyzed past the 14-day holding time at 17 days. No positive results were detected; the benzene result was estimated (UJ-1).

Field Blanks

Although trip blanks were shipped to the field and accompanied samples from the field to the laboratory, analyses of these trip blank samples was not requested, therefore data were not generated.

Field blanks were not submitted with this sampling event.

Surrogate Compounds

The surrogate compounds toluene-d8, 4-bromofluorobenzene, and dibromofluoromethane, were added to all samples. With the exceptions noted below, all surrogate recoveries were within the laboratory control limits.

SDG 1611186: The toluene-d8 recovery for QC Sample MB-15503 was greater than the upper control limit. No qualification was required for this QC sample outlier.

SDG 1611301: The toluene-d8 recovery for Sample MW 28S was greater than the upper control limit indicating a potential high bias. There were no target analytes detected in the sample; no qualification was required.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed at the appropriate frequency. No action is taken unless both the MS and MSD %R values are outside the control limits for MS/MSD %R outliers. Precision is evaluated using the RPD values calculated between the MS and MSD results. Any RPD values outside the control limits indicate uncertainty in the measured results for the sample. Qualifiers were only issued to the parent sample.

When the MS/MSD %R values indicate a potential low bias, associated results are estimated (J/UJ-8L). Only the associated positive results are estimated (J-8H) if the %R values indicate a potential high bias. Associated positive results are estimated (J-9) if the RPD values indicate uncertainty.

SDG 1610356: The MS/MSD analyses were performed on Sample GLB-7-102416-3. The recoveries for hexane were greater than the upper control limit. No positive result was detected in the parent sample; no qualification was required.

SDG 1611186: The MS/MSD analyses were performed on Sample MW-Z-16. The RPD values for methyl tert-butyl ether, 1,2-dichloroethane, and toluene were greater than the control limit. No positive results were detected in the parent sample for these analytes; no qualification was required.

Field Duplicates

For soil samples, the RPD control limit is 35% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL.

SDG 1611186: Samples MW-26D-16.5 and MW-Z-16 were identified as field duplicates. No positive results were detected in the samples. Field precision was acceptable.

SDG 1611204: Samples GLB-19-18 & GLB-X and MW-28D-20 & MW-Y were submitted as field duplicate pairs. For Samples GLB-19-18 and GLB-X, benzene was detected in the duplicate sample at a concentration greater than 5x the RL but was not detected in the parent sample. This resulted in the RPD value being greater than the control limit. The benzene results were estimated (J/UJ-9) in the parent and duplicate samples. No positive results were detected in Samples MW-28D-20 & MW-Y.

SDG 1611227: Samples MW-27D-20 & MW-V and GLB-17-23 & MW-W were identified as field duplicate sets. No positive results were detected in the samples. Field precision was acceptable.

Target Analyte List

The QAPP/SAP did not specify a target analyte list.

Reporting Limits

The target reporting limits for samples were adjusted for sample size and moisture content. No data were qualified.

Reported Results

SDG 1611301: The laboratory flagged several results listed in the table below with an "E" indicating the reported concentration value is above the quantitation range. These results have been estimated (J-20).

Sample ID	Analyte	Action
IP-4	Hexane	J-20
IP-5	Benzene	J-20
MW 16	m,p-Xylene	J-20
MW B	Benzene	J-20

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate, LCS/LCSD, and MS/MSD recovery values. With the exceptions noted above, precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and laboratory and field duplicate RPD values.

The laboratory has flagged results with a "Q" to denote that continuing calibration control criteria were not met. Because evaluation of calibration is not part of a level 2A validation and there was insufficient detail in the laboratory report to assess the impact of the outliers, these flags were not carried through to the final qualifier field in the EDD.

Data were estimated due to a cooler temperature outlier, holding time outliers, and a field duplicate precision outlier. Data were also estimated because the result exceeded the calibrated range of the instrument.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
G-Logics, Inc. – Boeing Field Chevron
Semivolatile Organic Compounds - Method SW8270D-SIM

This report documents the review of analytical data from the analyses of soil and groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Fremont Analytical Inc., Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1610356	22 Soil	Stage 2A
1610395	9 Soil	
1611186	10 Soil	
1611204	17 Soil	
1611227	10 Soil	
1611301	19 Water	
1612063	8 Water	

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (10% verification) by comparing the EDD to the laboratory data package.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

2	Sample Preservation and Holding Times	1	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)
✓	Laboratory Blanks	1	Field Duplicates
1	Field Blanks	✓	Laboratory Duplicates
2	Surrogate Compounds	1	Target Analyte List
1	Laboratory Control Samples (LCS)	✓	Reporting Limits
✓	Laboratory Duplicates (DUP)	2	Reported Results

✓ ***Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.***
1 ***Quality control results are discussed below, but no data were qualified.***
2 ***Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.***

Sample Preservation and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 0°C- 6°C and be extracted within 7 days for aqueous samples and 14 days for soil samples. Sample extracts must be analyzed within 40 days of extraction. The following exceptions were noted during validation:

SDG 1610356: The samples were received in two coolers at temperatures greater than the upper control limit of 6°C, at 8.8°C and 12.8°C. From the information submitted, it was not apparent which samples were affected by the temperature outlier. Therefore, the higher of the two temperatures was used to evaluate the samples. All results were estimated (J/UJ-1).

SDGs 1610395, 1611186, 1611227, 1610301, and 1612063: The laboratory received the sample coolers with temperatures greater than the upper control limit of 6°C. The coolers were received within several hours after the samples were collected preventing sufficient time for cooling; no results qualified.

Field Blanks

Field blanks were not submitted with these SDGs.

Surrogate Compounds

The surrogate compounds 2-fluorobiphenyl and terphenyl-d14, were added to all field and batch QC samples. When one or more surrogate %R values are below the control limits and indicate a potential low bias, associated results for the affected fraction are estimated (J/UJ-13L). When one or more surrogate %R values are greater than the control limit and indicate a potential high bias, only the positive results in a fraction for a sample are estimated (J-13H). If there is one surrogate outlier in a fraction that is less than 10% recovery, the reporting limits for that fraction are rejected (R-13L) and the detections are estimated (J-13L). With the exception noted below, all surrogate spike recoveries were within the laboratory control limits.

SDG 1610356: For Sample GLB-15-20161024-25, the percent recovery (%R) value for 2-fluorobiphenyl was less than the lower control limit, indicating a potential low bias. Results were estimated (UJ-2L).

Laboratory Control Samples

Laboratory control samples (LCS) and/or laboratory control sample/laboratory control sample duplicates (LCS/LCSD) were analyzed at the required frequency of one per batch of 20 or fewer samples. For batches with both an LCS and LCSD, no action is taken unless both the LCS and LCSD %R values are outside the control limits. Precision is evaluated using the relative percent difference (RPD) values calculated between the LCS and LCSD results.

When the LCS/LCSD %R values indicate a potential low bias, associated results are estimated (J/UJ-10L). Only associated positive results are estimated (J-10H) if the %R values indicate a potential

high bias. Associated positive results are estimated (J-9) if the RPD values indicate uncertainty. Qualifiers were issued to all samples in the extraction batch.

SDG 1611186: The %R values for benzo(a)pyrene and indeno(1,2,3-cd) pyrene were greater than the upper control limits. There were no positive results for these compounds in the associated samples. No action was required.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed at the appropriate frequency. No action is taken unless both the MS and MSD %R values are outside the control limits for MS/MSD %R outliers. Precision is evaluated using the RPD values calculated between the MS and MSD results. Any RPD values outside the control limits indicate uncertainty in the measured results for the sample. Qualifiers were only issued to the parent sample.

When the MS/MSD %R values indicate a potential low bias, associated results are estimated (J/UJ-8L). Only the associated positive results are estimated (J-8H) if the %R values indicate a potential high bias. Associated positive results are estimated (J-9) if the RPD values indicate uncertainty.

SDGs 1610356 and 1610395: The matrix spike/matrix spike duplicate (MS/MSD) analyses were performed using Samples GLB-10-20161024-25 and GLB-12-20161021-6. For GLB-10-20161024-25 MS/MSD, the RPD values for several compounds were greater than the laboratory control limit. There were no positive results associated with the outliers in the parent sample. No action was required.

SDG 1611186: The MS/MSD analyses were performed using Sample MW-23-16. The %R values for dibenz(a,h)anthracene and indeno(1,2,3-cd) pyrene were greater than the upper control limits. There were no positive results for these compounds in the parent sample. No action was required.

SDG 1612063: The MS/MSD analyses were performed using Sample MW-17. The %R value for 2-methylnaphthalene in the MSD was greater than the control limit. The %R value for the MS was within control limits. No action was required for this single outlier.

Field Duplicates

For soil samples, the RPD control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL.

SDG 1611186: One set of field duplicates was submitted with this SDG: MW-26D-16.5 & MW-Z-16. No positive results were detected in the samples. Field precision was acceptable.

SDG 1611204: Two sets of field duplicates was submitted with this SDG: GLB-19-18 & GLB-X and MW-28D-20 & MW-Y. No positive results were detected in the samples. Field precision was acceptable

SDG 1611227: Two sets of field duplicates was submitted with this SDG: MW-27D-20 & MW-V and GLB-17-23 & MW-W. No positive results were detected in the samples. Field precision was acceptable.

Target Analyte List

The QAPP/SAP did not specify a target analyte list.

SDG 1610356: For several samples, only a subset of the PAH target compound list (naphthalenes) was reported. Based on the COC, it was unclear what was requested. No action was taken.

SDG 1610395: For all samples, only a subset of the PAH target compound list (naphthalenes) was reported. Based on the COC, it was unclear what was requested. No action was taken.

SDG 1612063: For Samples IDW-1, MW-23, and MW-C, the naphthalene results were E-flagged by the laboratory indicating that the concentrations exceeded the calibration range of the instrument. These results were estimated (J-20).

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and laboratory and field duplicate relative percent difference values.

The laboratory has flagged results with a "Q" to denote that continuing calibration control criteria were not met. Because evaluation of calibration is not part of a level 2A validation and there was insufficient detail in the laboratory report to assess the impact of the outliers, these flags were not carried through to the final qualifier field in the EDD.

Results were estimated due to cooler temperatures and surrogate outliers. Other results were estimated because the concentrations exceeded the calibration range of the instrument.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
G-Logics, Inc. – Boeing Field Chevron
Gasoline Range Organics - Method NWTPH-Gx and Volatile Petroleum Hydrocarbons by NWVPH

This report documents the review of analytical data from the analyses of soil, sediment, catch basin, and groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Fremont Analytical, Inc., Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1610356	26 soil samples 4 soil samples for VPH	Stage 2A
1610374	15 soil samples	
1610395	12 soil samples	
1610416	9 soil samples	
1610417	2 sediment samples 4 groundwater samples	
1611186	10 soil samples	
1611204	19 soil samples	
1611227	10 soil samples	
1611301	19 groundwater samples	
1612063	8 groundwater samples	

DATA PACKAGE COMPLETENESS

With the exception noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG 1610417: The laboratory inadvertently omitted analysis of percent moisture and subsequently correcting the sediment sample results for sample moisture content. The laboratory was contacted and completed the moisture determination and resubmitted an updated report and EDD with moisture corrected sediment sample results.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (10% verification) by comparing the EDD to the laboratory data package.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

2	Sample Receipt, Preservation, and Holding Times	✓	Laboratory Duplicates
✓	Laboratory Blanks	1	Field Duplicates
1	Field Blanks	✓	Target Analyte List
1	Surrogate Compounds	✓	Reporting Limits
✓	Laboratory Control Samples (LCS)	✓	Reported Results
2	Matrix Spikes/Matrix Spike Duplicates (MS/MSD)		

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed.
1 Quality control results are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

As stated in the validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 0°C-6°C and samples must be analyzed within 14 days. For volatiles analysis, no action is taken if the cooler temperature is <10°C. If the cooler temperature is >10°C, associated sample results are estimated (J/UJ-1). The following exceptions were noted during validation:

SDG 1610356: The laboratory received two coolers at 8.8°C and 12.8 °C; both temperatures were greater than the upper control limit. Positive results and/or detection limits were estimated (J/UJ-1).

SDG 1610374, 1610395, 1610416, 1610417, 1611186, and 1611227: The laboratory received the sample coolers with temperatures greater than the upper control limit of 6°C. The coolers were received within several hours after the samples were collected preventing sufficient time for cooling; no results qualified.

SDG 1611301: The laboratory received two coolers at 7.3°C and 9.1°C; both temperatures were greater than the upper control limit. Cooler temperatures were less than 10°C; no results were qualified.

SDG 1611204: Sample GLP-19-30 was analyzed past the 14-day holding time on the 20th day; the GRO result was estimated (UJ-1).

SDG 1611227: Sample GLP-17-5 was analyzed past the 14-day holding time on the 17th day; the result was estimated (UJ-1).

Field Blanks

Although trip blanks were shipped to the field and accompanied samples from the field to the laboratory, analyses of these trip blank samples was not requested, therefore data were not generated.

Field blanks were not submitted with this sampling event.

Surrogate Compounds

The surrogate compounds 4-bromofluorobenzene and toluene-d8, were added to all field and batch QC samples. When one or more surrogate %R values are below the control limits and indicate a potential low bias, associated results for the affected fraction are estimated (J/UJ-13L). When one or more surrogate %R values are greater than the control limit and indicate a potential high bias, only the positive results for a sample are estimated (J-13H). With the exception noted below, all surrogate spike recoveries were within the laboratory control limits.

SDG 1611186: The %R for surrogate compound 4-bromofluorobenzene, was less than the lower control limit in LCS-15503; the sample was a QC sample, therefore, no results qualified.

Matrix Spike/Matrix Spike Duplicates

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed at the appropriate frequency. No action is taken unless both the MS and MSD %R values are outside the control limits for MS/MSD %R outliers. Precision is evaluated using the RPD values calculated between the MS and MSD results. Any RPD values outside the control limits indicate uncertainty in the measured results for the sample. Qualifiers were only issued to the parent sample.

When the MS/MSD %R values indicate a potential low bias, associated results are estimated (J/UJ-8). Only the associated positive results are estimated (J-8) if the %R values indicate a potential high bias. Associated positive results are estimated (J-9) if the RPD values indicate uncertainty.

SDG 1610356: The MS/MSD for the NWVPH analyses were performed using Sample GLB-16-20161024-16. The %R values for both the MS and MSD for aromatic hydrocarbon (C12-C13) were less than the lower control limit indicating a potential low bias. This analyte was estimated (UJ-8L) in the parent sample.

Field Duplicates

For soil samples, the RPD control limit is 35% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL.

SDG 1611186: Samples MW-26D-16.5 and MW-Z-16.5 were identified as field duplicates. No positive results were detected in the samples. Field precision was acceptable.

SDG 1611204: Samples GLB-19-18 & GLB-X and MW-28D-20 & MW-Y were identified as field duplicate sets. No positive results were detected in the samples. Field precision was acceptable.

SDG 1611227: Samples MW-27D-20 & MW-V and GLB-17-23 & MW-W were identified as field duplicate sets. No positive results were detected in the samples. Field precision was acceptable.

Target Analyte List

The QAPP/SAP did not specify a target analyte list.

Reported Results

SDG 1611301: The laboratory flagged the gasoline results for Samples MW 14 and MW A with an "E" indicating the reported concentration values are above the calibration range. These results have been estimated (J-20).

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. With the exceptions noted above, accuracy was acceptable as demonstrated by the surrogate, LCS/LCSD, and MS/MSD recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and laboratory and field duplicate RPD values.

Data were estimated due to cooler temperature outliers and a matrix spike recovery outlier. Data were also estimated because the results exceeded the calibrated range of the instrument.

All data, as qualified, are acceptable for use.

DATA VALIDATION REPORT
G-Logics, Inc. – Boeing Field Chevron
Diesel Range Organics - Method NWTPH-Dx

This report documents the review of analytical data from the analyses of soil, sediment, catch basin, and groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Fremont Analytical Inc., Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1610356	26 soil samples	Stage 2A
1610374	15 soil samples	
1610395	12 soil samples	
1610416	9 soil samples	
1610417	2 sediment and 4 ground water samples	
1611186	10 soil samples	
1611204	17 soil samples	
1611227	10 soil samples	
1611301	19 ground water samples	
1612063	8 ground water samples	

DATA PACKAGE COMPLETENESS

With the exception noted below, the laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

SDG 1610417: The laboratory inadvertently omitted analysis of percent moisture and subsequently correcting the sediment sample results for sample moisture content. The laboratory was contacted and completed the moisture determination and resubmitted an updated report and EDD with moisture corrected sediment sample results.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (10% verification) by comparing the EDD to the laboratory data package.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times	✓	Laboratory Duplicates
✓	Laboratory Blanks	1	Field Duplicates
1	Field Blanks	1	Target Analyte List
✓	Surrogate Compounds	1	Reporting Limits
✓	Laboratory Control Samples (LCS)	✓	Reported Results
✓	Matrix Spikes/Matrix Spike Duplicates		

✓*Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed*
1 *Quality control outliers are discussed below, but no data were qualified.*
2 *Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.*

Sample Preservation and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 0°C - 6°C and be extracted within 7 days for aqueous samples and 14 days for soil samples. Sample extracts must be analyzed within 40 days of extraction. The following exceptions were noted during validation:

SDGs 1610356 and 1611301: The laboratory received the coolers at temperatures greater than the upper control limit of 6°C at temperatures between 7.3°C and 12.8°C. Diesel and heavy oil are stable at these temperatures; no results qualified.

SDGs 1610374, 1610395, 1610416, 1610417, 1611186, 1611227, and 1612063: The laboratory received the sample coolers with temperatures greater than the upper control limit of 6°C. The coolers were received within several hours after the samples were collected preventing sufficient time for cooling; no results qualified.

Field Blanks

No field blanks were submitted with this sampling event.

Field Duplicates

For soil samples, the RPD control limit is 50% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL.

SDG 1611186: One set of field duplicates was submitted with this SDG: MW-26D-16.5 & MW-Z-16. No positive results were detected in the samples. Field precision was acceptable.

SDG 1611204: Two sets of field duplicates was submitted with this SDG: GLB-19-18 & GLB-X and MW-28D-20 & MW-Y. No positive results were detected in the samples. Field precision was acceptable.

SDG 1611227: Two sets of field duplicates was submitted with this SDG: MW-27D-20 & MW-V and GLB-17-23 & MW-W. No positive results were detected in the samples. Field precision was acceptable.

Target Analyte List

The QAPP/SAP did not specify a target analyte list.

Reporting Limits

The target reporting limits for samples were adjusted for sample size and moisture content. No data were qualified.

Reported Results

No anomalies were noted during validation for evaluated results.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD percent recovery values. Precision was also acceptable as demonstrated by the LCS/LCSD, MS/MSD, and laboratory and field duplicate relative percent difference values.

No data were qualified for any reason.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
G-Logics, Inc. – Boeing Field Chevron
Ethylene dibromide by SW8011

This report documents the review of analytical data from the analyses of groundwater samples and the associated laboratory (QC) samples. Samples were analyzed by Fremont Analytical Inc., Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	NUMBER OF SAMPLES	VALIDATION LEVEL
1611301	19 ground water samples	Stage 2A
1612063	6 ground water samples	

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (10% verification) by comparing the EDD to the laboratory data package.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Preservation and Holding Times	1	Field Duplicates
✓	Laboratory Blanks	✓	Laboratory Duplicates
1	Field Blanks	✓	Target Analyte List
✓	Surrogate Compounds	1	Reporting Limits
✓	Laboratory Control Samples (LCS)	✓	Reported Results
✓	Matrix Spike/Matrix Spike Duplicates		

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed
1 Quality control outliers are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Preservation and Holding Times

As stated in validation guidance documents, sample shipping coolers should arrive at the laboratory within the advisory temperature range of 0°C - 6°C and be extracted within 7 days for aqueous samples and 14 days for soil samples. The following exceptions were noted during validation:

SDG 1611301: The laboratory received two coolers at 7.3°C and 9.1°C; both temperatures were greater than the upper control limit. Ethylene dibromide is stable at temperatures above the control limits; no results qualified.

SDG 1612063: The laboratory received the coolers with temperatures greater than the upper control limit. The coolers were received less than 24 hours after the samples were collected; no results qualified.

Field Blanks

No field blanks were submitted with this sampling event.

Field Duplicates

No field duplicates were submitted with this sampling event.

Target Analyte List

The QAPP/SAP did not specify a target analyte list.

Reported Results

No anomalies were noted during validation for evaluated results.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the surrogate, laboratory control sample, and matrix spike percent recovery values. Precision was also acceptable as demonstrated by the laboratory control sample and laboratory duplicate relative percent difference values.

All data, as reported, are acceptable for use.

DATA VALIDATION REPORT
G-Logics, Inc. – Boeing Field Chevron
Total Metals - Method SW6020A
Total & Dissolved Metals - Method EPA 200.8

This report documents the review of analytical data from the analyses of soil and groundwater samples and the associated laboratory and field quality control (QC) samples. Samples were analyzed by Fremont Analytical, Inc., Seattle, Washington. Refer to the Sample Index for a complete list of samples.

SDG	Number of Samples	Validation Level
1610356	15 Soil	Stage 2A
1610395	4 Soil	
1611186	9 Soil	
1611227	4 Soil	
1611301	19 Groundwater (Total & Diss)	
1612063	8 Groundwater (Total & Diss)	

DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

EDD TO HARDCOPY VERIFICATION

All sample IDs and results reported in the electronic data deliverable (EDD) were verified (10% verification) by comparing the EDD to the laboratory data package.

TECHNICAL DATA VALIDATION

The QC requirements that were reviewed are listed below.

1	Sample Receipt, Preservation, and Holding Times	2	Laboratory Duplicates
✓	Laboratory Blanks	1	Field Duplicates
1	Field Blanks	1	Reporting Limits
✓	Laboratory Control Samples (LCS)	✓	Reported Results
✓	Matrix Spikes (MS) and Matrix Spike Duplicates (MSD)		

✓ Stated method quality objectives (MQO) and QC criteria have been met. No outliers are noted or discussed
1 Quality control outliers are discussed below, but no data were qualified.
2 Quality control outliers that impact the reported data were noted. Data qualifiers were issued as discussed below.

Sample Receipt, Preservation, and Holding Times

The validation guidance documents state that the cooler temperatures should be within an advisory temperature range of 0°C - 6°C. With the exceptions noted below, the laboratory received the sample coolers within the advisory temperature range.

SDG 1610356: The sample cooler temperature was greater than the upper control limit at 12.8°C. This outlier did not impact data quality; no data were qualified.

Sample GLB-FD-102416-1 has an identification (ID) on the chain-of-custody (COC) of GLB-FD-20161024-1.

SDGs 1610395, 1611186, 1611227, 1611301, and 1612063: The laboratory received the sample coolers with temperatures greater than the upper control limit of 6°C. The coolers were received within several hours after the samples were collected preventing sufficient time for cooling; no results qualified.

Laboratory Blanks

A method blank was analyzed at the required frequency of one per batch of 20 or fewer samples. Target analytes were not detected in the laboratory blanks.

Field Blanks

No field blanks were included with this analytical data set.

Laboratory Control Samples

Laboratory control samples (LCS) were analyzed at the required frequency of one per batch of 20 or fewer samples. All spike recoveries were within the laboratory control limits.

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate (MS/MSD) samples were analyzed at the appropriate frequency. All spike recoveries were within the laboratory control limits.

Laboratory Duplicates

For laboratory duplicate samples, the RPD control limit is 20% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than the RL for aqueous samples and less than 2 times the RL for soil samples.

SDGs 1610356 and 1610395: Sample GLB-12-20161021-6 was analyzed as the laboratory duplicate. The RPD value for lead was greater than the control limit at 51%. All associated samples in the digestion batch were estimated (J-9).

Field Duplicates

For soil samples, the RPD control limit is 35% for results greater than 5x the reporting limit (RL). For

results less than 5x the RL, the absolute difference between the sample and replicate must be less than 2x the RL.

For water samples, the RPD control limit is 25% for results greater than 5x the reporting limit (RL). For results less than 5x the RL, the absolute difference between the sample and replicate must be less than the RL.

SDG 1611186: Samples MW-26D-16.5 and MW-Z-16.5 were identified as field duplicates. All RPD values were within acceptance criteria.

SDG 1611227: Samples MW-27D-20 and MW-V were identified as field duplicates. All RPD values were within acceptance criteria.

Reporting Limits

Several samples were diluted due to interferences or other factors and the reporting limits were raised.

Reported Results

No anomalies were noted during validation for evaluated results.

OVERALL ASSESSMENT

As determined by this evaluation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the laboratory control sample and matrix spike %R values. With the exceptions noted previously, precision was acceptable as demonstrated by the matrix spike and laboratory and field duplicate RPD values.

Results were estimated based on laboratory duplicate precision outliers.

All data, as qualified, are acceptable for use.

ECOCHEM
Data Quality

APPENDIX A

DATA QUALIFIER DEFINITIONS
REASON CODES
AND CRITERIA TABLES

DATA VALIDATION QUALIFIER CODES
Based on National Functional Guidelines

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

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.
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents the 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.

The following is an EcoChem qualifier that may also be assigned during the data review process:

DNR	Do not report; a more appropriate result is reported from another analysis or dilution.

DATA QUALIFIER REASON CODES

Group	Code	Reason for Qualification
Sample Handling	1	Improper Sample Handling or Sample Preservation (i.e., headspace, cooler temperature, pH, summa canister pressure); Exceeded Holding Times
Instrument Performance	24	Instrument Performance (i.e., tune, resolution, retention time window, endrin breakdown, lock-mass)
	5A	Initial Calibration (RF, %RSD, r^2)
	5B	Calibration Verification (CCV, CCAL; RF, %D, %R) Use bias flags (H,L)[1] where appropriate
	5C	Initial Calibration Verification (ICV %D, %R) Use bias flags (H,L)[1] where appropriate
Blank Contamination	6	Field Blank Contamination (Equipment Rinsate, Trip Blank, etc.)
	7	Lab Blank Contamination (i.e., method blank, instrument blank, etc.) Use low bias flag (L)[1] for negative instrument blanks
Precision and Accuracy	8	Matrix Spike (MS and/or MSD) Recoveries Use bias flags (H,L)[1] where appropriate
	9	Precision (all replicates: LCS/LCSD, MS/MSD, Lab Replicate, Field Replicate)
	10	Laboratory Control Sample Recoveries (a.k.a. Blank Spikes) Use bias flags (H,L)[1] where appropriate
	12	Reference Material Use bias flags (H,L)[1] where appropriate
	13	Surrogate Spike Recoveries (a.k.a. labeled compounds, recovery standards) Use bias flags (H,L)[1] where appropriate
Interferences	16	ICP/ICP-MS Serial Dilution Percent Difference
	17	ICP/ICP-MS Interference Check Standard Recovery Use bias flags (H,L)[1] where appropriate
	19	Internal Standard Performance (i.e., area, retention time, recovery)
	22	Elevated Detection Limit due to Interference (i.e., chemical and/or matrix)
	23	Bias from Matrix Interference (i.e. diphenyl ether, PCB/pesticides)
Identification and Quantitation	2	Chromatographic pattern in sample does not match pattern of calibration standard
	3	2nd column confirmation (RPD or %D)
	4	Tentatively Identified Compound (TIC) (associated with NJ only)
	20	Calibration Range or Linear Range Exceeded
	25	Compound Identification (i.e., ion ratio, retention time, relative abundance, etc.)
Miscellaneous	11	A more appropriate result is reported (multiple reported analyses i.e., dilutions, re-extractions, etc. Associated with "R" and "DNR" only)
	14	Other (See DV report for details)
	26	Method QC information not provided

[1] H = high bias indicated
L = low bias indicated

Volatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8260C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	4°C±2°C Aqueous: HCl to pH < 2 Current SW846 criterion is ≤ 6° C [3]	NFG [1] Method [3]	**If required by project:** J (pos)/UJ (ND) if greater than 6° C	1	Use **PJ** for temp outliers; see **TM20** if pH ≤ 2, reject 2-chloroethyl vinyl ether (R-1) some projects may require methanol preserved soils/seds
Holding Time	**Aqueous:** 14 days preserved 7 Days: unpreserved **Solid:** 14 Days	NFG [1] Method [3]	J (pos)/UJ (ND) if HT exceeded J (pos)/R (ND) if gross exceedance (> 2x HT)	1	Gross exceedance = > 2x HT, as per 1999 NFG
Instrument Performance					
Tuning	BFB Beginning of each 12 hour period Use method or project acceptance criteria	NFG [1] Method [3]	R (pos/ND) all analytes in all samples associated with the tune	24	
Initial Calibration **Sensitivity**	Minimum 5 standards RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders * RRF ≥ 0.005 1,4-dioxane	NFG [1] Method [3]	Use **PJ** to qualify J (pos)/UJ (ND)	5A	**TM-06** EcoChem Policy for the Evaluation and Qualification of GCMS Instrument Performance **PJ** - no action if response is stable (ICAL RSD and CCAL %D acceptable)
Initial Calibration **Stability**	%RSD ≤ 20% except: %RSD ≤ 40% poor responders * %RSD ≤ 50% 1,4-dioxane	NFG [1] Method [3]	J (pos) if %RSD > limit	5A	
Initial Calibration Verification	Second source analyzed immediately after ICAL %R 70% - 130%	Method [3]	J (pos) %R > UCL J (pos)/UJ (ND) %R < LCL	5A (H,L)[4]	QAPP may have overriding accuracy limits.
Continuing Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders * RRF ≥ 0.005 1,4-dioxane	NFG [1] Method [3]	Use **PJ** to qualify J (pos)/UJ (ND)	5B	see ICAL RRF guidance
Continuing Calibration **Stability**	%D ≤ 25% except: %D ≤ 40% poor responders * %D ≤ 50% 1,4-dioxane	NFG [1] Method [3]	J (pos) - %D > control limit (high bias) J (pos)/UJ (ND) - %D < -control limit (low bias)	5B (H,L)[4]	

Volatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8260C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch (of ≤ 20 samples) No detected compounds > MDL	NFG (2) Method (3)	U (pos) if result is < 5X or 10X action level	7	10X action level for methylene chloride, acetone, & 2-butanone. 5X for all other target analytes **Hierarchy of blank review:** **#1 - Review MB, qualify as needed** **#2 - Review TB, qualify as needed** **#3 - Review FB, qualify as needed** **Note: Actions as per NFG 1999**
	No TICs present		R (pos) TICs using 10X rule		
Trip Blank (TB)	No detected compounds > MDL	NFG (2) Method (3)	U (pos) if result is < 5X or 10X action level	6	
Field Blank (FB)	No detected compounds > MDL	NFG (2) Method (3)	U (pos) if result is < 5X or 10X action level	6	
Precision and Accuracy					
LCS/LCSD (recovery)	One per matrix per batch (of ≤ 20 samples) LCSD not required by NFG or method Use method acceptance criteria/laboratory limits	Method (3)	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND)%R < 10%	10 (H,L)[4]	No action if only one spike %R is outside criteria when LCSD is analyzed, unless one recovery is <10%. QAPP may have overriding accuracy limits.
LCS/LCSD RPD	If LCSD analyzed RPD < lab limits	Method (3)	J (pos)	9	Qualify all associated samples. QAPP may have overriding precision limits.
Reference Material (RM, SRM, or CRM)	Result ±20% of the 95% confidence interval of the true value for analytes	EcoChem standard policy	J (pos)/UJ (ND) if < LCL J (pos) if > UCL	12 (H,L)[4]	QAPP may have overriding accuracy limits. Some manufacturers may have different RM control limits
Surrogates	Added to all samples Within method/laboratory control limits	NFG (1) Method (3)	J (pos) if %R >UCL J (pos)/UJ (ND) if %R <LCL J (pos)/R (ND) if <10%	13 (H,L)[4]	No action if there are 4+ surrogates and only 1 outlier Qualify all compounds if qualification is required.
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	NFG (1) Method (3)	J (pos) if > 200% J (pos)/UJ (ND) if < 50% J (pos)/R (ND) if < 25% if RT >30 seconds use **PJ**	19	Qualify compounds quantified using particular internal standard

Volatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8260C)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy (continued)					
MS/MSD (recovery)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG [1] Method [3]	J (pos) %R > UCL J (pos)/UJ (ND) if both %R < LCL J (pos)/R (ND) if both %R < 10% J (pos)/UJ (ND) if one > UCL & one < LCL, with no bias	8 (H,L)[4]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only.
MS/MSD (RPD)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG [1] Method [3]	J (pos) If RPD > control limit	9	Qualify parent sample only
Field Duplicates	**Solids:** RPD < 50% OR difference < 2X RL (for results < 5X RL) **Aqueous:** RPD < 35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	Use project limits if specified
Compound Identification and Quantitation					
Retention Time Relative Ion Intensities	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	NFG [1] Method [3]	U (pos) if identification criteria not met	25	
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NFG [1] Method [3]	NJ TIC R (pos) if common laboratory contaminants	4	Common laboratory contaminants: aldol condensation products, solvent preservatives, and reagent contaminants
Calibration Range	Results greater than highest calibration standard	EcoChem standard policy	Qualify J (pos)	20	If result from dilution analysis is not reported.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	EcoChem standard policy	Use "DNR" to flag results that will not be reported.	11	**TM-04** EcoChem Policy for Rejection/Selection Process for Multiple Results

[1] National Functional Guidelines for Organic Data Review, June, 2008
[2] National Functional Guidelines for Organic Data Review, Oct, 1999
[3] Method SW846 8260C Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)
[4] NFG 2013 suggests using "+ / -" to indicate bias; EcoChem has chosen "H" = high bias indicated; "L" = low bias indicated.

(pos): Positive Result
(ND): Non-detect

* "Poor responder" compounds: Acetone, 2-butanone, carbon disulfide, chloroethane, chloromethane, cyclohexane, 1,2-dibromoethane, dichlorodifluoromethane, cis-1,2-dichloroethene, 1,2-dichloropropane, 1,2-dibromo-3-chloropropane, 2-hexanone, isopropylbenzene, methyl acetate, methylene chloride, methylcyclohexane, 4-methyl-2-pentanone, methyl tert-butyl ether, trans-1,2-dichloroethene, trichlorofluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane **criterion is 0.010 RRF;** 1,4-dioxane RRF **criterion is 0.005**.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler/Storage Temperature Preservation	4°C±2°C sediment/tissues may require storage at -20°C	NFG (1) Method (3)	**If required by project:** J (pos)/UJ (ND) if greater than 6° C	1	Use **PJ** for temp outliers; see **TM20** Current SW846 criterion is ≤ 6° C (3)
Holding Time	**Extraction Aqueous:** 7 days from collection **Extraction Solid:** 14 days from collection **Analysis (all matrices)**: 40 days from extraction Holding time may be extended to 1 year for frozen sediments/tissues	NFG (1) Method (3)	J (pos)/UJ (ND) if HT exceeded J (pos)/R (ND) if gross exceedance (> 2x HT)	1	Gross exceedance = > 2x HT, as per 1999 NFG
Instrument Performance					
Tuning	DFTPP Beginning of each 12 hour period Use method or project acceptance criteria	NFG (1) Method (3)	R (pos/ND) all analytes in all samples associated with the tune	24	
Initial Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders *	NFG (1) Method (3)	Use **PJ** to qualify J (pos)/UJ (ND)	5A	**TM-06** EcoChem Policy for the Evaluation and Qualification of GCMS Instrument Performance **PJ** - no action if response is stable (ICAL RSD and CCAL %D acceptable)
Initial Calibration **Stability**	Minimum 5 standards %RSD ≤ 20.0% except: %RSD ≤ 40.0% poor responders * **or** co-efficient of determination (r^2) > 0.99	NFG (1) Method (3)	J (pos) if %RSD > limit **or** r^2 value <0.99	5A	
Initial Calibration Verification Check	Prepared from second source; analyze after each ICAL Percent recovery limits = 70-130%	Method (3)	J (pos) %R > UCL J (pos)/UJ (ND) %R < LCL	5A (H,L)[4]	QAPP may have overriding accuracy limits.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Instrument Performance (continued)					
Continuing Calibration **Sensitivity**	RRF ≥ 0.05 except: RRF ≥ 0.01 poor responders *	NFG [1] Method [3]	Use **PJ** to qualify J (pos)/UJ (ND)	5B	see ICAL RRF guidance
Continuing Calibration **Stability**	Prior to sample analysis and every 12 hours %D ≤ 25% except: %D ≤ 40.0% poor responders *	NFG [1] Method [3]	J (pos) - %D > control limit (high bias) J (pos)/UJ (ND) - %D < -control limit (low bias)	5B (H,L)[4]	
Blank Contamination					
Method Blank (MB)	MB: One per matrix per batch of (of ≤ 20 samples) No detected compounds > MDL	NFG [2] Method [3]	U(pos) if result is < 5X or 10X action level	7	10X action level applies to phthalates only. 5X for all other target analytes **Hierarchy of blank review:** **#1 - Review MB, qualify as needed** **#2 - Review FB , qualify as needed** **Note: Actions as per 1999 NFG**
	No TICs present		R (pos) TICs using 10X rule	7	
Field Blank (FB)	No detected compounds > MDL	NFG [2] Method [3]	U (pos) if result is < 5X or 10X action level	6	
Precision and Accuracy					
LCS/LCSD (recovery)	One per matrix per batch (of ≤ 20 samples) LCSD not required by NFG or method Use method acceptance criteria/laboratory limits	Method [3]	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND)%R < 10%	10 (H,L)[4]	No action if only one spike %R is outside criteria when LCSD is analyzed, unless one recovery is <10%. QAPP may have overriding accuracy limits. Qualify all associated samples.
LCS/LCSD (RPD)	If LCSD analyzed RPD < lab limits	Method [3]	J (pos)	9	Qualify all associated samples. QAPP may have overriding precision limits.

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy (continued)					
Reference Material (RM, SRM, or CRM)	Result ±20% of the 95% confidence interval of the true value for analytes	EcoChem standard policy	J (pos)/UJ (ND) if < LCL J (pos) if > UCL	12 (H,L)[4]	QAPP may have overriding accuracy limits. Some manufacturers have different RM control limits
MS/MSD (recovery)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (3)	J (pos) %R > UCL J (pos)/UJ (ND) if both %R < LCL J (pos)/R (ND) if both %R < 10% J (pos)/UJ (ND) if one > UCL & one < LCL, with no bias	8 (H,L)[4]	No action if only one spike %R is outside criteria. No action if parent concentration is >4x the amount spiked. Qualify parent sample only.
MS/MSD (RPD)	One per matrix per batch (of ≤ 20 samples) Use method acceptance criteria/laboratory limits	NFG (1) Method (2)	J (pos) in parent sample if RPD > CL	9	Qualify parent sample only
Surrogates	Minimum of 3 acid & 3 base/neutral (B/N) compounds added to all samples Within method control limits	NFG (1) Method (3)	J (pos) if %R > UCL J (pos)/UJ (ND) if %R < LCL J (pos)/R (ND) if %R < 10%	13 (H,L)[4]	Qualify all compounds in associated fraction. Do not qualify if only 1 acid and/or 1 B/N surrogate is out, unless <10%. If 1 surrogate outlier < 10% then J (pos)/R (ND)
Internal Standards	Added to all samples Acceptable Range: IS area 50% to 200% of CCAL area RT within 30 seconds of CC RT	NFG (1) Method (3)	J (pos) if > 200% J (pos)/UJ (ND) if < 50% J (pos)/R (ND) if < 25% if RT >30 seconds use **PJ**	19	Qualify compounds quantified using particular internal standard
Field Duplicates	**Solids:** RPD < 50% OR difference < 2X RL (for results < 5X RL) **Aqueous:** RPD < 35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	J (pos)/UJ (ND) Qualify only parent and field duplicate samples	9	Use project limits if specified

Semivolatile Organic Compounds by Gas Chromatography-Mass Spectroscopy (GC-MS)
(Based on NFG 1999 & 2008 and SW-846 Method 8270D)

QC Element	Acceptance Criteria	Source of Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound Identification and Quantitation and Calculation					
Retention times and relative ion intensities	RRT within 0.06 of standard RRT Ion relative intensity within 20% of standard All ions in std. at > 10% intensity must be present in sample	NFG [(1)] Method [(3)]	U (pos) if identification criteria not met	25	
TICs	Major ions (>10%) in reference must be present in sample; intensities agree within 20%; check identification	NFG [(1)] Method [(3)]	NJ the TIC unless: R (pos) common laboratory contaminants	4	
Calibration Range	Results greater than highest calibration standard	EcoChem standard policy	Qualify J (pos)	20	If result from dilution analysis is not reported.
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	EcoChem standard policy	Use "DNR" to flag results that will not be reported.	11	**TM-04** EcoChem Policy for Rejection/Selection Process for Multiple Results

[1] National Functional Guidelines for Organic Data Review, June, 2008
[2] National Functional Guidelines for Organic Data Review, October, 1999
[3] Method SW846 8270D Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, February 2007.
[4] NFG 2013 suggests using "+ / -" to indicate bias; EcoChem has chosen "H" = high bias indicated; "L" = low bias indicated.

(pos): Positive Result(s)
(ND): Non-detects

* "Poor responder" compounds: acetophenone, atrazine, benzaldehyde, 1,1'-biphenyl, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, caprolactam, carbazole, 4-chloroaniline, diethylphthalate, di-n-butylphthalate, 3-3'-dichlorobenzidine, dimethylphthalate, 2,4-dinitrophenol, 4,6-dinitro-2-methylphenol, di-n-octylphthalate, hexachlorobutadiene, hexachlorocyclopentadiene, 2-nitroaniline, 3-nitroaniline, 4-nitroaniline, 4-nitrophenol, N-nitrosodiphenylamine, 2,2'-oxybis-(1-chloropropane), 1,2,4,5-tetrachlorobenzene use a 0.010 RRF criterion.

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Gasoline Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Gx, June 1997, Wa DOE & Oregon DEQ)

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling				
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6°C	1	
Holding Time	Waters: 14 days preserved 7 days unpreserved Solids: 14 Days	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X	1	Professional Judgement
Instrument Performance				
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $r^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if r^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A	
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 80% to 120%	Narrate if frequency not met. J(+)/UJ(-) if %R < 80% J(+) if %R >120%	5B	
Blank Contamination				
Method Blank	At least one per batch (≤10 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7	
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7	
Trip Blank (if required by project)	No results >RL	Action is same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned.	18	
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in field blank after method **and** trip blank qualifiers are assigned.	6	

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Gasoline Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Gx, June 1997, Wa DOE & Oregon DEQ)

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy				
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked.	8	Use Professional Judgement if only one %R outlier
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9	
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10%	10	Professional Judgement
Surrogates	Bromofluorobenzene and/or 1,4-difluorobenzene added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R >UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits.	13	Professional Judgement
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2	
Field Duplicates	Use project control limits, if stated in QAPP **EcoChem default:** water: RPD < 35% solids: RPD < 50%	Narrate outliers **If required by project**, qualify with J(+)/UJ(-)	9	
Compound ID and Calculation				
Two analyses for one sample (e.g., dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported.	11	See EcoChem TM-04

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling				
Cooler Temperature & Preservation	4°C±2°C Water: HCl to pH < 2	J(+)/UJ(-) if greater than 6 deg. C	1	
Holding Time	Ext. Waters: 14 days preserved 7 days unpreserved Ext. Solids: 14 Days Analysis: 40 days from extraction	J(+)/UJ(-) if hold times exceeded J(+)/R(-) if exceeded > 3X	1	Professional Judgement
Instrument Performance				
Initial Calibration	5 calibration points (All within 15% of true value) Linear Regression: $r^2 \geq 0.990$ If used, RSD of response factors ≤20%	Narrate if fewer than 5 calibration levels or if %R >15% J(+)/UJ(-) if r^2 <0.990 J(+)/UJ(-) if %RSD > 20%	5A	
Mid-range Calibration Check Std.	Analyzed before and after each analysis shift & every 20 samples. Recovery range 85% to 115%	Narrate if frequency not met. J(+)/UJ(-) if %R < 85% J(+) if %R >115%	5B	
Blank Contamination				
Method Blank	At least one per batch (≤20 samples) No results >RL	U (at the RL) if sample result is < RL & < 5X blank result.	7	
		U (at reported sample value) if sample result is ≥ RL and < 5X blank result	7	
Field Blanks (if required by project)	No results > RL	Action is same as method blank for positive results remaining in the field blank after method blank qualifiers are assigned.	6	

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy				
MS samples (accuracy) (if required by project)	%R within lab control limits	Qualify parent only, unless other QC indicates systematic problems. J(+) if both %R > upper control limit (UCL) J(+)/UJ(-) if both %R < lower control limit (LCL) No action if parent conc. >5X the amount spiked.	8	Use Professional Judgement if only one %R outlier
Precision: MS/MSD or LCS/LCSD or sample/dup	At least one set per batch (≤10 samples) RPD ≤ lab control limit	J(+) if RPD > lab control limits	9	
LCS (not required by method)	%R within lab control limits	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10%	10	Professional Judgement
Surrogates	2-fluorobiphenyl, p-terphenyl, o-terphenyl, and/or pentacosane added to all samples (inc. QC samples). %R = 50-150%	J(+)/UJ(-) if %R < LCL J(+) if %R > UCL J(+)/R(-) if any %R <10% No action if 2 or more surrogates are used, and only one is outside control limits.	13	Professional Judgement
Pattern Identification	Compare sample chromatogram to standard chromatogram to ensure range and pattern are reasonable match. Laboratory may flag results which have poor match.	J(+)	2	
Field Duplicates	Use project control limits, if stated in QAPP **EcoChem default:** water: RPD < 35% solids: RPD < 50%	Narrate (Use Professional Judgement to qualify)	9	

EcoChem Validation Guidelines for Total Petroleum Hydrocarbons-Diesel & Residual Range

(Based on EPA National Functional Guidelines as applied to criteria in NWTPH-Dx, June 1997, Wa DOE & Oregon DEQ)

QC Element	Acceptance Criteria	Action for Non-Conformance	Reason Code	Discussion and Comments
Compound ID and Calculation				
Two analyses for one sample (dilution)	Report only one result per analyte	"DNR" (or client requested qualifier) all results that should not be reported.	11	See EcoChem TM-04

Metals by ICP-MS
(Based on Inorganic NFG 2010 and SW-846 6020A)

QC Element	EcoChem Acceptance Criteria	Source of Criteria	EcoChem Action for Non-Conformance	Reason Code	Discussion and Comments
Sample Handling					
Cooler / Storage Temperature Preservation	**Solid:** Cooler temperature 4°C±2°C **Aqueous:** Nitric Acid to pH < 2 **Dissolved Metals:** 0.45 µm filter, preserve to pH < 2 after filtration	NFG (1) Method (2)	Cooler Temps: **If required by project** J (pos)/UJ (ND) if greater than 6° C Aqueous: J (pos)/UJ (ND) if pH > 2	1	Use **PJ** to qualify for temperature outlier. Current SW846 criterion is ≤ 6° C (4) No quals for pH if samples preserved by lab immediately upon receipt and within 1 day of collection.
Holding Time	All matrices: 180 days from date sampled Frozen soils, sediments, tissues (-20°C) - HT extended to 1 year	NFG (1) Method (2) EcoChem standard policy	J (pos)/UJ (ND) if holding time exceeded	1	
Instrument Performance					
Tune	Analyzed prior to ICAL tunignsolution analyzed 5 times with Std. Dev. ≤ 5% Mass calibration < 0.1 amu difference from target mass Resolution < 0.9 amu @ 10% peak height	NFG (1) Method (2)	J(pos)/UJ(ND) if tune criteria not met	5A	Use **PJ** to evaluate tune. Alternate Resolution critteria may apply based on instrument specs (i.e <0.75 amu at 5% peak height)
Initial Calibration (ICAL)	Based on instrument requirements, blank + 1 standard minimum requirement for calibration If more than 1 standard used, r ≥ 0.995	NFG (1) Method (2)	J (pos)/UJ (ND) if r < 0.995	5A	
Initial Calibration Verification (ICV)	Independent source analyzed immediately after calibration %R within ± 10% of true value	NFG (1) Method (2)	R (pos/ND) if %R < 75% J (pos)/UJ (ND) if %R 75% - 89% J (pos) if %R >111%	5A (H,L)[3]	Qualify all samples in run
Reporting Limit (RL) Standard Low Level ICV/CCV	concentration at RL %R = 70%-130%	Method (2)	J (pos) < 2x RL / R (ND) if %R <50% J (pos) < 2x RL / UJ (ND) if %R 50 - 69% J (pos) < 2x RL if %R > 130%	5A (H,L)[3]	Qualify all samples in run

Metals by ICP-MS
(Based on Inorganic NFG 2010 and SW-846 6020A)

QC Element	EcoChem Acceptance Criteria	Source of Criteria	EcoChem Action for Non-Conformance	Reason Code	Discussion and Comments
Instrument Performance cont'd					
Continuing Calibration Verification (CCV)	Immediately following ICV/ICB, then every two hours or ten samples, and at end of run. %R within ± 10% of true value	NFG [1] Method [2]	R (pos/ND) if %R < 75% J (pos)/UJ (ND) if %R 75% - 89% J (pos) if %R >111%	5B (H,L)[3]	Qualify samples bracketed by CCV outliers
Interference Check Samples (ICSA / ICSAB)	ICSAB %R 80% - 120% for all spiked elements | ICSA | < MDL for all unspiked elements	NFG [1] Method [2]	For samples with Al, Ca, Fe, Mg > ICS levels: **ICSAB**: J(pos)/R (ND) if %R < 50% J (pos)/UJ (ND) if %R = 50% - 79% J (pos) if %R > 120% **ICSA:** J (pos)< 2x ICSA/UJ (ND) for ICSA <Neg MDL J (pos) < 2x ICSA for ICSA > MDL	17 (H,L)[3]	Use **PJ** and molecular interferences to evaluate ICSA to determine if bias is present. Refer to **TM-14** for additional information.
Blank Contamination					
Method Blank (MB)	One per matrix per batch of (of ≤ 20 samples) Blank conc < MDL	NFG [1] Method [2]	U (pos) if result is < 5X method blank concentration	7	Refer to **TM-02** for additional information. Blank Evaluation based on NFG 1994
Instrument Blanks (ICB/CCB)	After each ICV & CCV | blank concentration | < MDL	NFG [1] Method [2]	Action level is 5x absolute value of blank conc. For positive blanks: U (pos) results < action level For negative blanks: J (pos)/UJ (ND) results < action level	Pos Blks: 7 Neg Blks: 7L[3]	Use blanks bracketing samples for Qualification Refer to **TM-02** for additional information. **Hierarchy of blank review: #1 - Review MB, quaify as needed #2 - Review IB , qualify as needed #3 - Review FB , qualify as needed**
Field Blank (FB)	Blank conc < MDL	EcoChem standard policy	U (pos) if result is < 5x action level, as per analyte.	6	Qualify in associated field samples only. Refer to **TM-02** for additional information.

Metals by ICP-MS
(Based on Inorganic NFG 2010 and SW-846 6020A)

QC Element	EcoChem Acceptance Criteria	Source of Criteria	EcoChem Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy					
Internal Standards (IS)	Added to all samples. All analytes must be associated with an internal standard 60-125% of cal blank IS	NFG [1] Method [2]	J(pos)/UJ(ND) all analytes associated with IS outlier	19	6020A criteria - IS >70% of ICAL std
LCS (recovery)	One per matrix per batch (of ≤ 20 samples); LCSD not required %R between 80-120%	Method [2]	J (pos)/R (ND) if %R <50% J (pos)/UJ (ND) if %R 50% - 79% J (pos) if %R > 120%	10 (H,L)[3]	Qualify all samples in batch QAPP may have overriding accuracy limits. NFG Limits 70% -130%
LCS/LCSD (RPD)	LCSD not required, if analyzed: RPD ≤ 20%	Method [2]	J (pos)/UJ (ND) if RPD > 20%	9	Qualify all samples in batch QAPP may have overriding precision limits.
MS/MSD (recovery)	One per matrix per batch (of ≤ 20 samples); MSD not required %R between 75-125%	NFG [1] Method [2]	J (pos) if %R > 125% J (pos)/UJ (ND) if %R <75% J (pos)/R (ND) if %R < 30%, unless post digestion spike analyzed, J (pos)/UJ (ND) if post digestion spike %R OK	8 (H,L)[3]	No action if only one spike %R is outside criteria. NA if parent concentration >4x the amount spiked. Qualify all samples in batch. QAPP may have overriding accuracy limits.
Post Digestion Spikes	If MS is outside 75-125%, post-spike should be analyzed %R 80%-120% (method); 75%-125% (NFG)	NFG [1] Method [2]	Only used to support MS qualification decisions	NA	No qualifiers assigned based solely on this element.
MS/MSD (RPD)	MSD not required, if analyzed: RPD ≤ 20%	NFG [1] Method [2]	J (pos)/UJ (ND) if RPD > 20%	9	QAPP may have overriding precision limits.
Laboratory Duplicate	One per matrix per batch (of ≤ 20 samples) RPD ≤ 20% for results ≥ 5x RL Solids: difference < 2X RL for results < 5X RL Aqueous: difference < 1X RL for results < 5X RL	NFG [1] Method [2]	J (pos)/UJ (ND) if RPD > 20% or if difference > control limit	9	Qualify all samples in batch. QAPP may have overriding precision limits.

Metals by ICP-MS
(Based on Inorganic NFG 2010 and SW-846 6020A)

QC Element	EcoChem Acceptance Criteria	Source of Criteria	EcoChem Action for Non-Conformance	Reason Code	Discussion and Comments
Precision and Accuracy cont'd					
Reference Material (RM, SRM, or CRM)	Result ±20% of the 95% confidence interval of the true value for analytes	EcoChem standard policy	J (pos)/UJ (ND) if < LCL J (pos) if > UCL	12 (H,L)[3]	QAPP may have overriding accuracy limits. Some manufacturers may have different RM control limits
Serial Dilution	Analyze one sample per matrix at a 5x dilution %D <10% for original sample conc. > 50x MDL	NFG [(1)]	J(pos)/UJ(ND) if %D > 10% and native sample concentration > 50x MDL	16	Note serial dilutions for soil are reported in ug/L, but the MDL is in mg/kg. The units need to be adjusted. Qualify all samples in batch.
Field Duplicate	Solids: RPD <50% OR difference < 2X RL (for results < 5X RL) Aqueous: RPD <35% OR difference < 1X RL (for results < 5X RL)	EcoChem standard policy	Narrate and qualify if required by project **(EcoChem PJ)** Qualify only field duplicate samples J(pos)/UJ(ND)	9	QAPP may have overriding precision limits.
Compound Quantitation					
Total and Dissolved Comparison	Total > Dissolved	EcoChem standard policy	J (pos)/UJ (ND) if Dissolved > Total and results fall outside of standard duplicate precision criteria	14	
Calibration Range	Results < instrument linear range	NFG [(1)] Method [(2)]	if result exceeds linear range and sample was not diluted J (pos)	20	
Dilutions, Re-extractions and/or Reanalyses	Report only one result per analyte	EcoChem standard policy	Use "DNR" to flag results that will not be reported.	11	**TM-04** EcoChem Policy for Rejection/Selection Process for Multiple Results

[1] National Functional Guidelines for Inorganic Superfund Data Review, January 2010.
[2] Method SW846 6020A Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), Revision 1, February 2007.
[3] "H" = high bias indicated; "L" = low bias indicated
[4] SW846, Chapter 3, Inorganic Analytes

(pos): Positive Result
(ND): Not detected

ECOCHEM
Data Quality

APPENDIX B

QUALIFIED DATA SUMMARY TABLE

Qualified Data Summary Table
Boeing Field Chevron

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	1,2-Dichloroethane		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	Hexane		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW6020A	Total Lead	5.7	MG/KG		J	9
	GLB-12-20161021-6	1610356-004B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	EDC		MG/KG	Q	UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-10-20161024-30	1610356-015A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW6020A	Total Lead	3.77	MG/KG		J	9
	GLB-10-20161024-12	1610356-012B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1

Qualified Data Summary Table
Boeing Field Chevron

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-10-20161024-12	1610356-012B	SW8260C	EDC		MG/KG	Q	UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	Hexane		MG/KG	Q	UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-10-20161024-12	1610356-012A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-20	1610356-013B	NWTPH-GX	Gasoline	17.1	MG/KG		J	1
	GLB-10-20161024-20	1610356-013A	SW6020A	Total Lead	1.12	MG/KG		J	9
	GLB-10-20161024-20	1610356-013B	SW8260C	Ethylbenzene	0.596	MG/KG		J	1
	GLB-10-20161024-20	1610356-013B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-10-20161024-20	1610356-013B	SW8260C	EDC		MG/KG		UJ	1
	GLB-10-20161024-20	1610356-013B	SW8260C	Toluene	0.106	MG/KG		J	1
	GLB-10-20161024-20	1610356-013B	SW8260C	Hexane	0.0852	MG/KG		J	1
	GLB-10-20161024-20	1610356-013B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-10-20161024-20	1610356-013B	SW8260C	m,p-Xylene	3.46	MG/KG		J	1
	GLB-10-20161024-20	1610356-013B	SW8260C	Benzene	1.06	MG/KG		J	1
	GLB-10-20161024-20	1610356-013B	SW8260C	o-Xylene	0.0522	MG/KG		J	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1

Qualified Data Summary Table
Boeing Field Chevron

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-10-20161024-20	1610356-013A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	EDC		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	Hexane		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	m,p-Xylene	0.0294	MG/KG		J	1
	GLB-10-20161024-25	1610356-014B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-10-20161024-25	1610356-014A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	Hexane		MG/KG	Q	UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-12-20161021-6	1610356-004A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-10	1610356-016B	NWTPH-GX	Gasoline	3.43	MG/KG		J	1
	GLB-12-20161024-10	1610356-016A	SW6020A	Total Lead	11.1	MG/KG		J	9
	GLB-12-20161024-10	1610356-016B	SW8260C	Ethylbenzene		MG/KG		UJ	1

Qualified Data Summary Table
Boeing Field Chevron

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-12-20161024-10	1610356-016B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016B	SW8260C	EDC		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016B	SW8260C	Hexane	0.0527	MG/KG		J	1
	GLB-12-20161024-10	1610356-016B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016B	SW8260C	m,p-Xylene	0.0164	MG/KG		J	1
	GLB-12-20161024-10	1610356-016B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-15-20161024-18	1610356-032A	SW8270DSIM	Naphthalene	3080	UG/KG		J	1
	GLB-15-20161024-18	1610356-032A	SW8270DSIM	2-Methylnaphthalene	2160	UG/KG		J	1
	GLB-15-20161024-25	1610356-033B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-15-20161024-25	1610356-033A	SW6020A	Total Lead	0.898	MG/KG		J	9
	GLB-15-20161024-25	1610356-033B	SW8260C	Ethylbenzene	0.064	MG/KG		J	1
	GLB-15-20161024-25	1610356-033B	SW8260C	Toluene	0.0613	MG/KG		J	1
	GLB-15-20161024-25	1610356-033B	SW8260C	Hexane	0.079	MG/KG	Q	J	1
	GLB-15-20161024-25	1610356-033B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-15-20161024-25	1610356-033B	SW8260C	m,p-Xylene	0.226	MG/KG		J	1
	GLB-15-20161024-25	1610356-033B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-15-20161024-25	1610356-033B	SW8260C	o-Xylene	0.0463	MG/KG		J	1
	GLB-15-20161024-25	1610356-033A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1,2L
	GLB-15-20161024-25	1610356-033A	SW8270DSIM	Naphthalene		UG/KG		UJ	1,2L
	GLB-15-20161024-25	1610356-033A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1,2L
	GLB-15-20161024-30	1610356-034B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Benzo(a)pyrene	71.5	UG/KG		J	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-12-20161024-10	1610356-016A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1

Qualified Data Summary Table
Boeing Field Chevron

SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-12-20161024-14	1610356-017B	SW8260C	EDC		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	Hexane		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	m,p-Xylene	0.0303	MG/KG		J	1
	GLB-12-20161024-14	1610356-017B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-12-20161024-14	1610356-017A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	EDC		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	Hexane		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-18	1610356-018A	SW8270DSIM	Naphthalene		UG/KG		UJ	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-12-20161024-18	1610356-018A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	EDC		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	Hexane		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-12-20161024-25	1610356-019A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	1,2-Dichloroethane		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	Hexane		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-12-20161024-30	1610356-020A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-14-20161024-12.5	1610356-024B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-14-20161024-17	1610356-025B	NWTPH-GX	Gasoline	216	MG/KG	D	J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aliphatic Hydrocarbon (C10-C12)	16.6	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aliphatic Hydrocarbon (C5-C6)	31.6	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aliphatic Hydrocarbon (C6-C8)	42	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aliphatic Hydrocarbon (C8-C10)	23.5	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aromatic Hydrocarbon (C10-C12)	27.4	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aromatic Hydrocarbon (C12-C13)	6.12	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	NWVPH	Aromatic Hydrocarbon (C8-C10)	88.6	MG/KG		J	1
	GLB-14-20161024-17	1610356-025A	SW6020A	Total Lead	2.09	MG/KG		J	9
	GLB-14-20161024-17	1610356-025B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-14-20161024-17	1610356-025B	SW8260C	EDC		MG/KG		UJ	1
	GLB-14-20161024-17	1610356-025B	SW8260C	Hexane	2.12	MG/KG		J	1
	GLB-14-20161024-17	1610356-025B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-14-20161024-17	1610356-025B	SW8260C	Ethylbenzene	5.76	MG/KG	D	J	1
	GLB-14-20161024-17	1610356-025B	SW8260C	Toluene	12.5	MG/KG	D	J	1
	GLB-14-20161024-17	1610356-025B	SW8260C	m,p-Xylene	24.5	MG/KG	D	J	1
	GLB-14-20161024-17	1610356-025B	SW8260C	Benzene	3.01	MG/KG	D	J	1
	GLB-14-20161024-17	1610356-025B	SW8260C	o-Xylene	7.15	MG/KG	D	J	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	1-Methylnaphthalene	94.9	UG/KG		J	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	Naphthalene	471	UG/KG		J	1
	GLB-14-20161024-17	1610356-025A	SW8270DSIM	2-Methylnaphthalene	213	UG/KG		J	1
	GLB-14-20161024-22	1610356-026B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW6020A	Total Lead	0.985	MG/KG		J	9
	GLB-14-20161024-22	1610356-026B	SW8260C	Ethylbenzene		MG/KG		UJ	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-14-20161024-22	1610356-026B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	EDC		MG/KG	Q	UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	Hexane		MG/KG	Q	UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-14-20161024-22	1610356-026A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-14-20161024-25	1610356-027B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-15-20161024-12	1610356-031B	NWTPH-GX	Gasoline	37.2	MG/KG		J	1
	GLB-15-20161024-12	1610356-031A	SW6020A	Total Lead	3.19	MG/KG		J	9
	GLB-15-20161024-12	1610356-031B	SW8260C	Ethylbenzene	0.673	MG/KG		J	1
	GLB-15-20161024-12	1610356-031B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-15-20161024-12	1610356-031B	SW8260C	1,2-Dichloroethane (EDC)		MG/KG		UJ	1
	GLB-15-20161024-12	1610356-031B	SW8260C	Toluene	0.106	MG/KG		J	1
	GLB-15-20161024-12	1610356-031B	SW8260C	Hexane	0.51	MG/KG		J	1
	GLB-15-20161024-12	1610356-031B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-15-20161024-12	1610356-031B	SW8260C	m,p-Xylene	1.67	MG/KG		J	1
	GLB-15-20161024-12	1610356-031B	SW8260C	Benzene	0.0735	MG/KG		J	1
	GLB-15-20161024-12	1610356-031B	SW8260C	o-Xylene	0.193	MG/KG		J	1
	GLB-15-20161024-12	1610356-031A	SW8270DSIM	1-Methylnaphthalene	126	UG/KG		J	1
	GLB-15-20161024-12	1610356-031A	SW8270DSIM	Naphthalene	408	UG/KG		J	1
	GLB-15-20161024-12	1610356-031A	SW8270DSIM	2-Methylnaphthalene	298	UG/KG		J	1
	GLB-15-20161024-18	1610356-032B	NWTPH-GX	Gasoline	3510	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	NWVPH	Aliphatic Hydrocarbon (C10-C12)	102	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	NWVPH	Aliphatic Hydrocarbon (C5-C6)	102	MG/KG	D	J	1

Qualified Data Summary Table
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-15-20161024-18	1610356-032B	NWVPH	Aliphatic Hydrocarbon (C6-C8)	222	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	NWVPH	Aliphatic Hydrocarbon (C8-C10)	100	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	NWVPH	Aromatic Hydrocarbon (C10-C12)	197	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	NWVPH	Aromatic Hydrocarbon (C8-C10)	526	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	NWVPH	Aromatic Hydrocarbon (C12-C13)	32.6	MG/KG		J	1
	GLB-15-20161024-18	1610356-032A	SW6020A	Total Lead	2.51	MG/KG		J	9
	GLB-15-20161024-18	1610356-032B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-15-20161024-18	1610356-032B	SW8260C	1,2-Dichloroethane		MG/KG		UJ	1
	GLB-15-20161024-18	1610356-032B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-15-20161024-18	1610356-032B	SW8260C	Ethylbenzene	59.1	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	SW8260C	Toluene	312	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	SW8260C	Hexane	68.6	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	SW8260C	m,p-Xylene	238	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	SW8260C	Benzene	32.5	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032B	SW8260C	o-Xylene	89	MG/KG	D	J	1
	GLB-15-20161024-18	1610356-032A	SW8270DSIM	1-Methylnaphthalene	904	UG/KG		J	1
	GLB-15-20161024-9	1610356-030B	NWTPH-GX	Gasoline	70.8	MG/KG		J	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aliphatic Hydrocarbon (C10-C12)	5.11	MG/KG	H	J	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aliphatic Hydrocarbon (C5-C6)		MG/KG	H	UJ	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aliphatic Hydrocarbon (C6-C8)	3.47	MG/KG	H	J	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aliphatic Hydrocarbon (C8-C10)	5.1	MG/KG	H	J	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aromatic Hydrocarbon (C10-C12)	11	MG/KG	H	J	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aromatic Hydrocarbon (C12-C13)	3.93	MG/KG	H	J	1
	GLB-15-20161024-9	1610356-030B	NWVPH	Aromatic Hydrocarbon (C8-C10)	13.4	MG/KG	H	J	1
	GLB-15-20161024-9	1610356-030A	SW6020A	Total Lead	1.67	MG/KG		J	9
	GLB-15-20161024-9	1610356-030B	SW8260C	Ethylbenzene	1.38	MG/KG		J	1
	GLB-15-20161024-9	1610356-030B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-15-20161024-9	1610356-030B	SW8260C	EDC		MG/KG		UJ	1
	GLB-15-20161024-9	1610356-030B	SW8260C	Toluene	0.207	MG/KG		J	1
	GLB-15-20161024-9	1610356-030B	SW8260C	Hexane	0.124	MG/KG	Q	J	1
	GLB-15-20161024-9	1610356-030B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-15-20161024-9	1610356-030B	SW8260C	m,p-Xylene	4.98	MG/KG		J	1
	GLB-15-20161024-9	1610356-030B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-15-20161024-9	1610356-030B	SW8260C	o-Xylene	1.05	MG/KG		J	1
	GLB-15-20161024-9	1610356-030A	SW8270DSIM	1-Methylnaphthalene	178	UG/KG		J	1
	GLB-15-20161024-9	1610356-030A	SW8270DSIM	Naphthalene	210	UG/KG		J	1

Qualified Data Summary Table
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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-15-20161024-9	1610356-030A	SW8270DSIM	2-Methylnaphthalene	418	UG/KG		J	1
	GLB-16-102416-25	1610356-040B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-16-102416-25	1610356-040B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-16-102416-25	1610356-040B	SW8260C	Toluene	0.0537	MG/KG		J	1
	GLB-16-102416-25	1610356-040B	SW8260C	Hexane	0.0916	MG/KG		J	1
	GLB-16-102416-25	1610356-040B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-16-102416-25	1610356-040B	SW8260C	m,p-Xylene	0.0764	MG/KG		J	1
	GLB-16-102416-25	1610356-040B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-16-102416-25	1610356-040B	SW8260C	o-Xylene	0.0239	MG/KG		J	1
	GLB-16-102416-25	1610356-040A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-102416-25	1610356-040A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-16-102416-25	1610356-040A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-20161024-12	1610356-037B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037A	SW6020A	Total Lead	3.33	MG/KG		J	9
	GLB-16-20161024-12	1610356-037B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037B	SW8260C	Hexane		MG/KG	Q	UJ	1
	GLB-16-20161024-12	1610356-037B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-16-20161024-12	1610356-037A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-20161024-12	1610356-037A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-16-20161024-12	1610356-037A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-20161024-16	1610356-038B	NWTPH-GX	Gasoline	10.8	MG/KG		J	1
	GLB-16-20161024-16	1610356-038B	NWVPH	Aliphatic Hydrocarbon (C10-C12)		MG/KG	H	UJ	1
	GLB-16-20161024-16	1610356-038B	NWVPH	Aliphatic Hydrocarbon (C5-C6)		MG/KG	H	UJ	1
	GLB-16-20161024-16	1610356-038B	NWVPH	Aliphatic Hydrocarbon (C6-C8)		MG/KG	H	UJ	1
	GLB-16-20161024-16	1610356-038B	NWVPH	Aliphatic Hydrocarbon (C8-C10)		MG/KG	H	UJ	1
	GLB-16-20161024-16	1610356-038B	NWVPH	Aromatic Hydrocarbon (C10-C12)		MG/KG	H	UJ	1
	GLB-16-20161024-16	1610356-038B	NWVPH	Aromatic Hydrocarbon (C12-C13)		MG/KG	H	UJ	1,8L
	GLB-16-20161024-16	1610356-038B	NWVPH	Aromatic Hydrocarbon (C8-C10)		MG/KG	H	UJ	1
	GLB-16-20161024-16	1610356-038A	SW6020A	Total Lead	4.06	MG/KG		J	9
	GLB-16-20161024-16	1610356-038B	SW8260C	Ethylbenzene	0.234	MG/KG		J	1
	GLB-16-20161024-16	1610356-038B	SW8260C	Toluene	0.182	MG/KG		J	1
	GLB-16-20161024-16	1610356-038B	SW8260C	Hexane	0.091	MG/KG		J	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-16-20161024-16	1610356-038B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-16-20161024-16	1610356-038B	SW8260C	m,p-Xylene	0.692	MG/KG		J	1
	GLB-16-20161024-16	1610356-038B	SW8260C	Benzene	1.49	MG/KG		J	1
	GLB-16-20161024-16	1610356-038B	SW8260C	o-Xylene	0.275	MG/KG		J	1
	GLB-16-20161024-16	1610356-038A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-20161024-16	1610356-038A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-16-20161024-16	1610356-038A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-20161024-20	1610356-039B	NWTPH-GX	Gasoline	15.3	MG/KG		J	1
	GLB-16-20161024-20	1610356-039A	SW6020A	Total Lead	0.942	MG/KG		J	9
	GLB-16-20161024-20	1610356-039B	SW8260C	Ethylbenzene	0.174	MG/KG		J	1
	GLB-16-20161024-20	1610356-039B	SW8260C	Toluene	0.068	MG/KG		J	1
	GLB-16-20161024-20	1610356-039B	SW8260C	Hexane	0.0901	MG/KG	Q	J	1
	GLB-16-20161024-20	1610356-039B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-16-20161024-20	1610356-039B	SW8260C	m,p-Xylene	1.59	MG/KG		J	1
	GLB-16-20161024-20	1610356-039B	SW8260C	Benzene	0.201	MG/KG		J	1
	GLB-16-20161024-20	1610356-039B	SW8260C	o-Xylene	0.0358	MG/KG		J	1
	GLB-16-20161024-20	1610356-039A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-16-20161024-20	1610356-039A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-16-20161024-20	1610356-039A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW6020A	Total Lead	4.9	MG/KG		J	9
	GLB-7-102416-3	1610356-045B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	EDC		MG/KG	Q	UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	Hexane		MG/KG	Q	UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Indeno(1,2,3-cd)pyrene		UG/KG	Q	UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Benzo(b)fluoranthene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Benzo(k)fluoranthene		UG/KG	Q	UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Chrysene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Benzo(a)pyrene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Dibenz(a,h)anthracene		UG/KG	Q	UJ	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610356	GLB-7-102416-3	1610356-045A	SW8270DSIM	Benz(a)anthracene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-7-102416-3	1610356-045A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
	GLB-8-20161024-15	1610356-008B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-8-20161024-18	1610356-009B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	NWTPH-GX	Gasoline		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	1,2-Dichloroethane		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-8-20161024-25	1610356-010B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-FD-102416-1	1610356-050B	NWTPH-GX	Gasoline	26.5	MG/KG		J	1
	GLB-FD-102416-1	1610356-050A	SW6020A	Total Lead	3.12	MG/KG		J	9
	GLB-FD-102416-1	1610356-050B	SW8260C	Ethylbenzene	1.22	MG/KG		J	1
	GLB-FD-102416-1	1610356-050B	SW8260C	Toluene	0.268	MG/KG		J	1
	GLB-FD-102416-1	1610356-050B	SW8260C	Hexane	0.259	MG/KG		J	1
	GLB-FD-102416-1	1610356-050B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-FD-102416-1	1610356-050B	SW8260C	m,p-Xylene	4.29	MG/KG		J	1
	GLB-FD-102416-1	1610356-050B	SW8260C	Benzene	1.87	MG/KG		J	1
	GLB-FD-102416-1	1610356-050B	SW8260C	o-Xylene	1.7	MG/KG		J	1
	GLB-FD-102416-1	1610356-050A	SW8270DSIM	1-Methylnaphthalene		UG/KG		UJ	1
	GLB-FD-102416-1	1610356-050A	SW8270DSIM	Naphthalene		UG/KG		UJ	1
	GLB-FD-102416-1	1610356-050A	SW8270DSIM	2-Methylnaphthalene		UG/KG		UJ	1
1610395	GLB-9-102616-23	1610395-007A	SW6020A	Total Lead	1.07	MG/KG		J	9
	GLB-7-102616-20	1610395-011A	SW6020A	Total Lead	1.12	MG/KG		J	9
	GLB-9-102616-10	1610395-006A	SW6020A	Total Lead	14.1	MG/KG		J	9
1610416	GLB-5-102716-20	1610416-010B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-5-102716-20	1610416-010B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-5-102716-20	1610416-010B	SW8260C	EDC		MG/KG		UJ	1
	GLB-5-102716-20	1610416-010B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-5-102716-20	1610416-010B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-5-102716-20	1610416-010B	SW8260C	m,p-Xylene		MG/KG		UJ	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1610416	GLB-5-102716-20	1610416-010B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-5-102716-20	1610416-010B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	EDC		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-5-102716-25	1610416-011B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	EDC		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-6-102716-25	1610416-005B	SW8260C	o-Xylene		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	Ethylbenzene		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	1,2-Dibromoethane (EDB)		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	EDC		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	Toluene		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	m,p-Xylene		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	Benzene		MG/KG		UJ	1
	GLB-6-102716-30	1610416-006B	SW8260C	o-Xylene		MG/KG		UJ	1
1611204	GLB-X	1611204-015B	SW8260C	Benzene	0.355	MG/KG		J	9
	GLB-19-18	1611204-012B	SW8260C	Benzene		MG/KG		UJ	9
	GLB-19-30	1611204-014B	NWTPH-GX	Gasoline		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	Ethylbenzene		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	Toluene		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	Hexane		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	Methyl tert-butyl ether (MTBE)		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	m,p-Xylene		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	Benzene		MG/KG	H	UJ	1
	GLB-19-30	1611204-014B	SW8260C	o-Xylene		MG/KG	H	UJ	1

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SDG	Sample ID	Laboratory ID	Method	Analyte	Result	Units	Lab Flag	Validation Qualifier	Validation Reason
1611227	GLB-17-5	1611227-008B	NWTPH-GX	Gasoline		MG/KG	H	UJ	1
	GLB-17-5	1611227-008B	SW8260C	Benzene		MG/KG	H	UJ	1
1611301	IP-4	1611301-011D	SW8260C	Hexane	127	UG/L	EQ	J	20
	IP-5	1611301-012D	SW8260C	Benzene	3450	UG/L	DE	J	20
	MW 14	1611301-006D	NWTPH-GX	Gasoline	2220	UG/L	E	J	20
	MW 16	1611301-007D	SW8260C	m,p-Xylene	2340	UG/L	DE	J	20
	MW A	1611301-010D	NWTPH-GX	Gasoline	3210	UG/L	E	J	20
	MW-B	1611301-013D	SW8260C	Benzene	3440	UG/L	DE	J	20
1612063	IDW-1	1612063-007C	SW8270DSIM	Naphthalene	18.6	UG/L	E	J	20
	MW-23	1612063-004C	SW8270DSIM	Naphthalene	30.6	UG/L	E	J	20
	MW-C	1612063-006C	SW8270DSIM	Naphthalene	27.1	UG/L	E	J	20