DATA VALIDATION REPORT

Red Hill Bulk Fuel Storage Facility
Joint Base Pearl Harbor-Hickam
CTO 22F0106

SDG: 580-126374-1
Eurofins, Seattle

Prepared by

ENVIRONMENTAL DATA SERVICES, LTD.

Prepared for

AECOM Environmental

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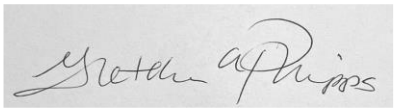
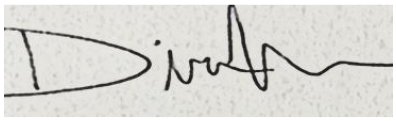
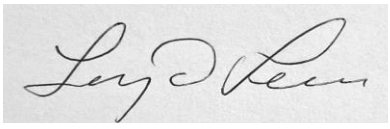


Gretchen Phipps



Dina Manov



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ENVIRONMENTAL DATA SERVICES, LTD.

EXECUTIVE NARRATIVE

Sample Delivery Group: 580-126374-1
Laboratory: Eurofins Seattle
Site: Red Hill Bulk Storage Facility, CTO CV22F0106 - P-Wells
Sampling dates: 04/21/2023
Number of Samples: 6
Test Method: SW 8260/CALUFT; SW 8015D
Analysis: Petroleum Hydrocarbons C6-C10 (GRO), C10-C24 Diesel Range Organics (DRO), and C24-C40 Total Petroleum Hydrocarbons Oil Range Organics (ORO)

Quality Assurance Project Plan: NAVFAC Preliminary Site Characterization Plan, November 2021 Release, U.S. Navy Well 2254-01, JBPHH, O'ahu, Hawai'i (January 2022); NAFAC Site Characterization Plan, Adit 3 LNAPL Step-Out Addendum, November 2021 Release, U.S. Navy Well 2254-01, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (July 2022).

Validation Guidelines: Department of Defense Module 4: Data Validation Procedure for Organic Analysis by GC, March 2021; Department of Defense Module 1: Data Validation Procedure for Organic Analysis by GC/MS, May 2020; United States Department of Defense (DOD) Environmental Data Quality Workgroup (EDQW), November 2019, General Data Validation Guidelines, and Department of Defense Quality Systems Manual (DoD QSM) for Environmental Laboratories Version 5.4 (DoD and DOE 2021). United States Department of Defense Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination, February 09, 2022.

Client Sample Identification	Laboratory Sample Identification	Matrix	Validation Stage
RHP02-WQTB01-2304WK3[1]	580-126374-1	trip blank	S2BVEM
RHP02-WGN01LF-2304WK3	580-126374-2	water	S2BVEM
RHP01-WQTB01-2304WK3[1]	580-126374-3	trip blank	S2BVEM
RHP01-WGN01LF-2304WK3	580-126374-4	water	S2BVEM
RHP04A-WQTB01-2304WK3[1]	580-126374-5	trip blank	S2BVEM
RHP04A-WGN01LF-2304WK3[2]	580-126374-6	water	S2BVEM

[1]GRO analysis only

[2] DRO/ORO with silica gel and without silica gel

Table 1 provides a summary of the major and minor data quality issues identified in this data set. All data are acceptable except those results which have been qualified with "X", rejected. Data validation qualifiers along with associated descriptions are provided in Table 2. All data qualification related to this group of samples is detailed on the attached sheets.

All data users should note two facts. First, an "X" flag means that the associated value is unusable due to significant quality control (QC) problems, the data is invalid and provides no information as to whether the compound is present or not. "X" values should not appear on any data tables even as a last resort. Second, no analyte concentration, even if it passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

DATA ASSESSMENT

1. NARRATIVE AND COMPLETENESS REVIEW:

The case narrative was reviewed, and the data package was checked for completeness.

2. SAMPLE DELIVERY AND CONDITION:

The samples arrived at the laboratory in acceptable condition. Proper custody was documented.

3. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detect results will be flagged as not detected at an estimated quantitation limit, "UJ", unless the holding time is grossly exceeded (by more than two times the holding time specified), in which case non-detect results are flagged "X", rejected. Qualifications were applied to the samples and analytes as shown below.

All sample analyses reported were within the validation guidance.

4. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument can produce acceptable quantitative data. An initial calibration demonstrates that the instrument can give acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Initial Calibration

Percent Relative Standard Deviation (%RSD) is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent RSD must be less than the maximum %RSD of 20% or, in cases where linear and non-linear regressions are used, linear correlation coefficients must be greater than or equal to 0.995. If the %RSD or correlation coefficient do not meet quality control criteria, detects may be qualified as "J" and professional judgement is used to qualify non-detects. Qualifications were applied to the samples and analytes as shown below.

All associated initial calibrations met validation criteria.

B) Continuing Calibration

Percent difference (%D) compares the response factor of the continuing calibration check to mean response factor (RF) from the initial calibration. For the opening continuing calibration verification (CCV) the %D must be <20% for all target compounds. For the closing CCV the %D must be less than limits outlined in validation guidance. A value outside of these limits indicates potential detection and quantitation errors. If the %D exceeds quality control criteria, the positive results are flagged as estimated, "J" and non-detects are flagged "UJ". Qualifications were applied to the samples and analytes as shown below.

All associated continuing calibrations met validation criteria.

5. BLANKS:

Quality assurance (QA) blanks (i.e. method, trip, field, or rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. Qualifications were applied to the samples and analytes as shown below.

A) Method Blank

Method blanks were analyzed with appropriate frequency. No problems were found for this criterion.

B) Equipment/Field Blank

No sample was submitted as an equipment/field blank in association with the samples in this sample delivery group (SDG).

C) Trip Blank

Samples RHP01-WQTB01-2304WK3, RHP02-WQTB01-2304WK3, and RHP04A-WQTB01-2304WK3 were submitted as a trip blank for GRO analysis in association with this SDG. No problems were found for this criterion.

6. SURROGATES:

All samples are spiked with system monitoring compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate recovery limits were outside quality control limits qualifications were applied to all the samples and analytes as shown below.

No problems were found for this criterion.

7. INTERNAL STANDARDS PERFORMANCE:

The internal standard area count must not vary by more than a factor of two from the associated continuing calibration standard. The retention time of the internal standard must not vary by more than ±10 seconds from the associated continuing calibration standard.

No problems were found for this criterion.

Note: Internal standards were not used for DRO / ORO analyses via method 8015D.

8. COMPOUND IDENTIFICATION:

Compound Identification

The compounds are identified on the GC-FID by using the analytes relative retention time (RRT) on the chromatogram. For the results to be a positive hit, the sample peak must be within the anticipated RRT range for VPH, GRO, DRO, and RRO compounds.

Target compound identifications were not reviewed at the Stage 2B level.

Compound Quantification

Target compound results quantitation were not reviewed at the Stage 2B level.

Manual integrations were not reviewed for samples at the Stage 2B level.

9. MATRIX SPIKE/MATRIX SPIKE DUPLICATE:

Matrix spike/matrix spike duplicate (MS/MSD) data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other quality control criteria for additional qualification of data.

No sample was submitted for MS/MSD pair evaluations in association with this SDG.

10. LABORATORY CONTROL SAMPLE:

The Laboratory Control Sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Aqueous/water, soil/sediment, wipe, and filter LCSs shall be analyzed for each analyte utilizing the same sample preparations, analytical methods, and quality assurance/quality control (QA/QC) procedures as employed for the samples. All LCS percent recoveries must fall within the control limits. Qualifications were applied to the samples and analytes as shown below.

LCS/LCS duplicate (LCSD) evaluations were performed at the appropriate frequency. No problems were found for this criterion.

11. FIELD DUPLICATE:

Field duplicates may be taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision. A control limit of ≤ 30% for the Relative Percent Difference (RPD) for water samples and ≤ 50% RPD for solid samples, shall be used. For field duplicate analyses that do not meet the technical criteria, the action was applied to only the parent sample and its duplicate.

No samples were submitted as a field duplicate pair in association with this SDG.

12. DILUTIONS, RE-EXTRACTIONS & REANALYSIS:

Samples may be re-analyzed for dilution, re-extraction and for other QC reasons. In such cases, the best result values are used.

No dilutions, re-extractions, or other re-analyses were performed by the laboratory.

13. OTHER PROBLEMS:

None.

Table 1 Major and Minor Findings

	Were acceptance criteria met?		
	Yes	**No**	
GRO		**Major**	**Minor**
Sample Delivery Condition	x		
Holding Time	x		
Percent Relative Standard Deviation and Percent Difference	x		
Method Blank	x		
Equipment Blank/Field Blank	NA		
Trip Blank	x		
Surrogates	x		
Internal Standards	x		
Compound Identification	NA		
Matrix Spike/Matrix Spike Duplicate	NA		
Field Duplicate	NA		
Laboratory Control Samples	x		
Other Quality Control Data out of Specification	x		
Required Reporting Limits	x		
	Were acceptance criteria met?		
	Yes	**No**	
DRO / ORO		**Major**	**Minor**
Sample Delivery Condition	x		
Holding Time	x		
Percent Relative Standard Deviation and Percent Difference	x		
Method Blank	x		
Equipment Blank/Field Blank	NA		
Trip Blank	NA		
Surrogates	x		
Internal Standards	NA		
Compound Identification	NA		
Matrix Spike/Matrix Spike Duplicate	NA		
Field Duplicate	NA		
Laboratory Control Samples	x		
Other Quality Control Data out of Specification	x		
Required Reporting Limits	x		

Major = Major data quality issue identified resulting in rejection of data.
Minor = Minor data quality issue identified resulting in the qualification of data. Data qualification should be used to inform the data users of data limitations.
NA = Not applicable

Table 2 Data Validation Qualifiers

Data Qualifier	Definition
U	The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analyte was tentatively identified, and the associated numerical value represents its approximate concentration.

ENVIRONMENTAL DATA SERVICES, LTD.

EXECUTIVE NARRATIVE

Sample Delivery Group: 580-126374-1
Laboratory: Eurofins, Seattle
Site: Red Hill Bulk Storage Facility, CTO CV22F0106 - P-Wells
Sampling dates: 04/21/2023
Number of Samples: 3
Test Method: 8270E Selective Ion Monitoring (SIM)
Analysis: Naphthalene, 1-Methylnaphthalene, 2-Methylnaphthalene

Quality Assurance Project Plan: NAVFAC Preliminary Site Characterization Plan, November 2021 Release, U.S. Navy Well 2254-01, JBPHH, O'ahu, Hawai'i (January 2022); NAFAC Site Characterization Plan, Adit 3 LNAPL Step-Out Addendum, November 2021 Release, U.S. Navy Well 2254-01, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (July 2022).

Validation Guidelines: Department of Defense Module 1: Data Validation Procedure for Organic Analysis by GC/MS, May 2020; and United States Department of Defense (DOD) Environmental Data Quality Workgroup (EDQW), November 2019, General Data Validation Guidelines, and Department of Defense Quality Systems Manual (DoD QSM) for Environmental Laboratories Version 5.4 (DoD and DOE 2021). United States Department of Defense Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination, February 09, 2022.

Client Sample Identification	Laboratory Sample Identification	Matrix	Validation Stage
RHP02-WGN01LF-2304WK3	580-126374-2	water	S2BVEM
RHP01-WGN01LF-2304WK3	580-126374-4	water	S2BVEM
RHP04A-WGN01LF-2304WK3	580-126374-6	water	S2BVEM

Table 1 provides a summary of the major and minor data quality issues identified in this data set. All data are acceptable except those results which have been qualified with "X", rejected. Data validation qualifiers along with associated descriptions are provided in Table 2. All data qualification related to this group of samples is detailed on the attached sheets.

All data users should note two facts. First, an "X" flag means that the associated value is unusable due to significant quality control (QC) problems, the data is invalid and provides no information as to whether the compound is present or not. "X" values should not appear on any data tables even as a last resort. Second, no analyte concentration, even if it passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

DATA ASSESSMENT

1. NARRATIVE AND COMPLETENESS REVIEW:

The case narrative was reviewed, and the data package was checked for completeness. No discrepancies were noted.

2. SAMPLE DELIVERY AND CONDITION:

The samples arrived at the laboratory in acceptable condition. Proper custody was documented. No qualification was required.

3. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detect results will be flagged as not detected at an estimated quantitation limit, "UJ", unless the holding time is grossly exceeded (by more than two times the holding time specified), in which case non-detect results are flagged "X", rejected. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

4. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for semi-volatile organics is decafluorotriphenylphosphine. If the mass calibration is in error, all associated data will be classified as unusable "X". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

5. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument can produce acceptable quantitative data. An initial calibration demonstrates that the instrument can give acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor:

The response factor measures the instrument's response to specific chemical compounds. All analytes for initial and continuing calibration should meet the minimum relative response factor (RRF) criteria. If the RRF is less than minimum RRF specified, professional judgment is used, and all detects in the sample will be qualified as "J". All non-detects for that compound will be rejected "X". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

B) Percent Relative Standard Deviation and Percent Difference:

Percent relative standard deviation (%RSD) is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent difference (%D) compares the response factor of the continuing calibration check to the mean RRF from the initial calibration.

Percent RSD must be less than maximum %RSD listed in the Department of Defense Quality Systems Manual or, in cases where linear and non-linear regressions are used, correlation coefficients must be greater than those listed in the Department of Defense Quality Systems Manual. For the opening or closing continuing calibration verification (CCV) the %D must be within the inclusive opening or closing maximum %D limits as listed in the Department of Defense Quality Systems Manual for all target compounds. A value outside of these limits indicates potential detection and quantitation errors. If the %RSD exceeds quality control criteria, detects may be qualified as "J" and professional judgment is used to qualify non-detects. If the %D exceeds quality control criteria, the positive results are flagged as estimated, "J" and non-detects are flagged "UJ". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

6. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Field and rinse blanks measure cross-contamination of samples during field operations. Qualifications were applied to the samples and analytes as shown below. When an equipment blank, trip blank, or lab blank has an analyte detection greater than ½ the analyte Limit of Quantitation (LOQ), then all associated field samples are flagged per validation guidance.

A) Method blank contamination:

No problems were found for this criterion.

B) Field /Equipment blank contamination:

No sample was submitted as a field/equipment blank in association with the samples in this sample delivery group (SDG).

7. SURROGATES:

All samples are spiked with system monitoring compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate recovery limits were outside quality control limits established in the Department of Defense Quality Systems Manual, qualifications were applied to all the samples and analytes as shown below.

No problems were found for this criterion.

8. MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY:

Matrix spike/matrix spike duplicate (MS/MSD) data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other quality control criteria for additional qualification of data. All MS/MSD percent recoveries must fall within the Department of Defense Quality Systems Manual limits. In addition, relative percent differences observed between results reported for the pair must be ≤ 20%.

No samples were submitted for MS/MSD analyses in association with this SDG.

9. COMPOUND IDENTIFICATION AND QUANTIFICATION:

Compound Identification

The compounds are identified on the GC/MS by using the analytes relative retention time (RRT) and ion spectra. For the results to be a positive hit the sample peak must be within ±0.06 RRT units of the standard compound and have an ion spectrum which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

Target compound identifications were not reviewed at the Stage 2B level.

Tentatively Identified Compounds (TICs) were not reported.

Compound Quantification

Target compound results quantitation were not reviewed at the Stage 2B level.

Manual integrations were not reviewed for samples at the Stage 2B level.

10. INTERNAL STANDARDS PERFORMANCE:

Internal standard performance criteria are meant to ensure that the gas chromatograph/mass spectrometer (GC/MS) sensitivity and response are stable during every experimental run.

The internal standard area count must not vary by more than a factor of two from the associated continuing calibration standard. The retention time of the internal standard must not vary by more than ±30 seconds from the associated continuing calibration standard. The area count must be within a (50-200%) range of the associated standard. If the area count is greater than 200%, non-detected results are not qualified, and positive results are flagged as estimated "J". If the area count is less than 50%, positive results are flagged as estimated "J" and non-detected results are flagged "UJ". If the area count is less than 25%, positive results are flagged as estimated "J" and non-detected results will be classified as unusable "X". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

11. FIELD DUPLICATES:

Field duplicates may be taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision. A control limit of ≤ 30% for the Relative Percent Difference (RPD) for water samples and ≤ 50% RPD for solid samples, shall be used. For field duplicate analyses that do not meet the technical criteria, the action was applied to only the parent sample and its duplicate.

No samples were submitted as a field duplicate pair in association with this SDG.

12. LABORATORY CONTROL SAMPLES:

The Laboratory Control Sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Aqueous/water, soil/sediment, wipe, and filter LCSs shall be analyzed for each analyte utilizing the same sample preparations, analytical methods, and quality assurance/quality control (QA/QC) procedures as employed for the samples. All LCS percent recoveries must fall within the Department of Defense Quality Systems Manual limits. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

13. OTHER PROBLEMS:

None.

14. DILUTIONS, RE-EXTRACTIONS & REANALYSIS:

Samples may be re-analyzed for dilution, re-extraction and for other QC reasons. In such cases, the best result values are used.

No dilutions, re-extractions, or other re-analyses were reported by the laboratory.

Table 1 Major and Minor Findings

	Were acceptance criteria met?		
	Yes	No	
Semi-volatiles SIM		Major	Minor
Holding Time	x		
Mass Spectrometer Tuning	x		
Calibration	x		
Response Factor	x		
Percent Relative Standard Deviation and Percent Deviation	x		
Internal Standards	x		
Method Blank	x		
Field/Equipment Blank	NA		
Surrogates	x		
Matrix Spike/Matrix Spike Duplicate	NA		
Compound Identification and Quantitation	NA		
Field Duplicate	NA		
Laboratory Control Samples	x		
Other Quality Control Data out of Specification	x		

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Table 2 Data Validation Qualifiers

Data Qualifier	Definition
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UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
X	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analyte was tentatively identified, and the associated numerical value represents its approximate concentration.

ENVIRONMENTAL DATA SERVICES, LTD.

EXECUTIVE NARRATIVE

Sample Delivery Group: 580-126374-1
Laboratory: Eurofins, Seattle
Site: Red Hill Bulk Storage Facility, CTO CV22F0106 - P-Wells
Sampling dates: 04/21/2023
Number of Samples: 6
Test Method: SW 846 8260D
Analysis: Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX)

Quality Assurance Project Plan: NAVFAC Preliminary Site Characterization Plan, November 2021 Release, U.S. Navy Well 2254-01, JBPHH, O'ahu, Hawai'i (January 2022); NAFAC Site Characterization Plan, Adit 3 LNAPL Step-Out Addendum, November 2021 Release, U.S. Navy Well 2254-01, Joint Base Pearl Harbor-Hickam, O'ahu, Hawai'i (July 2022).

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RHP01-WQTB01-2304WK3	580-126374-3	trip blank	S2BVEM
RHP01-WGN01LF-2304WK3	580-126374-4	water	S2BVEM
RHP04A-WQTB01-2304WK3	580-126374-5	trip blank	S2BVEM
RHP04A-WGN01LF-2304WK3	580-126374-6	water	S2BVEM

Table 1 provides a summary of the major and minor data quality issues identified in this data set. All data are acceptable except those results which have been qualified with "X", rejected. Data validation qualifiers along with associated descriptions are provided in Table 2. All data qualification related to this group of samples is detailed on the attached sheets.

All data users should note two facts. First, an "X" flag means that the associated value is unusable due to significant quality control (QC) problems, the data is invalid and provides no information as to whether the compound is present or not. "X" values should not appear on any data tables even as a last resort. Second, no analyte concentration, even if it passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data, but any value potentially contains error.

DATA ASSESSMENT

1. NARRATIVE AND COMPLETENESS REVIEW:

The case narrative was reviewed, and the data package was checked for completeness. No discrepancies were noted.

2. SAMPLE DELIVERY AND CONDITION:

The samples arrived at the laboratory in acceptable condition. Proper custody was documented.

3. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detect results will be flagged as not detected at an estimated quantitation limit, "UJ", unless the holding time is grossly exceeded (by more than two times the holding time specified), in which case non-detect results are flagged "X", rejected. Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

4. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is bromofluorobenzene. If the mass calibration is in error, all associated data will be classified as unusable "X". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

5. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument can produce acceptable quantitative data. An initial calibration demonstrates that the instrument can give acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

No problems were found for this criterion.

A) Response Factor:

The response factor measures the instrument's response to specific chemical compounds. All analytes for initial and continuing calibration should meet the minimum relative response factor (RRF) criteria. If the RRF is less than minimum RRF specified, professional judgment is used, and all detects in the sample will be qualified as "J". All non-detects for that compound will be rejected "X". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

B) Percent Relative Standard Deviation and Percent Difference:

Percent relative standard deviation (%RSD) is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent difference (%D) compares the response factor of the continuing calibration check to the mean RRF from the initial calibration.

Percent RSD must be less than maximum %RSD listed in the Department of Defense Quality Systems Manual or, in cases where linear and non-linear regressions are used, correlation coefficients must be greater than those listed in the Department of Defense Quality Systems Manual. For the opening or closing continuing calibration verification (CCV) the %D must be within the inclusive opening or closing maximum %D limits as listed in the Department of Defense Quality Systems Manual for all target compounds. A value outside of these limits indicates potential detection and quantitation errors. If the %RSD exceeds quality control criteria, detects may be qualified as "J" and professional judgment is used to qualify non-detects. If the %D exceeds quality control criteria, the positive results are flagged as estimated, "J" and non-detects are flagged "UJ". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

6. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks (TB) measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. When an equipment blank, trip blank, or lab blank has an analyte detection greater than ½ the analyte Limit of Quantitation (LOQ), then all associated field samples are flagged per validation guidance.

A) Method blank contamination:

Method blanks were analyzed with appropriate frequency. No problems were found for this criterion requiring result qualification.

B) Field/Equipment blank contamination:

No samples were submitted as a field/equipment blank in association with the samples in this sample delivery group (SDG).

C) Trip blank contamination:

Samples RHP01-WQTB01-2304WK3, RHP02-WQTB01-2304WK3, and RHP04A-WQTB01-2304WK3 were submitted as a trip blank in association with the samples in this SDG. No problems were found for this criterion.

D) Storage Blank associated with volatile samples only:

No storage blank was submitted in association with this SDG.

7. SURROGATES:

All samples are spiked with system monitoring compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate recovery limits were outside quality control limits established in the Department of Defense Quality Systems Manual, qualifications were applied to all the samples and analytes as shown below.

No problems were found for this criterion requiring qualification of sample results.

8. COMPOUND IDENTIFICATION AND QUANTIFICATION:

Compound Identification

The compounds are identified on the GC/MS by using the analytes relative retention time (RRT) and ion spectra. For the results to be a positive hit the sample peak must be within ±0.06 RRT units of the standard compound and have an ion spectrum which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

Target compound identifications were not reviewed at the Stage 2B level.

Tentatively Identified Compounds (TICs) were not reported.

Compound Quantification

Target compound results quantitation were not reviewed at the Stage 2B level.

Manual integrations were not reviewed for samples at the Stage 2B level.

9. MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY:

Matrix spike/matrix spike duplicate (MS/MSD) data are generated to determine the long-term precision and accuracy of the analytical method in various matrices. The MS/MSD data may be used in conjunction with other quality control criteria for additional qualification of data. All MS/MSD percent recoveries must fall within the Department of Defense Quality Systems Manual limits. In addition, relative percent differences observed between results reported for the pair must be ≤ 20%.

No samples were submitted for MS/MSD evaluation in association with this SDG.

10. INTERNAL STANDARDS PERFORMANCE:

Internal standard performance criteria are meant to ensure that the gas chromatograph/mass spectrometer (GC/MS) sensitivity and response are stable during every experimental run.

The internal standard area count must not vary by more than a factor of two from the associated continuing calibration standard. The retention time of the internal standard must not vary by more than ±10 seconds from the associated continuing calibration standard. The area count must be within a (50-200%) range of the associated standard. If the area count is greater than 200%, non-detected results are not qualified and positive results are flagged as estimated with potential negative bias, "J-". If the area count is less than 50%, positive results are flagged as estimated with potential positive bias, "J+", and non-detected results are flagged "UJ". If the area count is less than 20%, positive results and non-detected results will be classified as unusable "X". Qualifications were applied to the samples and analytes as shown below.

No problems were found for this criterion.

11. FIELD DUPLICATES:

Field duplicates may be taken and analyzed as an indication of overall precision. These analyses measure both field and laboratory precision. A control limit of ≤ 30% for the Relative Percent Difference (RPD) for water samples and ≤ 50% RPD for solid samples, shall be used. For field duplicate analyses that do not meet the technical criteria, the action was applied to only the parent sample and its duplicate.

No samples were submitted as a field duplicate pair in association with this SDG.

12. LABORATORY CONTROL SAMPLES:

The Laboratory Control Sample (LCS) serves as a monitor of the overall performance of each step during the analysis, including the sample preparation. Aqueous/water, soil/sediment, wipe, and filter LCSs shall be analyzed for each analyte utilizing the same sample preparations, analytical methods, and quality assurance/quality control (QA/QC) procedures as employed for the samples. All LCS percent recoveries must fall within the Department of Defense Quality Systems Manual limits. Qualifications were applied to the samples and analytes as shown below.

The LCS evaluations were performed at the appropriate frequency. No problems were found for this criterion.

13. DILUTIONS, RE-EXTRACTIONS & REANALYSIS:

Samples may be re-analyzed for dilution, re-extraction and for other QC reasons. In such cases, the best result values are used.

No dilutions, re-extractions, or other re-analyses were reported by the laboratory.

14. OTHER PROBLEMS:

None.

Table 1 Major and Minor Findings

	Were acceptance criteria met?		
	Yes	No	
Volatiles		Major	Minor
Holding Time	x		
Mass Spectrometer Tuning	x		
Response Factor	x		
Percent Relative Standard Deviation and Percent Difference	x		
Internal Standards	x		
Method Blank	x		
Field/Equipment Blank	NA		
Trip Blank	x		
Storage Blank	NA		
Surrogates	x		
Compound Identification	NA		
Matrix Spike/Matrix Spike Duplicate	NA		
Field Duplicate	NA		
Laboratory Control Samples	x		
Other Quality Control Data out of Specification Dilutions	x		
Required Reporting Limits	x		

Major = Major data quality issue identified resulting in rejection of data.
Minor = Minor data quality issue identified resulting in the qualification of data. Data qualification should be used to inform the data users of data limitations.
NA = Not applicable

Table 2 Data Validation Qualifiers

Data Qualifier	Definition
U	The analyte was analyzed for but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
X	The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the analyte cannot be substantiated by the data provided.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
NJ	The analyte was tentatively identified, and the associated numerical value represents its approximate concentration.

Data Qualification Reason Codes	
Reason Code	**Reason Code Description**
A	**Serial dilution**
A1	**Ambient Blank**
B	**The analyte was found in an associated blank as well as in the sample.**
B2	**CCB**
B3	**CCB - Neg**
B4	**Grinding Blank**
C	**LCS Recovery**
C1	**Reference Recovery**
C2	**Reference Recovery RPD**
D	**MS RPD**
D1	**Lab Replicate RPD**
D2	**No precision available**
D3	**Field Duplicate RPD**
D4	**Field Triplicate RSD**
D5	**Laboratory Triplicate RSD**
F	**Field Blank**
F1	**Hydrocarbon pattern does not match standard**
G1	**Initial Calibration RRF**
G2	**Initial Calibration RSD/r^2/r**
G3	**ICV RRF**
H1	**Test Hold Time**
H2	**Prep Hold Time**
I	**Surrogate recovery outside project limits.**
J	**CRA/CRI Recovery**
K	**An analyte (non-common laboratory artifact) was detected in the sample at a concentration less than 5X the concentration detected in the associated method blank.**
L	**Lab Blank**
L1	**Lab Blank - Neg**
M	**MS Recovery**
M2	**Post Spike**
N	**Blank - No Action**
O	**ICS**
P	**Sample preservation/collection requirement not met.**
P1	**Column RPD**
P2	**Improper preparation/extraction**
Q	**Encore sample holding time exceeded by more than 2X.**
Q1	**Material Blank**

Q2	**Encore sample holding time exceeded by less than 2X.**
R	**Exceeds LinearCalibration Range**
S	**Internal standard**
T	**Trip Blank**
TI	**Tentatively Identified Compound**
TR	**Trace Level Detect**
U	**Receipt Temperature**
V	**Equipment Blank**
V1	**ICV**
V2	**CCV**
V3	**CCV RRF**
V4	**Sample Receipt Condition**
V5	**Ending Continuing Calibration Verification**
V6	**Low Level Calibration Verification**
V7	**Interference Check Sample A**
V8	**Interference Check Sample AB**
V9	**Interference Check Sample A - Negative**
W	**Column breakdown (pesticides/8270)**
X	**Raised reporting limit**
Y	**Cooler temperature greater than 10 degreec C.**
Y1	**False Positive**
Y2	**Data rejected due to radiological anomolies**
Y3	**Non-accredited analyte/compound. Accreditation not offered at time of analyses for the analyte/compound by the stated method and matrix.**
Y4	**Performance Check - Degradation of DDT**
Y5	**Extracted Internal Standard**
Y6	**Analyte not confirmed on second column.**
Y7	**Signal to Noise Ratio not met**
Z	**LCS RPD**
Z1	**Non-accredited analyte/compound**
Z1	**Data rejected, more valid data available.**
Z2	**Detection Level not met uncertainty greater than DL**
Z4	**MDA Greater than RDL.**
Z5	**Ion Ratio**
Z6	**Samples were analyzed past the 12 hour time period from the Tune or opening CCV.**

Data Validation Worksheet

TEPH METHOD VALIDATION CHECKLIST

For Red Hill P Wells/S Wells

Site:	Red Hill Bulk Storage Facility, CTO CV22F0106
Laboratory:	Eurofins Seattle
SDG:	580-126374-1
Data Validator:	DM
Validation Date:	5/16/2023
Reviewer:	DLW
Review Date:	5/16/2023

Analyzed for: ☑ GRO ☑ DRO ☑ ORO

Data Completeness and Deliverables

Have any missing deliverable been recieved and added to the data package? ☐ Yes ☑ No

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If the lab cannot provide them, note the effect on review of the data in the non-compliance section of the data assessment narrative.

Notes and validation action:

Custody Documents and Narratives

Are chains of custody present and complete for all samples? ☑ Yes ☐ No

ACTION: Contract lab for replacement of missing documents.

Do chains of custody or lab narratives indicate any problems with sample receipt, condition of samples, analytical problems o r special notations affecting the quality of the data? ☐ Yes ☑ No

ACTION: If any sample analyzed as a soil other than a TCLP, contains 50-100% water, flag all data as estimated. If the soil sample, other than TCLP, contains more than 90% water, all data would be flagged as unusable.
ACTION: If samples were not iced upon receipt, flag all positive results as estimated, an all non-detects "UJ".

Notes and validation action:

Holding Times

Have any TEPH technical holding times, determined from date of collection to date of extraction been exceeded?

☐ Yes ☑ No

NOTE: Water and Soil sample must be extracted within 7 days of sample collection. Extracts must be analyzed within forty days of extraction.
14 days for preserved GRO, pH <2

ACTION: If holding times are exceeded, flag all data as estimated ("J" for detects and "UJ" for non-detects). If holding times were grossly exceeded (i.e., more than 2x the holding time), flag all positive data as estimated and reject all non-detects as unusable ("R").

Collected		4/21/23		
Prepped	DRO/ORO:	4/25/2023		
Analyzed	DRO/ORO:	4/26/2023	5/1/2023	ok
	GRO:	4/26/2023		ok

Surrogate Recovery

Are surrogate recoveries summarized within the report?

☑ Yes ☐ No

ACTION: If no, contact the lab for explanation/re-submittals. If redeliverables are not available, document in the narrative notes.

(QSM 5.4 Table C24 4-Bromofluorobenzene aqueous 85-114%)
(QSM 5.4 Table C14 o-Terphenyl 56-125%).

No outliers

Were outliers marked as such?

☐ Yes ☐ No

Were surrogate recoveries outside of specifications for any sample or method blank?

☐ Yes ☑ No

ACTION: If any surrogate recoveries are >10% but do not meet project requirements.
1. Flag all positive results as estimated.
2. Flagall non-detects as estimated detection limits when recoveries are less than the lower limit.
3. If recoveries are above the upper limit, do not flag non-detects.
4. If any surrogate recovery is less than 10%:
a. qualify positive results as estimated.
b. non-detects for that sample should be qualified as unusable.
Professional judgment is used to qualify data that have method blank surrogate recoveries outside acceptance limits in both the

Are surrogate standard retention times within the retention time windows established during the initial calibration?

☑ Yes ☐ No

ACTION: If the retention time limits are not met, the analysis may be qualified unusable (R) for the affected sample on the basis of professional judgement.

Are there any transcription/calculation errors between the surrogate recoveries

☐ Yes ☑ No

Notes and validation action:
Sample %R Flag per module 4 QAPP(10/21),
GRO
all ok

DRO /ORO
all ok

Were internal standard areas within -50% to 100% of ICAL midpoint standard and retention times +/- 30 seconds form retention time of the impoint ICAL standard? ☑ Yes ☐ No

Notes: IS for GRO via 8260, no IS for DRO/ORO
all ok

Matrix Spike

Is a matrix spike/matrix spike duplicate summary present? ☐ Yes ☑ No
Were matrix spikes analyzed at the required frequency for each of the following matrixes:
a. low water? ☐ Yes ☐ No ☑ NA
b. low soil? ☐ Yes ☐ No ☑ NA
c. medium soil? ☐ Yes ☐ No ☑ NA

ACTION: If any matrix spike data are missing, call the lab for explanation/re-submittal. If information is not available, document the effect in narrative notes.

Are all matrix spike and/or matrix spike duplicate %Rs or RPDs within acceptance range? ☐ Yes ☐ No ☑ NA
ACTION: Do not qualify associated sample results on the basis of the MS/MSD data alone. Use the MS/MSD results in conjunction with other QC criteria to determine the need for qualification of associated data. If the MS and MSD both have less than 10 percent recovery for an analyte, reject non-detect results for that analyte and qualify positive results for that analyte as estimated for the sample used for the MS/MSD analysis. If the MS and MSD both have greater than 200 percent recovery for ananalyte, reject detected results for that analyte and qualify non-detectresults for that analyte as estimated for the sample used for the MS/MSD analysis. Use professional judgment in applying this criterion to othersamples.

eQAPP Aqueous: C6-C10 GRO 75-127%, Petroleum Hydrocarbons (as Gasoline): 58 - 137%, RPD ≤ 20%
Solid Petroleum Hydrocarbons (as Gasoline): 56 - 135%, RPD ≤ 20%
eQAPP and QSM 5.4 Table C14: aqueous DRO 36-132%; ORO 41-113%, eQAPP RPD ≤ 30%

Notes and validation action:

Sample	MS %R	MSD %R	RPD	Flag
GRO				
none				
DRO				
none				
ORO				
none				

Laboratory Control Sample

Were LCS samples evaluated with each batch of 20 samples or less and were observed percent recoveries within the laboratory defined limits of (70 -120%)? ☑ Yes ☐ No

eQAPP Aqueous: C6-C10 GRO 75-127%, Petroleum Hydrocarbons (as Gasoline): 58 - 137%, RPD ≤ 20%
Solid Petroleum Hydrocarbons (as Gasoline): 56 - 135%, RPD ≤ 20%
eQAPP and QSM 5.4 Table C14: aqueous DRO 36-132%; ORO 41-113%, eQAPP RPD ≤ 30%

Notes and validation action:

LCS or LCSD	%R		Flag	Associated samples:	Reason Code
GRO					
LCS 580-424119/9	ok				
LCSD 580-424119/10	ok	RPD ok			

DRO /ORO

LCS 580-424072/2-A	ok	LCSD 580-424072/3-A	ok
LCS 580-424434/2-A	ok	LCSD 580-424434/3-A	ok
LCS 580-424072/2-B	ok	LCSD 580-424072/3-B	ok
LCS 580-424434/2-B	ok	LCSD 580-424434/3-B	ok

Has a method blank analysis been reported per twenty samples of a similar matrix or concentration level, and for each extraction batch? ☑ Yes ☐ No

Upon examination of laboratory and field blank data, do any blanks contain positive results? use United States Department of Defense Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination, February 09, 2022 ☐ Yes ☑ No

Table 4A: Sample Qualification in the Presence of Blank Contamination

	Sample		
Row Number	Result	Validated Result	Validation Qualifier
1	non-detect or detect ≤ LOD	Report at LOD	U
2	> LOD and ≤ 5x blank	Report at Sample Result	J+
3	> 5x blank	Report at Sample Result	None

LOD = Limit of Detection

☐ Yes ☑ No

Notes and validation action:
MB positives Flag associated samples
GRO
All ND

DRO/ORO
All ND

w SGC
All ND

Trip Blanks GRO	C6-C10
RHP01-WQTB01-2304WK3	ND
RHP02-WQTB01-2304WK3	ND
RHP04A-WQTB01-2304WK3	ND

Field Blank:
none

Equipment Blank:
none

Calibration

Are raw data and summary sheets present for both initial and continuing calibrations? ☑ Yes ☐ No

Are the % RSD values for the initial calibration less than or equal to 20% or correlation coefficient greater than 0.995? ☑ Yes ☐ No

ACTION: Associated sample data for those analytes with % RSD > 20 will be qualified as estimated.

Are the % D values between the true and measured concentration values for the continuing calibrations < 20? ☑ Yes ☐ No
ACTION: If no, data following the last in-control standard to the next-incontrol standard are potentially affected. Associated detected sample data will be qualified as estimated and associated non-detected sample data will be qualified as estimated if low bias is determined to be present. Check calibration factors and % RSD values back to raw data for 10% of data received.

Are miss-calculations or transcription errors found? ☐ Yes ☑ No
NOTE: If yes, contact the laboratory.

Notes and validation action:
Calibration Date Time %D and RT OK Associated samples:
GRO(C6-C10)

INST: TAC036
IC 580-422570/3 04/06/2023 15:45 1 040623_013A.D 624SIL-MS ok
ICV 580-422570/13 04/06/2023 19:47 1 040623_023A.D 624SIL- ok
IC 580-423196/2 04/12/2023 17:08 1 041223_016.D 624SIL-MS ok
ICV 580-423196/9 04/13/2023 14:06 1 041323_001.D 624SIL-MS ok

CCVIS 580-424119/5 04/26/2023 03:16 ok
CCV 580-424119/16 04/26/2023 07:41 ok
CCV 580-424119/27 04/26/2023 12:09 ok

DRO/ORO
INST: TAC129_R
STD1 580-422384/3 IC 04/05/2023 12:38 ok
ICV 580-422384/14 04/05/2023 16:05 ok
STD1 580-423884/3 IC 04/21/2023 11:53
CCV 580-424143/26 04/26/2023 00:59 ok all
CCV 580-424143/35 04/26/2023 03:46 ok

w SGC
INST: TAC129_R
CCV 580-424462/19 04/28/2023 17:24
CCV 580-424462/28 04/28/2023 20:19
CCVRT 580-424586/4 05/01/2023 14:56
CCV 580-424586/14 05/01/2023 18:50

Compound Quantitation and Reported Detection Limits

Check data for one or more detected target analytes per sample for ten percent of the data packages. Recalculate from the raw data to check for calculation and transcription errors.

Were miscalculation/transcription errors found?

ACTION: If errors are found 100% of the data will be evaluated. Contact the lab for the explanation/resubmittals.

☐ Yes ☐ No ☑ NA

Notes and validation action:
SDG validated at level 2B

Field Duplicates

Were field duplicates submitted for TEPH analysis?

☐ Yes ☑ No

ACTION: Where both the sample duplicate values are greater than 5 times the SQL, acceptable sampling and analytical precision is indicated by an RPD for the two field duplicate results of less than or equal to 100 percent. Where one or both analytes of the field duplicate pair are less than 5 times the SQL, satisfactory precision is indicated if the field duplicate results agree within 2 times the SQL. If the above criteria are not met for an analyte, qualify all associated sample data for that analyte as estimated ("J").

Notes and validation action:
none

Review Level ***Is a level 4 review required for this project?***	☐ Yes ☑ No

List samples reviewed and bold samples used for calculations:
Level 2B

As part of the data validation process, the following validation qualifiers and their meanings will be used:

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

"J" - Estimated Value – The analyte was positively identified; but 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 its approximate concentration.

"UJ" - Estimated Non-Detect – 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.

"X" - The sample results are rejected. Due to significant QA/QC problems the analysis is invalid and provides no information as to whether the analyte is present or not. Once the data are flagged with "X", any further review or consideration is unnecessary.

If no determination of the overall bias of a result qualified as estimated can be made, the result will be flagged with "J". If the data reviewer can determine the overall bias for sample data qualified as estimated, the data reviewer will qualify the sample result as either an estimated minimum value (JL) or an estimated maximum value (JH).

DATA VALIDATION GC/MS (8270)

DOD MODULE 1

Validator: Dm

Date Validated: 5/15/23

Reviewer: DLW

Review Date: 5/16/23

Project: Red Hill P Well

SDG: 580-126374-1

LAB: Eurofins Seattle

Samples Collected: 4/21/23

Sample Receipt and Case Narrative Review

- ✓ Traffic reports, chain-of-custody forms or SDG narrative do not indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data.

  No problems found

Holding Times (see Table 1 Module)

- ✓ VOC: aqueous: ≤6◦C analyzed and properly preserved analyzed within 14 days
- ✓ VOC: solid: ≤6◦C and properly preserved analyzed within 14 days
- ✓ SVOC: aqueous: ≤6◦C extraction within 7 days, analysis withing 40days of extraction
- ✓ SVOC: solid: ≤6◦C extraction within 14 days, analysis withing 40days of extraction
- ✓ VOC: if sample vial has air bubble or headspace, is cracked, or improperly sealed qualify J- / UJ
- ✓ If hold time is exceeded qualify J- / UJ
- ✓ If hold time is grossly exceeded by a factor of 2 qualify J- / X

  Samples collected on 4/21
  Samples extracted on 4/25
  Samples analyzed on 4/26

  All ok

Tune Check/ICAL//ICV/CCV (from VI, VII, VII/Analysis Run Log)

- ✓ Tune check was performed at the beginning of each 12-hour period which sample were analyzed
- ✓ All tune check criteria is met
- ✓ minimum RF met listed below in Table IX
- ✓ if RF out then qualify J / UJ
- ✓ if RF <0.01 then qualify J / X
- ✓ ICAL: all %RSDs ≤15% or r2≥0.99
- ✓ if %RSD out then qualify J / UJ (>30% J / X)
- ✓ ICV after ICAL
- ✓ CCVs before sample, every 12 hours, ending
- ✓ all ICV/CCV %D ± 20%; if out ↑ qualify J+ / UJ; if out ↓ qualify J- / UJ
- ✓ closing CCV %D ± 50%
- ✓ RTs within established window
- ✓ For 8270 SIM analyses % degradation ≤20% for DDT

SEA101
DFTPP 580-423758/2 04/19/2023 20:58
ICV 580-423758/16 04/20/2023 02:06 1 0419a23_028.D
DFTPP 580-424232/2 04/26/2023 17:19 1 042623_018.D ZB-SV 0.25(mm)
CCVIS 580-424232/3 04/26/2023 17:43
CCVC 580-424232/42 04/27/2023 02:41

All ok

Surrogate (Form II)

- ✓ if acceptance criteria is not defined by project,

SAP: 2-Methylnaphthalene-d10: 40 - 140%
Fluoranthene-d10: 40 - 140%
Terphenyl-d14: 58 - 132%

- ✓ RTs within range of 5 pt
- ✓ do not evaluate for if diluted out
- ✓ if surrogate <lower limit but >10% within a fraction (acid or base/neutral) qualify associated fraction J- / UJ
- ✓ if surrogate >upper limit within a fraction (acid or base/neutral) qualify associated fraction J+
- ✓ if surrogate <10% within a fraction (acid or base/neutral) qualify associated fraction J- / X

All ok

LCS (Form III)

- ✓ one per prep batch
- ✓ If spike compound is not listed in Table C-15(solid) or C-16(aqueous) below then use lab limits
- ✓ if %R >upper limit qualify J+
- ✓ if %R <lower limit qualify J- / X
- ✓ if RPD out qualify J (positive results only)

SAP:

Analytical Accuracy (laboratory)	Lab Control Sample	1-Methylnaphthalene: 41 - 115%
		2-Methylnaphthalene: 39 - 114%
		Naphthalene: 43 - 114%
Analytical Precision (laboratory)	Lab Control Sample Duplicate	RPD ≤ 20%
	Lab Replicate	RPD ≤ 20%

All ok

MS/MSD (Form III)

✓ one per prep batch

✓ If spike compound is not listed in Table C-25 to C-28 above then use lab limits

SAP:

Analytical Accuracy (matrix interference)	Matrix Spike	1-Methylnaphthalene: 41 - 115%
		2-Methylnaphthalene: 39 - 114%
		Naphthalene: 43 - 114%
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicate	RPD ≤ 20%

✓ do not evaluate if sample concentration is >4X spike concentration

✓ if %R >upper limit qualify parent sample J+

✓ if %R <lower limit but >10%qualify parent sample J- / UJ

✓ if %R <10%qualify parent sample J- / X

✓ if RPD out qualify J (positive results only) 20

None

Blanks (Form IV/Form1)

✓ method blank – analyzed one per prep batch

✓ if method blank contamination is greater than field blank contamination then qualify the field blank (however, **do not** qualify a method blank for field blank contamination)

United States Department of Defense Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination, February 09, 2022

Table A: Sample Qualification in the Presence of Blank Contamination

	Sample		
Row Number	Result	Validated Result	Validation Qualifier
1	non-detect or detect ≤ LOD	Report at LOD	U
2	> LOD and ≤ 5x blank	Report at Sample Result	J+
3	> 5x blank	Report at Sample Result	None

LOD = Limit of Detection

Professional judgment should be applied to any field blank result that was associated with a contaminated method blank. Generally, if the blank result was qualified as a non-detect due to the method blank, it does not need to be applied to the associated sample results.

Module 1 - Page 18 of 52

However, the fact that the field blank was qualified should be noted in the data validation report.

Multiple blank contaminations (such as a batch with field blanks and a method blank) does not establish a 'hierarchy' of one blank over another. Each blank must be evaluated individually. Blanks should not be qualified due to the results of other blanks.

Method Blank

all ND

Field Blank

- ✓ trip blanks required for VOC – one per cooler
- ✓ use 5X rule to qualify
- ✓ use 10X rule to qualify for methylene chloride, acetone, 2-butanone, phthalates(SVOC)

none

Internal Standard Areas and RTs (Form VIII)

- ✓ areas within -50% to +100% of ICAL midpoint standard
- ✓ if area >200% of ICAL midpoint standard qualify J- (no qual for ND)
- ✓ if area <50% but >20% of ICAL midpoint standard qualify J+ / UJ
- ✓ if area <20% of ICAL midpoint standard qualify positive and NDs X
- ✓ RTs within 30 seconds of midpoint standard
- ✓ if RTs not withing 30 seconds qualify NDs X

all ok

Sample Data (Form I)

- ✓ Chromatogram acceptable
- ✓ manual integrations acceptable

N/A-2B

FIELD DUPLICATES

- ✓ if RPD is greater than those stated in the QAPP, qualification of the associated sample results is not necessary, but any non-conformities should be noted in the data validation summary.
- ✓ See field duplicate worksheet

SAP:

Overall Precision	Field Duplicate	RPD ≤ 30%

none

EDS internal checklist for:

Standard Operating Procedure Number: 11-B
Revised March 2015

Revision 1: April 2021

CLIENT: AECOM

PROJECT: Red Hill P Well

SDG: 580-126374-1

Validated by: DM 5/16/23

Reviewed by: **DLW 5/16/23**

LAB: Eurofins Seattle

Sample Receipt / Hold times (COC, receipt logs, case narrative)

- ✓ VOC: aqueous: ≤6◦C analyzed and properly preserved analyzed within 14 days
- ✓ VOC: solid: ≤6◦C and properly preserved analyzed within 14 days
- ✓ VOC: if sample vial has air bubble or headspace, is cracked, or improperly sealed qualify J- / UJ
- ✓ If hold time is exceeded qualify J- / UJ
- ✓ If hold time is grossly exceeded by a factor of 2 qualify J- / X

Department of Defense Module 4 Data Validation Guidelines: Data Validation Procedure for Organic Analysis by GC March 2021
Evaluation of Holding Time
*If the holding time is exceeded, qualify all associated detects as estimated **J-** and all associated non-detects as estimated **UJ** and document that holding times were exceeded.*
*If holding times are grossly exceeded (defined as > 14 days to extraction for aqueous samples and > 28 days for solid samples), detects should be qualified as estimated **J-** and non-detects as **X**, exclusion of data recommended.*

Collected: 4/21/23
Analyzed: 4/26/23

All ok

Instrument Performance Check, Calibration and Verification (Form V, run log)

- ✓ BFB before calibrations and verifications and every 12 hours
- ✓ all ion abundance criteria within range

All ok

Calibration and Verification (run log, Form VI, Form VII)

VOC

- ✓ minimum RF ≥0.05 unless listed below in Table VI or 0.01 for analytes in Table VIII in Module 1
- ✓ if RF out then qualify J / X
- ✓ ICAL: all %RSDs ≤15% except the CCC listed in Table VII below - %RSD ≤30% or r2≥0.99

  Per SAP ICV/CCV 20%D, closing CCV 50%

- ✓ if %RSD out then qualify J / UJ (>30% Q X per module 1)

Module 1: for gross exceedances %D>50 for ICV/CCV and >80% for closing CCV Q all X

TAC036
BFB 580-423084/2 04/12/2023 11:28 1 041223_002.D 624SIL-MS 0.25(mm)
ICIS 580-423084/7 04/12/2023 13:30 1 041223_007.D 624SIL-MS 0.25(mm)
ICV 580-423084/13 04/12/2023 15:55 1 041223_013.D 624SIL-MS 0.25(mm)
BFB 580-424116/1002 04/26/2023 02:03 1 -042523_035-BFB 624SIL-MS 0.25(mm)
CCVIS 580-424116/4 04/26/2023 02:51
CCVC 580-424116/31 04/26/2023 13:46

All ok except if noted above

Table VI: SPCCs average RFs should meet the following criteria (Method 8260B):

Analyte	Minimum Average RF (method uses the term "mean")
Chloromethane	0.1
1,1-Dichloroethane	0.1
Bromoform	0.1
Chlorobenzene	0.3
1,1,2,2-Tetrachloroethane	0.3

Table VII: CCCs (Method 8260B)

Analyte	
1,1-Dichloroethene	Toluene
Chloroform	Ethylbenzene
1,2-Dichloropropane	Vinyl Chloride

Table VIII: VOC Poor Performers (Method 8260B):

Analyte	
Acetone	1,2-Dibromo-3-chloropropane
2-Butanone	Isopropylbenzene
Carbon disulfide	Methyl acetate
Chloroethane	Methylene chloride
Cyclohexane	Methylcyclohexane
1,2-Dibromoethane	Methyl-tert-butyl ether
Dichlorodifluoromethane	trans-1,2-Dichloroethene
1,2-Dichloropropane	4-Methyl-2-pentanone
cis-1,2-Dichloroethene	2-Hexanone
1,4-Dioxane	Trichlorofluoroethane
1,2-Dibromo-3-chloropropane	1,1,2-Trichloro-1,2,2-triflouroethane

Evaluation of VOC RFs and %RSD

Blanks (Form IV, Form 1)

- ✓ evaluate storage, method, field and trip blanks
- ✓ method blank were prepared and analyzed in association with all samples in SDG
- ✓ method blank – analyzed one per prep batch

United States Department of Defense Data Validation Guidelines Modules 1, 2, 3, and 4 Revised Table for Sample Qualification in the Presence of Blank Contamination, February 09, 2022

Table A: Sample Qualification in the Presence of Blank Contamination

	Sample		
Row Number	Result	Validated Result	Validation Qualifier
1	non-detect or detect ≤ LOD	Report at LOD	U
2	> LOD and ≤ 5x blank	Report at Sample Result	J+
3	> 5x blank	Report at Sample Result	None

LOD = Limit of Detection

10x for common lab contaminates: methylene chloride, acetone, 2-butanone, cyclohexane

Method Blank
MB5804241166 all ND

RHP01-WQTB01-2304WK3 all ND
RHP02-WQTB01-2304WK3 all ND
RHP04A-WQTB01-2304WK3 all ND

Professional judgment should be applied to any field blank result that was associated with a contaminated method blank. Generally, if the blank result was qualified as a non-detect due to the method blank, it does not need to be applied to the associated sample results.

However, the fact that the field blank was qualified should be noted in the data validation report.

Multiple blank contaminations (such as a batch with field blanks and a method blank) does not establish a 'hierarchy' of one blank over another. Each blank must be evaluated individually. Blanks should not be qualified due to the results of other blanks.

Surrogates (Form II)

- ✓ Use laboratory or method specific criteria to evaluate
- ✓ do not evaluate if surrogates are diluted out
- ✓ if surrogate %R is outside limits qualify as noted below

ACTION: if any surrogate is below the lower acceptance limit but has a recovery greater than 10%, qualify positive results as estimated "J" and non-detects as estimated "UJ". If any surrogate is above the upper acceptance limit, qualify detects in the sample as estimated "J". Compounds with non-detects should not be qualified. If any surrogate in a fraction shows less than 10% recovery, flag detects for that fraction as estimated "J", and non-detects for the fraction as unusable "R".

SAP:

Analytical Accuracy	Surrogate	1,2-Dichloroethane-d4: 81 - 118%
		1-Bromo-4-fluorobenzene (4-Bromofluorobenzene): 85 - 114%
		Dibromofluoromethane: 80 - 119%
		Toluene-d8: 89 - 112%

All ok

LCS (Form III, batch worksheet)

- ✓ use lab limits to evaluate accuracy (%R)

ACTION: -If the LCS results are below the control limits, but above 10%, but the MS/MSD results are within control limits, sample data associated with the out-of-control point shall be discussed in the data validation report. No qualification of the data is necessary.

-If the LCS results are below the control limits, but above 10% and if the MS/MSD results are below the control limits but above 10%, spiked analytes that showed low recovery in all associated samples shall be flagged as estimated “J” or “UJ”.

-If the LCS results are below 10% and if the MS/MSD results are below 10%, only the spiked analytes that showed low recovery in all associated samples shall be flagged as “R” for non-detects and “J” for detects.

-If the associated blank spike and the MS/MSD recoveries are above the control limits, all positive results for only the spiked analyte that showed high recovery shall be estimated “J” in the associated samples.

-If the blank spike/LCS results are outside the control limits and no MS/MSD results are available, only the spiked analytes in all associated samples shall be qualified as listed:

a) If blank spike/LCS results are below the control limits (above 10%), spiked analytes that showed low recovery in all associated samples shall be flagged as estimated “UJ” or “J”.

b) If blank spike/LCS results are below 10%, only the spiked analytes that showed low recovery in all associated samples shall be flagged as “R” for non-detects and “J” for detects.

c) If blank spike/LCS results are above the control limits, detects for only the spiked analytes that showed high recovery in all associated samples shall be flagged as “J”.

✓ if qualification is required, qualified all samples prepped with the LCS

SAP:

Analytical Accuracy (laboratory)	Lab Control Sample	Benzene: 79 - 120%
		C6-C10 Gasoline Range Organics: 75 - 127%
		Ethylbenzene: 79 - 121%
		m,p-Xylene: 80 - 121%
		o-Xylene: 78 - 122%
		Petroleum Hydrocarbons (as Gasoline): 58 - 137%
		Toluene: 80 - 121%
		Xylenes, Total: 79 - 121%
Analytical Precision (laboratory)	Lab Control Sample Duplicate	RPD ≤ 20%
	Lab Replicate	RPD ≤ 20%

all ok

MS/MSD (Form III)

✓ one per prep batch

✓ do not evaluate if sample concentration is >4X spike concentration

✓ if %R >upper limit qualify parent sample J+

✓ if %R <lower limit but >10%qualify parent sample J- / UJ

- ✓ if %R <10%qualify parent sample J- / X
- ✓ if RPD out qualify J (positive results only)
- ✓ qualify parent sample only

SAP:

Analytical Accuracy (matrix interference)	Matrix Spike	Toluene: 80 - 121%
		Xylenes, Total: 79 - 121%
Analytical Accuracy/Bias (matrix interference)	Matrix Spike Duplicate	RPD ≤ 20%
Analytical Accuracy (matrix interference)	Matrix Spike	Benzene: 79 - 120%
		C6-C10 Gasoline Range Organics: 75 - 127%
		Ethylbenzene: 79 - 121%
		m,p-Xylene: 80 - 121%
		o-Xylene: 78 - 122%
		Petroleum Hydrocarbons (as Gasoline): 58 - 137%

List samples, results affected and qualifications below.

MS MSD RPD Parent Flag

None

Internal Standards (Form VIII)

areas within -50% to +100% of ICAL midpoint standard

- ✓ if area >200% of ICAL midpoint standard qualify J- (no qual for ND)
- ✓ if area <50% but >20% of ICAL midpoint standard qualify J+ / UJ
- ✓ if area <20% of ICAL midpoint standard qualify positive and NDs X
- ✓ RTs within 30 seconds of midpoint standard
- ✓ if RTs not withing 30 seconds qualify NDs X

List samples, results affected and qualifications below.

All ok

Target Compound Identification (Form1, raw data)

- ✓ RRTs for all positive results withing ±0.06 of standard
- ✓ primary and secondary ion intensities within 20% of that in the standard

N/A-2B

TICs (Form 1)

✓ all TICs should be qualified as tentatively identified - NJ

✓ any semi-volatile reported as a TIC should be qualified as rejected, “R”

None

Compound Quantitation (Form 1, run log, prep log, EDD)

✓ evaluate dilutions, re-extractions and re-analyses to confirm best results is reported and all other results are not reportable in EDD

N/A-2B

Field Duplicates

✓ Evaluate and qualify per QAPP if available for project

✓ see field duplicate worksheet

see field duplicate table

None

Data Validation Report for 5801263741

Facility:	JBPHH Site Characterization
Event:	P-Well Sampling April 2023
SDG:	5801263741
Guidance Document:	2022 JBPHH Site Characterization UFP-QAPP
Prime Contractor:	AECOM, Honolulu, HI
Project Manager:	Peggy Schuler
Contract Laboratory(ies):	Eurofins Environment Testing TestAmerica, Tacoma, WA
Data Review Contractor:	Environmental Data Services Ltd.
Data Review Level:	S2BVEM
Primary Data Reviewer:	Gretchen Phipps, Technical Specialist
Date Submitted:	May 16, 2023

Field Sample ID	Lab Sample ID	Matrix	Type/Type Code	BNASIM	M8015D	SW8015D	SW8260	SW8260D
RHP01-WGN01LF-2304WK3	580-126374-4	Water	Field Sample/N	X		X	X	X
RHP01-WQTB01-2304WK3	580-126374-3	Water	Trip Blank/TB				X	X
RHP02-WGN01LF-2304WK3	580-126374-2	Water	Field Sample/N	X		X	X	X
RHP02-WQTB01-2304WK3	580-126374-1	Water	Trip Blank/TB				X	X
RHP04A-WGN01LF-2304WK3	580-126374-6	Water	Field Sample/N	X	X	X	X	X
RHP04A-WQTB01-2304WK3	580-126374-5	Water	Trip Blank/TB				X	X

This report assesses the analytical data quality associated with the analyses listed on the preceding cover page at S2BVEM data validation level. This assessment has been made through a combination of automated data review (ADR) and supplemental manual review, the details of which are described below. The approach taken in the review of this data set is consistent with the requirements contained in the 2022 JBPHH Site Characterization UFP-QAPP and the additional guidance documents incorporated by reference to the extent possible. Where definitive guidance is not provided, results have been evaluated in a conservative manner using professional judgment.

Sample collection was managed and directed by AECOM, Honolulu, HI; analyses were performed by Eurofins Environment Testing TestAmerica, Tacoma, WA and were reported under sample delivery group (SDG) 5801263741. Data have been evaluated electronically based on electronic data deliverables (EDDs) provided by the laboratory, and hard copy data summary forms have also been reviewed during this effort and compared to the automated review output by the reviewers whose signatures appear on the following page. Findings based on the automated data submission and manual data verification processes are detailed in the ADR narrative and throughout this report.

All quality control (QC) elements associated with this SDG have been reviewed by a project chemist in accordance with the requirements defined for the project. This review is documented in the attached Data Review Checklists. The QC elements listed below were supported by the electronic deliverable and were evaluated using ADR processes.

- Continuing Calibration Verification
- Lab Blank
- LCS Recovery
- LCS RPD
- Prep Hold Time
- Surrogate
- Test Hold Time
- Trip Blank

Results of the ADR process were subsequently reviewed and updated as applicable by the data review chemists identified on the signature page. Quality control elements that were not included in the electronic deliverable were reviewed manually and findings are documented within this report. Summaries of findings and associated qualified results are documented throughout this report.

A total of 0 results (0.00%) out of the 59 results (sample and field QC samples) reported are qualified based on review and 0 results (0.00%) have been rejected or deemed a serious deficiency (X qualifier). Trace values, defined as results that are qualified as estimated because they fall between the detection limit and the reporting limit/limit of quantitation, are not counted as qualified results in the above count. The qualified results are detailed throughout this report and discussed in the narrative below, where appropriate.

Narrative Comments

Analytical Method	Data Reviewer Comment
BNASIM	No additional comments; see Checklist for detail.
M8015D	No additional comments; see Checklist for detail.
SW8015D	No additional comments; see Checklist for detail.
SW8260	No additional comments; see Checklist for detail.
SW8260D	No additional comments; see Checklist for detail.

May 16, 2023

Reviewed by Gretchen Phipps, Technical Specialist,
Environmental Data Services Ltd.

As the Reviewer, I certify that I have performed a data review process in accordance with the requirements of the project guidance document, and have compared the electronic data to the laboratory's hard copy report and have verified the consistency of the reported sample results and method quality control data between the two deliverables.

No Outliers were associated with this sample delivery group.

Qualified Results

No results associated with this sample delivery group required qualification.

Results with Modified Qualifiers

No qualifiers associated with this sample delivery group were modified manually.

Reason Code Definitions

Code	Definition
TR	Trace Level Detect

Flag Code and Definitions

Flag	Definition
J	Estimated Value
N	The analysis indicates the presence of an analyte for which there was presumptive evidence to make a tentative identification.
NJ	The analyte has been tentatively identified or presumptively as present and the associated numerical value was the estimated concentration in the sample.
R	The data are rejected due to deficiencies in meeting QC criteria and may not be used for decision making.

U	Undetected: The analyte was analyzed for, but not detected.
UJ	The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.
X	Result may require rejection; PDT attention required

Bias	
-	The result may be biased low
+	The result may be biased high
Note - The bias field is a separate field; however, it is an integral part of the final flag (qualifier) on the sample result	

Review Questions

Method: BNASIM (GC/MS-SIM Analysis of 1,4-Dioxane by SW8270)				
Review Questions	Yes	No	NA	Comment
Were there discrepancies between the COC and the samples received?				
Were there discrepancies between the COC and the sample labels?				
Were samples relinquished properly on the COC?				
Were all samples properly preserved?				
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) documented?				
Were sample results reported with percent moisture correction if required?				
Were analytical methods performed and analysis dates present?				
Were all requested target analytes reported?				
Were QAPP specified Project Quantitation Limit Goals achieved? (The laboratory LOQ is compared to the QAPP Project Quantitation Goal)				
Were holding times met?				
Were trip blanks analyzed at the proper frequency and in control?				
Were field blanks analyzed at the proper frequency and in control?				
Were equipment blanks analyzed at the proper frequency and in control?				
Was a method blank prepared and analyzed with each batch?				
Were target analytes in the method blank less than DL?				
Was an LCS/LCSD pair prepared and analyzed with each batch?				
Were LCS/LCSD recoveries within project acceptance limits?				
Was the LCS/LCSD RPD within project acceptance limits?				
Was a MS/MSD pair prepared with each batch?				
Were MS/MSD recoveries within project acceptance limits?				
Was the MS/MSD RPD within project acceptance limits?				
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?				
Were surrogate recoveries within project acceptance limits?				
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?				
Were reported sample concentrations within calibration range?				
Was the GC/MS system properly tuned based on method criteria?				
Was instrument tuning completed every 12 hours during sample analysis?				
Was the Calibration within project acceptance criteria?				

Review Questions

Method: BNASIM (GC/MS-SIM Analysis of 1,4-Dioxane by SW8270)				
Review Questions	Yes	No	NA	Comment
Was a ICV performed after each ICAL prior to sample analysis and within project acceptance criteria?				
Were CCVs run at the required frequency and within project acceptance criteria?				
Were internal standard retention times and area criteria within project acceptance criteria?				
Were internal standards spiked for every sample, standard, and QC sample?				
Were instrument run logs present and filled out appropriately?				
Were sample preparation sheets present and filled out appropriately?				
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?				
Were DoD QSM corrective actions followed if deviations were noted?				
Were any data recommended for exclusion in the data validation process?				

Review Questions

Method: M8015D (Modified SW8015 for the Determination of Diesel Range Organics in Soil and Water, GC/FID)				
Review Questions	Yes	No	NA	Comment
Were there discrepancies between the COC and the samples received?				
Were there discrepancies between the COC and the sample labels?				
Were samples relinquished properly on the COC?				
Were all samples properly preserved?				
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) documented?				
Were sample results reported with percent moisture correction if required?				
Were analytical methods performed and analysis dates present?				
Were all requested target analytes reported?				
Were QAPP specified Project Quantitation Limit Goals achieved? (The laboratory LOQ is compared to the QAPP Project Quantitation Goal)				
Were holding times met?				
Were trip blanks analyzed at the proper frequency and in control?				
Were field blanks analyzed at the proper frequency and in control?				
Were equipment blanks analyzed at the proper frequency and in control?				
Was a method blank prepared and analyzed with each batch?				
Were target analytes in the method blank less than DL?				
Was an LCS/LCSD pair prepared and analyzed with each batch?				
Were LCS/LCSD recoveries within project acceptance limits?				
Was the LCS/LCSD RPD within project acceptance limits?				
Was a MS/MSD pair prepared with each batch?				
Were MS/MSD recoveries within project acceptance limits?				
Was the MS/MSD RPD within project acceptance limits?				
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?				
Were surrogate recoveries within project acceptance limits?				
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?				
Were reported sample concentrations within calibration range?				
Were Instrument Performace Checks (Degradation Checks) performed and within acceptace criteria?				
Was the Calibration within project acceptance criteria?				
Was a ICV performed after each ICAL prior to sample analysis and within project acceptance criteria?				

Review Questions

Method: M8015D (Modified SW8015 for the Determination of Diesel Range Organics in Soil and Water, GC/FID)				
Review Questions	Yes	No	NA	Comment
Were CCVs run at the required frequency and within project acceptance criteria?				
Were internal standard retention times and area criteria within method requirements?				
Were internal standards spiked for every sample, standard, and QC sample?				
Were instrument run logs present and filled out appropriately?				
Were sample preparation sheets present and filled out appropriately?				
Was a Cleanup Procedure required (Cleanup Recovery Checks) verified and within acceptance limits?				
Was a Second Column/Detector used and the column difference within acceptance limits?				
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?				
Were DoD QSM corrective actions followed if deviations were noted?				
Were any data recommended for exclusion in the data validation process?				

Review Questions

Method: SW8015D (Nonhalogenated Organics using GC/FID)

Review Questions	Yes	No	NA	Comment
Were there discrepancies between the COC and the samples received?				
Were there discrepancies between the COC and the sample labels?				
Were samples relinquished properly on the COC?				
Were all samples properly preserved?				
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) documented?				
Were sample results reported with percent moisture correction if required?				
Were analytical methods performed and analysis dates present?				
Were all requested target analytes reported?				
Were QAPP specified Project Quantitation Limit Goals achieved? (The laboratory LOQ is compared to the QAPP Project Quantitation Goal)				
Were holding times met?				
Were trip blanks analyzed at the proper frequency and in control?				
Were field blanks analyzed at the proper frequency and in control?				
Were equipment blanks analyzed at the proper frequency and in control?				
Was a method blank prepared and analyzed with each batch?				
Were target analytes in the method blank less than DL?				
Was an LCS/LCSD pair prepared and analyzed with each batch?				
Were LCS/LCSD recoveries within project acceptance limits?				
Was the LCS/LCSD RPD within project acceptance limits?				
Was a MS/MSD pair prepared with each batch?				
Were MS/MSD recoveries within project acceptance limits?				
Was the MS/MSD RPD within project acceptance limits?				
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?				
Were surrogate recoveries within project acceptance limits?				
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?				
Were reported sample concentrations within calibration range?				
Were Instrument Performace Checks (Degradation Checks) performed and within acceptace criteria?				
Was the Calibration within project acceptance criteria?				
Was a ICV performed after each ICAL prior to sample analysis and within project acceptance criteria?				

Review Questions

Method: SW8015D (Nonhalogenated Organics using GC/FID)				
Review Questions	Yes	No	NA	Comment
Were CCVs run at the required frequency and within project acceptance criteria?				
Were internal standard retention times and area criteria within method requirements?				
Were internal standards spiked for every sample, standard, and QC sample?				
Were instrument run logs present and filled out appropriately?				
Were sample preparation sheets present and filled out appropriately?				
Was a Cleanup Procedure required (Cleanup Recovery Checks) verified and within acceptance limits?				
Was a Second Column/Detector used and the column difference within acceptance limits?				
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?				
Were DoD QSM corrective actions followed if deviations were noted?				
Were any data recommended for exclusion in the data validation process?				

Review Questions

Method: SW8260 (Volatile Organic Compounds by Capillary GC/MS)

Review Questions	Yes	No	NA	Comment
Were there discrepancies between the COC and the samples received?				
Were there discrepancies between the COC and the sample labels?				
Were samples relinquished properly on the COC?				
Were all samples properly preserved?				
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) documented?				
Were sample results reported with percent moisture correction if required?				
Were analytical methods performed and analysis dates present?				
Were all requested target analytes reported?				
Were QAPP specified Project Quantitation Limit Goals achieved? (The laboratory LOQ is compared to the QAPP Project Quantitation Goal)				
Were holding times met?				
Were trip blanks analyzed at the proper frequency and in control?				
Were field blanks analyzed at the proper frequency and in control?				
Were equipment blanks analyzed at the proper frequency and in control?				
Was a method blank prepared and analyzed with each batch?				
Were target analytes in the method blank less than DL?				
Was an LCS/LCSD pair prepared and analyzed with each batch?				
Were LCS/LCSD recoveries within project acceptance limits?				
Was the LCS/LCSD RPD within project acceptance limits?				
Was a MS/MSD pair prepared with each batch?				
Were MS/MSD recoveries within project acceptance limits?				
Was the MS/MSD RPD within project acceptance limits?				
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?				
Were surrogate recoveries within project acceptance limits?				
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?				
Were reported sample concentrations within calibration range?				
Was the GC/MS system properly tuned based on method criteria?				
Was instrument tuning completed every 12 hours during sample analysis?				
Was the Calibration within project acceptance criteria?				

Review Questions

Method: SW8260 (Volatile Organic Compounds by Capillary GC/MS)				
Review Questions	Yes	No	NA	Comment
Was a ICV performed after each ICAL prior to sample analysis and within project acceptance criteria?				
Were CCVs run at the required frequency and within project acceptance criteria?				
Were internal standard retention times and area criteria within project acceptance criteria?				
Were internal standards spiked for every sample, standard, and QC sample?				
Were instrument run logs present and filled out appropriately?				
Were sample preparation sheets present and filled out appropriately?				
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?				
Were DoD QSM corrective actions followed if deviations were noted?				
Were any data recommended for exclusion in the data validation process?				

Review Questions

Method: SW8260D (Volatile Organic Compounds by GC/MS)

Review Questions	Yes	No	NA	Comment
Were there discrepancies between the COC and the samples received?				
Were there discrepancies between the COC and the sample labels?				
Were samples relinquished properly on the COC?				
Were all samples properly preserved?				
Were sampling dates/times, date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) documented?				
Were sample results reported with percent moisture correction if required?				
Were analytical methods performed and analysis dates present?				
Were all requested target analytes reported?				
Were QAPP specified Project Quantitation Limit Goals achieved? (The laboratory LOQ is compared to the QAPP Project Quantitation Goal)				
Were holding times met?				
Were trip blanks analyzed at the proper frequency and in control?				
Were field blanks analyzed at the proper frequency and in control?				
Were equipment blanks analyzed at the proper frequency and in control?				
Was a method blank prepared and analyzed with each batch?				
Were target analytes in the method blank less than DL?				
Was an LCS/LCSD pair prepared and analyzed with each batch?				
Were LCS/LCSD recoveries within project acceptance limits?				
Was the LCS/LCSD RPD within project acceptance limits?				
Was a MS/MSD pair prepared with each batch?				
Were MS/MSD recoveries within project acceptance limits?				
Was the MS/MSD RPD within project acceptance limits?				
If ISM was used for sample collection, were laboratory triplicates analyzed and within project acceptance limits?				
Were surrogate recoveries within project acceptance limits?				
Were field replicates (duplicates, triplicates, etc.) analyzed at the proper frequency and in control?				
Were reported sample concentrations within calibration range?				
Was the GC/MS system properly tuned based on method criteria?				
Was instrument tuning completed every 12 hours during sample analysis?				
Was the Calibration within project acceptance criteria?				

Review Questions

Method: SW8260D (Volatile Organic Compounds by GC/MS)				
Review Questions	Yes	No	NA	Comment
Was a ICV performed after each ICAL prior to sample analysis and within project acceptance criteria?				
Were CCVs run at the required frequency and within project acceptance criteria?				
Were internal standard retention times and area criteria within project acceptance criteria?				
Were internal standards spiked for every sample, standard, and QC sample?				
Were instrument run logs present and filled out appropriately?				
Were sample preparation sheets present and filled out appropriately?				
Have all Laboratory Case Narrative comments/findings been addressed in the data review process?				
Were DoD QSM corrective actions followed if deviations were noted?				
Were any data recommended for exclusion in the data validation process?				