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NASJRB WILLOW GROVE  
5090.3a

VALIDATED DATA PACKAGE, PC14031, NAS WILLOW GROVE PA  
11/24/2014  
RESOLUTION CONSULTANTS



### Purpose

This form is intended to accompany Laboratory Data Packages and/or Data Validation Narratives submitted to the NIRIS Regional Data Manager (RDM). The information provided will supplement metadata requirements necessary for inclusion to NIRIS and the Federal Records Center (FRC).

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<b>Validator Name and SDG #:</b>	<u>Lori Herberich/Resolution Consultant PC14031- Metals</u>		

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## Data Validation Report

Project: NAS JRB Willow Grove, PA

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Laboratory: Shealy Environmental, Inc.

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Service Request: PC14031

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Analyses/Method: EPA SW-846 Method 6010C (ICP-AES)  
EPA SW-846 Method 7470A for Mercury in Liquid Waste (Manual Cold-Vapor Technique) and  
EPA SW-846 Method 7471B for Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)

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Validation Level: Limited

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Resolution Consultants Project Number: 60276503.PP.QS

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Prepared by: Kristin Rutherford/Resolution Consultants      Completed on: 05/05/2014

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Reviewed by: Lori Herberich/Resolution Consultants      File Name: PC14031 Metals.docx

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### SUMMARY

The samples listed below were collected by Resolution Consultants from the NAS JRB Willow Grove, PA site on March 11, 2014, March 12, 2014 and March 13, 2014.

Sample ID	Matrix/Sample Type
139-EB-01-031214	Equipment blank
OEB-01-0-031314	Equipment blank
112-S-01D-031214	Field Duplicate of 112-S-01-031214
OWS-S-08D-031314	Field Duplicate of OWS-S-08-031314
112-S-01-031214	Soil
112-S-02-031214	Soil
112-S-03-031214	Soil
112-S-04-031214	Soil
112-S-05-031214	Soil
112-S-06-031214	Soil
112-S-07-031214	Soil
OWS-S-01-031314	Soil
OWS-S-02-031314	Soil
OWS-S-03-031314	Soil
OWS-S-04-031314	Soil
OWS-S-05-031314	Soil
OWS-S-06-031314	Soil
OWS-S-07-031314	Soil

Sample ID	Matrix/Sample Type
OWS-S-08-031314	Soil

Data validation activities were conducted with reference to

- *DoD Quality Systems Manual (QMS) for Environmental Laboratories, version 4.2 (10/2010) (October 2010);*
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846, specifically SW-846 Method 6010C, Inductively Coupled Plasma-Atomic Emission Spectrometry (USEPA, 1996);*
- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846, specifically SW-846 Method 7470A, Mercury in Liquid Waste (Manual Cold-Vapor Technique) (USEPA, 1996) and/or SW-846 Method 7471B Mercury In Solid or Semisolid Waste (Manual Cold-Vapor Technique) (USEPA, 1996);*
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010);*
- the project-specific Sampling and Analysis Plan; and
- laboratory quality control (QC) limits, as applicable.

## REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody (COC)/sample integrity
- ✓ Holding times and sample preservation
- ✗ Initial calibration/continuing calibration verification
- ✗ Laboratory blanks/equipment blanks
- ✗ ICP interference check standards
- ✗ Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✗ Laboratory duplicate results
- ✓ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- ✗ Field duplicates
- ✓ ICP serial dilution results
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a quality control (QC) nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were estimated, negated, and/or rejected due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

## RESULTS

### Data Completeness

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

Note that equipment blank 139-EB-01-031214 was marked on the COC for lead analysis only; however, the sample was analyzed and reported for all TAL metals by the laboratory.

### Holding Times/Sample Preservation

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria.

Samples were received at 1.0C which is outside of the 4°C ± 2°C criteria. No qualifications were required since samples were received in good condition on ice.

### Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- all criteria were met for the calibration curves
- the initial calibration verification (ICV) percent recovery (%R) criteria were met;
- the continuing calibration verification standard (CCV) method percent difference (%Ds) were met; and
- the low level check standards (CRI or CRA) %R criteria were met.

Nonconformances are summarized in Attachment A in Table A-1. Data qualification to the analytes associated with the specific ICV, CCV and/or CRI/CRA was as follows:

#### **ICV/CCV Nonconformances:**

Qualification based on ICV/CCV	%R of Analyte in the ICV/CCV and Recommended Actions				
	< 75%	75 to 89%	111 to 125%	126 to 160%	> 160%
<u>ICP-AES and ICP-MS Metals (ICV/CCV) and Mercury (ICV)</u>					
<u>Mercury (CCV)</u>	< 65%	65 to 79%	121 to 135%	136 to 170%	> 170%
Detected Results	J- or R	J-	J+ [1]	J+ or R	R
Nondetects	R	UJ	Accept	Accept	Accept

Qualified sample results are shown in Table 1.

**CRI/CRA Nonconformances:**

Qualification based on CRI/CRA	%R of Analyte in the CRI/CRA and Recommended Actions			
	< 50%	50 to 79%	121 to 180%	> 180%
All Analytes				
Detected Results > 2x the CRI/CRA	J- [1]	Accept	Accept	R
Detected Results < 2x the CRI/CRA	R	J-	J+	R
Nondetects	R	UJ	Accept	Accept

[1] A "J" is the recommended qualifier in the NFGs; however, Resolution Consultants will indicate bias in these instances.

Qualified sample results are shown in Table 1.

**Laboratory Blanks/Equipment Blanks**

Laboratory method blanks and equipment rinsate blanks were evaluated as to whether there were contaminants detected above the detection limit (DL). Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Method and equipment rinsate results were reviewed for conformance with the QC acceptance criteria. Detected results in blanks are not discussed in this data validation report if the associated results were nondetect or if qualification of sample results was not required.

Nonconformances are summarized in Attachment A in Tables A-2a, A-2b, and A-2c. Sample results were qualified as follows:

Blank Type	Blank Result	Sample Result	Action for Samples
ICB/CCB (Positive)	≥DL but ≤ LOQ	Nondetect	No action
		≥DL but <LOQ	Qualify as nondetect (U) at the LOQ
		> LOQ	No action is taken based on Resolution Consultants professional judgment
	>LOQ	≥DL but <LOQ	Qualify as nondetect (U) at the LOQ
		> LOQ but < ICB/CCB Result	Qualify at level of Blank Result with a "U" or Qualify result as unusable
		>ICB/CCB but <10x the ICB/CCB result	Qualify as estimated (J)
	≥10x ICB/CCB	No action is taken based on Resolution Consultants professional judgment	
ICB/CCB (Negative)	< (-LOQ)	Nondetect	Use Resolution Consultants professional judgment and qualify as estimated (UJ)
		≥DL but < LOQ	Use Resolution Consultants professional judgment and qualify results < LOQ as estimated (J)
		< 10x LOQ	Qualify results >LOQ but <10x LOQ as estimated (J)
		≥10x LOQ	No action is taken based on Resolution Consultants professional judgment
	≤ -DL and ≥ -LOQ	Nondetect	Use Resolution Consultants professional judgment, qualify as estimated (UJ)
		≥DL and <5x [neg. blank]	Use Resolution Consultants professional judgment, qualify results as estimated (J)
PB / EB/ FB (Positive)	> LOQ	≥DL but ≤ LOQ	Qualify as nondetect (U) at the LOQ
		>LOQ but < 10x Blank Result	Qualify results as unusable
		≥10x Blank Result	No action

Blank Type	Blank Result	Sample Result	Action for Samples
	≥DL but ≤LOQ	Nondetect	No action
		>DL but <LOQ	Qualify as nondetect (U) at the LOQ
		> LOQ	No action is taken based on Resolution Consultants professional judgment
<b>PB (Negative)</b>	< (-LOQ)	< 10x LOQ	Qualify positive results <10x LOQ as estimated (J) and nondetects as estimated (UJ)
		≥10x LOQ	No action

Qualified sample results are shown in Table 1.

### ICP Interference Check Standards

The ICP interference check standards (ICSA, ICSAB) were reviewed for conformance.

Nonconformances are summarized in Attachment A in Table A-3. Data qualification on the basis of the ICS A and ICS AB solutions was as follows:

### **ICS A and ICS AB Nonconformances:**

Qualify Results	% R of Analyte in the ICS A and AB Solutions		
	%R < 50	%R = 50 - 79 or < true value - LOD	%R > 120 or > true value + LOD
Detected Results	J- / R (6010B/6020)	J-	J+
Nondetects	R	UJ	Accept

Limited Validation: Apply actions to all samples in the analytical sequence.

### MS Results

The MS and/or MSD %Rs and/or relative percent difference (RPD) were reviewed for conformance with the QC acceptance criteria.

Sample OWS-S-04-031314 (PC14031-004) was analyzed as an MS for TAL Metals in this SDG. Due to recoveries less than 30%, the nondetect results for silver and thallium in sample OWS-S-04-031314 were rejected (R), and the positive result for antimony in sample OWS-S-04-031314 was qualified as estimated (J-) with potential low bias.

Sample OWS-S-05-031314 (PC4031-005) was analyzed as an MS/MSD in this SDG. Since the recoveries for most analytes were within QC criteria in two of the three matrix spikes performed on the site samples, qualifications for sample OWS-S-04-031314 (PC14031-004) were based on the recoveries for the matrix spike performed on that sample. Qualifications for the other soil samples in this SDG were based on the recoveries and RPDs of the matrix spike performed on sample OWS-S-05-031314 (PC4031-005).

Due to recoveries less than 30%, the positive results for antimony in all soil samples except OWS-S-04-031314 were qualified as estimated (J-) with potential low bias. Based on professional judgment, results qualified as nondetect for antimony due to blank contamination were qualified (J-) as estimated rather than rejected due to matrix spike recoveries in all soil samples except OWS-S-04-031314 (PC14031-004).

Recoveries for lead, silver, and thallium were below QC criteria in MS and/or MSD performed on sample OWS-S-05-031314. The results for lead, silver and thallium in all soils except OWS-S-04-031314 were qualified as estimated (J-) and may be biased low. The recoveries for magnesium and potassium were above QC limits; the positive results in all soils except OWS-S-04-031314 were

qualified as estimated (J+) and may be biased high. The RPD for antimony and potassium did not meet criteria (<20%); therefore, the positive results for antimony and potassium in all soils except OWS-S-04-031314 were qualified as estimated (J) with an unknown direction of bias. Since the results for aluminum and iron in the spiked sample were greater than 4X the spiked amount; no qualifications were required.

Nonconformances are summarized in Attachment A in Table A-4. Data qualification on the basis of MS and/or MSD nonconformances was as follows:

Qualify Results	%R < 30	80 > %R ≥ 30	%R >120	RPD>20
Detected results	J-	J-	J+	J
Nondetects	R	UJ	Accept	UJ

Notes: MS actions apply to all samples of the same matrix. This qualification will also be applied to the results of all samples within a given area of the site, if deemed appropriate.

1. If the sample result (SR) > 4x the spike concentration (S), no action is taken.
2. If either the MS or MSD does not meet %R criteria, qualify all associated samples.

Qualified sample results are shown in Table 1.

#### **Laboratory Duplicate Results**

A laboratory duplicate was not analyzed in this SDG. The relative percent differences (RPDs) of the MS/MSD were reviewed for conformance. See Matrix Spike section for RPD criteria.

#### **LCS/LCSD Results**

The LCS/LCSD %Rs and/or RPDs were reviewed for conformance with the QC acceptance criteria.

The LCS and LCSD %Rs and RPDs were within the QC acceptance criteria.

#### **Field Duplicate Results**

Field duplicate RPDs were reviewed for conformance with the Resolution Consultants QC acceptance criterion of ≤50% for solid matrices and ≤30% for aqueous matrices. This criterion applies if both results were greater than 5 times the limit of quantitation (LOQ).

Sample 112-S-01D-031214 was collected as a field duplicate of sample 112-S-01-031214 for lead analysis. RPD criteria were met; no qualifications were required.

Sample OWS-S-08D-031314 was collected as a field duplicate of sample OWS-S-08-031314 for TAL metals analysis in this SDG.

Nonconformances are summarized in Attachment A in Table A-5. Data qualifications on the basis of field duplicate RPDs were as follows:

**Actions:** (Based on Resolution Consultants professional judgment)

Criteria	RPD	Action	
		Detected	Nondetected
Sample and duplicate are nondetect results	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results <LOQ	Not applicable	No qualification	No qualification
Sample and duplicate results $\geq 5 \times \text{LOQ}$	>30% Aqueous >50% All other sample types	J	Not Applicable
Sample and duplicate results are >SLOQ and <5xLOQ	>60% Aqueous >100% All other sample types	J	Not Applicable
If sample or duplicate result is =LOQ and the other is not detected	NC	J	UJ
If sample or duplicate result is <LOQ and the other is not detected	NC	No qualification	No qualification

Qualified sample results are summarized in Table 1.

**ICP Serial Dilution Results**

The serial dilution percent differences (%Ds) were reviewed for conformance with the QC acceptance criteria.

The serial dilution %Ds were within the QC acceptance criteria.

**Sample Results/Reporting Issues**

All analytes detected at concentrations less than the limit of quantitation (LOQ) but greater than the detection limit (DL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

Resolution Consultants professional judgment was used to qualify sample results with percent solids that were <30%.

All criteria were met.

**QUALIFICATION ACTIONS**

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

**ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

**Table 1 - Data Validation Summary of Qualified Data**

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
112-S-01-031214	SO	LEAD	600	0.32	0.63	MG/KG	J-	m
112-S-01D-031214	SO	LEAD	510	0.33	0.65	MG/KG	J-	m
112-S-02-031214	SO	LEAD	780	0.34	0.67	MG/KG	J-	m
112-S-03-031214	SO	LEAD	280	0.30	0.59	MG/KG	J-	m
112-S-04-031214	SO	LEAD	280	0.31	0.62	MG/KG	J-	m
112-S-05-031214	SO	LEAD	130	0.36	0.71	MG/KG	J-	m
112-S-06-031214	SO	LEAD	230	0.30	0.59	MG/KG	J-	m
112-S-07-031214	SO	LEAD	550	0.31	0.61	MG/KG	J-	m
139-EB-01-031214	WQ	THALLIUM		0.025	0.050	MG/L	UJ	z
OEB-01-0-031314	WQ	ARSENIC		0.010	0.010	MG/L	U	bl
OEB-01-0-031314	WQ	THALLIUM		0.025	0.050	MG/L	UJ	z
OEB-01-0-031314	WQ	MERCURY		0.00010	0.00010	MG/L	U	bl
OWS-S-01-031314	SO	ANTIMONY	0.72	0.28	0.55	MG/KG	J	fd,m,md
OWS-S-01-031314	SO	ARSENIC		0.55	0.55	MG/KG	U	be
OWS-S-01-031314	SO	LEAD	1.2	0.28	0.55	MG/KG	J-	m
OWS-S-01-031314	SO	MAGNESIUM	430	54	270	MG/KG	J+	m
OWS-S-01-031314	SO	MANGANESE	310	0.16	0.82	MG/KG	J	fd
OWS-S-01-031314	SO	POTASSIUM	290	27	270	MG/KG	J	m,md
OWS-S-01-031314	SO	SILVER	5.0	0.14	0.27	MG/KG	J-	m
OWS-S-01-031314	SO	THALLIUM		0.54	2.7	MG/KG	UJ	m,z
OWS-S-02-031314	SO	ANTIMONY	0.67	0.29	0.58	MG/KG	J	fd,m,md
OWS-S-02-031314	SO	ARSENIC		0.58	0.58	MG/KG	U	be
OWS-S-02-031314	SO	LEAD	7.1	0.29	0.58	MG/KG	J-	m
OWS-S-02-031314	SO	MAGNESIUM	3100	58	290	MG/KG	J+	m
OWS-S-02-031314	SO	MANGANESE	52	0.18	0.88	MG/KG	J	fd
OWS-S-02-031314	SO	POTASSIUM	3500	29	290	MG/KG	J	m,md
OWS-S-02-031314	SO	SILVER	6.3	0.15	0.29	MG/KG	J-	m
OWS-S-02-031314	SO	THALLIUM		0.58	2.9	MG/KG	UJ	m,z
OWS-S-03-031314	SO	ANTIMONY		0.55	0.55	MG/KG	UJ	bl,fd,m,md
OWS-S-03-031314	SO	LEAD	0.24	0.28	0.55	MG/KG	J-	m
OWS-S-03-031314	SO	MAGNESIUM	440	54	270	MG/KG	J+	m
OWS-S-03-031314	SO	MANGANESE	160	0.16	0.82	MG/KG	J	fd
OWS-S-03-031314	SO	POTASSIUM	210	27	270	MG/KG	J	m,md
OWS-S-03-031314	SO	SILVER	4.8	0.14	0.27	MG/KG	J-	m
OWS-S-03-031314	SO	THALLIUM		0.54	2.7	MG/KG	UJ	m,z
OWS-S-04-031314	SO	ANTIMONY		1.1	1.1	MG/KG	UJ	bl,fd,m
OWS-S-04-031314	SO	ARSENIC		1.1	1.1	MG/KG	U	bl
OWS-S-04-031314	SO	BARIIUM	120	0.27	1.4	MG/KG	J-	m
OWS-S-04-031314	SO	BERYLLIUM	2.0	0.22	0.44	MG/KG	J-	m

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
OWS-S-04-031314	SO	CALCIUM	930	54	270	MG/KG	J-	m
OWS-S-04-031314	SO	COBALT	6.5	0.27	1.4	MG/KG	J-	m
OWS-S-04-031314	SO	LEAD	9.5	0.28	0.55	MG/KG	J-	m
OWS-S-04-031314	SO	MAGNESIUM	3500	110	550	MG/KG	J+	m
OWS-S-04-031314	SO	MANGANESE	70	0.16	0.82	MG/KG	J	m,fd
OWS-S-04-031314	SO	POTASSIUM	4200	27	270	MG/KG	J+	m
OWS-S-04-031314	SO	SILVER				MG/KG	R	m
OWS-S-04-031314	SO	THALLIUM				MG/KG	R	c,m,z
OWS-S-05-031314	SO	ANTIMONY	0.59	0.27	0.53	MG/KG	J	fd,m,md
OWS-S-05-031314	SO	LEAD	1.5	0.27	0.53	MG/KG	J-	m
OWS-S-05-031314	SO	MAGNESIUM	1100	52	260	MG/KG	J+	m
OWS-S-05-031314	SO	MANGANESE	52	0.16	0.79	MG/KG	J	fd
OWS-S-05-031314	SO	POTASSIUM	740	26	260	MG/KG	J	m,md
OWS-S-05-031314	SO	SILVER	4.5	0.13	0.26	MG/KG	J-	m
OWS-S-05-031314	SO	THALLIUM		0.52	2.6	MG/KG	UJ	m,z
OWS-S-06-031314	SO	ANTIMONY	0.42	0.55	1.1	MG/KG	J	m,md,fd
OWS-S-06-031314	SO	LEAD	7.8	0.55	1.1	MG/KG	J-	m
OWS-S-06-031314	SO	MAGNESIUM	1600	56	280	MG/KG	J+	m
OWS-S-06-031314	SO	MANGANESE	78	0.17	0.83	MG/KG	J	fd
OWS-S-06-031314	SO	POTASSIUM	2100	28	280	MG/KG	J	m,md
OWS-S-06-031314	SO	SILVER		0.28	0.55	MG/KG	UJ	m
OWS-S-06-031314	SO	SODIUM	85	110	550	MG/KG	J-	c
OWS-S-06-031314	SO	THALLIUM		1.1	5.5	MG/KG	UJ	c,m,z
OWS-S-06-031314	SO	VANADIUM	22	1.1	5.5	MG/KG	J-	c
OWS-S-07-031314	SO	ANTIMONY	0.32	0.27	0.54	MG/KG	J	m,md,fd
OWS-S-07-031314	SO	LEAD	0.22	0.27	0.54	MG/KG	J-	m
OWS-S-07-031314	SO	MAGNESIUM	630	54	270	MG/KG	J+	m
OWS-S-07-031314	SO	MANGANESE	36	0.16	0.82	MG/KG	J	fd
OWS-S-07-031314	SO	POTASSIUM	180	27	270	MG/KG	J	m,md
OWS-S-07-031314	SO	SILVER	3.9	0.14	0.27	MG/KG	J-	m
OWS-S-07-031314	SO	THALLIUM		0.54	2.7	MG/KG	UJ	m,z
OWS-S-08-031314	SO	ANTIMONY	1.5	0.28	0.57	MG/KG	J	m,md,fd
OWS-S-08-031314	SO	LEAD	12	0.28	0.57	MG/KG	J-	m
OWS-S-08-031314	SO	MAGNESIUM	2100	56	280	MG/KG	J+	m
OWS-S-08-031314	SO	MANGANESE	300	0.17	0.85	MG/KG	J	fd
OWS-S-08-031314	SO	POTASSIUM	1500	28	280	MG/KG	J	m,md
OWS-S-08-031314	SO	SILVER	5.2	0.14	0.28	MG/KG	J-	m
OWS-S-08-031314	SO	THALLIUM		0.56	2.8	MG/KG	UJ	m,z
OWS-S-08D-031314	SO	ANTIMONY	0.21	0.28	0.57	MG/KG	J	m,md,fd

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
OWS-S-08D-031314	SO	LEAD	13	0.28	0.57	MG/KG	J-	m
OWS-S-08D-031314	SO	MAGNESIUM	2100	56	280	MG/KG	J+	m
OWS-S-08D-031314	SO	MANGANESE	510	0.17	0.85	MG/KG	J	fd
OWS-S-08D-031314	SO	POTASSIUM	1400	28	280	MG/KG	J	m,md
OWS-S-08D-031314	SO	SILVER	5.2	0.14	0.28	MG/KG	J-	m
OWS-S-08D-031314	SO	THALLIUM		0.56	2.8	MG/KG	UJ	m,z

## Attachment A

## Non Conformance Summary Tables

Table A-1 Initial Calibration/Continuing Calibration Verification

ICV/CCV/CRI ID	Compound	% Recovery	Lower Limit	Upper Limit	Associated Samples
CCV3 3/25/14 23:44	THALLIUM	89	90	110	OWS-S-04-031314 OWS-S-06-031314
CCV4 3/26/14 00:13	SODIUM	88	90	110	OWS-S-06-031314
CCV4 3/26/14 00:13	THALLIUM	88	90	110	OWS-S-06-031314
CCV4 3/26/14 00:13	VANADIUM	89	90	110	OWS-S-06-031314

Table A-2a Lab Blanks

Blank ID	Compound	Result	LOD	LOQ	Units	Associated Samples
PQ42653-001	ALUMINUM	1.5	4.9	9.7	MG/KG	OWS-S-01-031314
PQ42653-001	CADMIUM	0.015	0.019	0.097	MG/KG	OWS-S-02-031314
PQ42653-001	SILVER	0.060	0.12	0.24	MG/KG	OWS-S-03-031314
PQ42653-001	THALLIUM	0.78	0.48	2.4	MG/KG	OWS-S-04-031314 OWS-S-05-031314 OWS-S-06-031314 OWS-S-07-031314 OWS-S-08-031314 OWS-S-08D-031314
PQ42978-001	ANTIMONY	0.0032	0.0050	0.010	MG/L	139-EB-01-031214 OEB-01-0-031314
PQ42978-001	ARSENIC	0.0067	0.0050	0.010	MG/L	139-EB-01-031214 OEB-01-0-031314
PQ43215-001	MERCURY	0.000016	0.000050	0.00010	MG/L	139-EB-01-031214 OEB-01-0-031314

Table A-2b Calibration Blanks

Blank ID	Compound	Result	LOD	LOQ	Units	Associated Samples
SOIL						
ICB 3/25/14 07:30	ARSENIC	0.0038	0.0050	0.010	MG/L	OWS-S-01-031314 OWS-S-02-031314 OWS-S-03-031314 OWS-S-04-031314 OWS-S-05-031314 OWS-S-06-031314 OWS-S-07-031314 OWS-S-08-031314 OWS-S-08D-031314
ICB 3/25/14 21:28	ARSENIC	0.0071	0.0050	0.010	MG/L	OWS-S-04-031314 OWS-S-06-031314

Blank ID	Compound	Result	LOD	LOQ	Units	Associated Samples
CCB2 3/25/14 23:02	ANTIMONY	0.0032	0.0050	0.010	MG/L	OWS-S-01-031314 OWS-S-02-031314 OWS-S-03-031314 OWS-S-04-031314 OWS-S-05-031314
CCB2 3/25/14 23:02	ARSENIC	0.0041	0.0050	0.0010	MG/L	OWS-S-01-031314 OWS-S-02-031314 OWS-S-03-031314 OWS-S-04-031314 OWS-S-05-031314
<b>AQUEOUS</b>						
CCB4 3/26/14 00:17	CADMIUM	0.0004	0.0010	0.0020	MG/L	139-EB-01-031214 OEB-01-0-031314
ICB1 3/26/14 14:23	MERCURY	0.000044	0.000050	0.00010	MG/L	139-EB-01-031214 OEB-01-0-031314

**Table A-2c Field Blanks**

Blank ID	Compound	Result	LOD	LOQ	Units	Associated Samples
OEB-01-0-031314	ARSENIC	0.0031	0.0050	0.010	MG/L	OWS-S-01-031314 OWS-S-02-031314 OWS-S-03-031314 OWS-S-04-031314 OWS-S-05-031314 OWS-S-06-031314 OWS-S-07-031314 OWS-S-08-031314 OWS-S-08D-031314
OEB-01-0-031314	MERCURY	0.000022	0.000050	0.00010	MG/L	OWS-S-01-031314 OWS-S-02-031314 OWS-S-03-031314 OWS-S-04-031314 OWS-S-05-031314 OWS-S-06-031314 OWS-S-07-031314 OWS-S-08-031314 OWS-S-08D-031314

**Table A-3 Interference Check Sample**

ICV/CCV/CRI ID	Compound	% Recovery	Lower Limit	Upper Limit	Concentration (mg/L)	LOD	Associated Samples
ICSAB 3/25/14 07:38	THALLIUM	78	80	120			OWS-S-01-031314 OWS-S-02-031314 OWS-S-03-031314 OWS-S-05-031314 OWS-S-07-031314 OWS-S-08-031314 OWS-S-08D-031314 139-EB-01-031214 OEB-01-0-031314
ICSAB 3/25/14 21:36	THALLIUM	79	80	120			OWS-S-04-031314 OWS-S-06-031314

**Table A-4 Matrix Spikes**

Sample ID	Compound	MS % Recovery	MSD % Recovery	Lower Limit	Upper Limit	RPD	RPD Limit
OWS-S-04-031314	SILVER	0		80	120		20
OWS-S-04-031314	THALLIUM	-141		80	120		20
OWS-S-04-031314	ANTIMONY	21		80	120		20
OWS-S-04-031314	BARIUM	65		80	120		20
OWS-S-04-031314	BERYLLIUM	70		80	120		20
OWS-S-04-031314	COBALT	69		80	120		20
OWS-S-04-031314	CALCIUM	77		80	120		20
OWS-S-04-031314	ALUMINUM	1170		80	120		20
OWS-S-04-031314	IRON	577		80	120		20
OWS-S-04-031314	LEAD	77		80	120		20
OWS-S-04-031314	MAGNESIUM	157		80	120		20
OWS-S-04-031314	MANGANESE	67		80	120		20
OWS-S-04-031314	POTASSIUM	290		80	120		20
OWS-S-05-031314	POTASSIUM	97	155	80	120	34	20
OWS-S-05-031314	SILVER	72	90	80	120	19	20
OWS-S-05-031314	THALLIUM	84	79	80	120	8.8	20
OWS-S-05-031314	ANTIMONY	36	25	80	120	37	20
OWS-S-05-031314	ALUMINUM	538	796	80	120	12	20
OWS-S-05-031314	IRON	-84	194	80	120	15	20
OWS-S-05-031314	LEAD	77	77	80	120	2.4	20
OWS-S-05-031314	MAGNESIUM	99	125	80	120	14	20

**Table A-5 Field Duplicates**

Sample ID	Duplicate ID	Compound	Sample Result	Qual	Duplicate Result	Qual	LOD	LOQ	Units	RPD
OWS-S-08-031314	OWS-S-08D-031314	MANGANESE	300		510		0.17	0.85	MG/KG	51.9
OWS-S-08-031314	OWS-S-08D-031314	ANTIMONY	1.5		0.21	J	0.28	0.57	MG/KG	150.9

**Attachment B****Qualifier Codes and Explanations**

<b>Qualifier</b>	<b>Explanation</b>
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
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.

### Attachment C

#### Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results



## Data Validation Report

Project: NAS JRB Willow Grove, PA  
Laboratory: Shealy Environmental, Inc.  
Service Request: PC14031  
Analyses/Method: EPA SW-846 Method 8270D for SVOCs (GC/MS) / 8270D  
Validation Level: Limited  
Resolution Consultants Project Number: 60276503PP.QS  
Prepared by: Paula DiMattei/Resolution Consultants Completed on: 05/01/2014  
Reviewed by: Lori Herberich/Resolution Consultants File Name: PC14031\_SVOCs

### SUMMARY

The samples listed below were collected by Resolution Consultants from the NAS JRB Willow Grove, PA site on March 13, 2014.

Sample ID	Matrix/Sample Type
OEB-01-0-031314	Equipment blank
OWS-S-08D-031314	Field Duplicate of OWS-S-08-031314
OWS-S-01-031314	Soil
OWS-S-02-031314	Soil
OWS-S-03-031314	Soil
OWS-S-04-031314	Soil
OWS-S-05-031314	Soil
OWS-S-06-031314	Soil
OWS-S-07-031314	Soil
OWS-S-08-031314	Soil

Data validation activities were conducted with reference to

- DoD Quality Systems Manual (QSM) for Environmental Laboratories, version 4.2 (10/2010) (October 2010);
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846, specifically SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (USEPA, 1996);
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008);
- the project-specific Sampling and Analysis Plan; and
- laboratory quality control (QC) limits, as applicable.

The National Data Validation Functional Guidelines were modified to accommodate the non-CLP methodologies. In the absence of method-specific information, laboratory quality control (QC) limits, DoD QSM 4.2, or project-specific requirements, Resolution Consultants professional judgment was used as appropriate.

## REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody (COC)/sample integrity)
- ✓ Holding times and sample preservation
- ✓ Instrument tuning
- ✗ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks/equipment blanks
- ✓ Surrogate spike recoveries
- ✓ Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS) results
- ✗ Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no results were qualified based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (✗) indicates that a quality control (QC) nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were qualified as estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

## RESULTS

### Data Completeness

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

**Holding Times/Sample Preservation**

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

**GC/MS Performance Checks**

The data were reviewed to ensure that the decafluorotriphenylphosphine (DFTPP) tuning was performed at the correct frequency and that the method acceptance criteria were met. All samples were analyzed within 12 hours of the DFTPP tunes.

**Initial Calibration/Continuing Calibration Verification**

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r<sup>2</sup>), and/or response factor method acceptance criteria were met;
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and
- the retention time method acceptance criteria were met.

The percent recoveries (%Rs) for acenaphthylene (124%) and n-nitrosodiphenylamine (127%) in the ICV associated with all samples in this data set exceeded the QC acceptance limit of 80-120%. The initial calibration was not reanalyzed as a result of the ICV nonconformance as stipulated in the QSM. Data qualification to the compounds associated with the specific ICV nonconformance was as follows:

**ICV Recovery Nonconformances**

Criteria	Actions*	
	Detected Results	Nondetected Results
Recovery > 120	J	No qualification
Recovery < 80	J	UJ

\* No guidance in NFG, thus Resolution Consultants professional judgment was used

Qualified sample results are shown in Table 1.

**Laboratory Blanks/Equipment Blanks**

Laboratory method blanks and equipment rinsate blanks were evaluated as to whether there were contaminants detected above the method detection limit (MDL). Target compounds were not detected in the laboratory method blanks or in the equipment rinsate blank (OEB-01-031314) associated with the samples in this data set.

**Surrogate Spike Recoveries**

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

**MS/MSD Results**

The MS/MSD %Rs and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

**LCS Results**

The LCS %Rs were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met or qualification of the data was not required.

**Field Duplicate Results**

Field duplicate RPDs were reviewed for conformance with the Resolution Consultants QC criteria of  $\leq 50\%$  for solid matrices and  $\leq 30\%$  for aqueous matrices. These criteria apply if both results were greater than five times the limit of quantitation (LOQ).

Nonconformances are summarized in Attachment A in Table A-1. Data qualification to the analytes associated with the specific field duplicate RPDs was as follows:

Criteria	RPD	Action	
		Detected	Nondetected
Sample and duplicate are nondetect results	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results $\geq 5xLOQ$	>30 (aqueous) >50 (solids)	J	Not Applicable
Sample and duplicate results $< 5xLOQ$	>60 (aqueous) >100 (solids)	J	Not Applicable
If sample or duplicate result is $> 5xLOQ$ and the other is not detected	NC	J	UJ
If sample or duplicate result is $< 5xLOQ$ and the other is not detected	NC	No qualification	No qualification

**Actions:** (Resolution Consultants professional judgment was used)

Qualified sample results are shown in Table 1.

**Internal Standard Results**

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

**Sample Results/Reporting Issues**

All compounds detected at concentrations less than the limit of quantitation (LOQ) but greater than the method detection limit (MDL) were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

The percent solids data were reviewed to ensure that NFG 2008 specified criteria were met. All percent solids criteria were met.

## **QUALIFICATION ACTIONS**

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

## **ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

**Table 1 - Data Validation Summary of Qualified Data**

Sample ID	Matrix	Compound	Result	LOD	LOQ	Units	Validation Qualifiers	Validation Reason
OWS-S-08-031314	SO	ACENAPHTHYLENE	9.3	4.5	7.6	UG/KG	J	c
OWS-S-08-031314	SO	BENZO[A]ANTHRACENE	70	4.5	7.6	UG/KG	J	fd
OWS-S-08-031314	SO	BENZO[G,H,I]PERYLENE	39	4.5	7.6	UG/KG	J	fd
OWS-S-08-031314	SO	CHRYSENE	84	4.5	7.6	UG/KG	J	fd
OWS-S-08-031314	SO	FLUORANTHENE	160	4.5	7.6	UG/KG	J	fd
OWS-S-08-031314	SO	INDENO[1,2,3-CD]PYRENE	39	4.5	7.6	UG/KG	J	fd
OWS-S-08-031314	SO	PHENANTHRENE	67	4.5	7.6	UG/KG	J	fd
OWS-S-08-031314	SO	PYRENE	130	4.5	7.6	UG/KG	J	fd
OWS-S-08D-031314	SO	ACENAPHTHYLENE	14	4.7	7.9	UG/KG	J	c
OWS-S-08D-031314	SO	BENZO[A]ANTHRACENE	130	4.7	7.9	UG/KG	J	fd
OWS-S-08D-031314	SO	BENZO[G,H,I]PERYLENE	88	4.7	7.9	UG/KG	J	fd
OWS-S-08D-031314	SO	CHRYSENE	150	4.7	7.9	UG/KG	J	fd
OWS-S-08D-031314	SO	FLUORANTHENE	300	4.7	7.9	UG/KG	J	fd
OWS-S-08D-031314	SO	INDENO[1,2,3-CD]PYRENE	87	4.7	7.9	UG/KG	J	fd
OWS-S-08D-031314	SO	PHENANTHRENE	140	4.7	7.9	UG/KG	J	fd
OWS-S-08D-031314	SO	PYRENE	250	4.7	7.9	UG/KG	J	fd

## Attachment A

## Nonconformance Summary Tables

Table A-1 - Field Duplicates

Sample ID	Duplicate ID	Compound	Sample Result	Qual	Duplicate Result	Qual	LOD	LOQ	Units	RPD
OWS-S-08-031314	OWS-S-08D-031314	PYRENE	130		250		4.5	7.6	UG/KG	63.2
OWS-S-08-031314	OWS-S-08D-031314	PHENANTHRENE	67		140		4.5	7.6	UG/KG	70.5
OWS-S-08-031314	OWS-S-08D-031314	INDENO[1,2,3-CD]PYRENE	39		87		4.5	7.6	UG/KG	76.2
OWS-S-08-031314	OWS-S-08D-031314	FLUORANTHENE	160		300		4.5	7.6	UG/KG	60.9
OWS-S-08-031314	OWS-S-08D-031314	CHRYSENE	84		150		4.5	7.6	UG/KG	56.4
OWS-S-08-031314	OWS-S-08D-031314	BENZO[G,H,I]PERYLENE	39		88		4.5	7.6	UG/KG	77.2
OWS-S-08-031314	OWS-S-08D-031314	BENZO[A]ANTHRACENE	70		130		4.5	7.6	UG/KG	60

**Attachment B**  
**Qualifier Codes and Explanations**

<b>Qualifier</b>	<b>Explanation</b>
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
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.

### Attachment C

#### Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results



## Data Validation Report

Project:	NAS JRB Willow Grove, PA	
Laboratory:	Shealy Environmental, Inc.	
Service Request:	PC14031	
Analyses/Method:	EPA SW-846 Method 8260B for VOCs (GC/MS) / 8260B	
Validation Level:	Limited	
Resolution Consultants Project Number:	60276503PP.QS	
Prepared by:	Lori Herberich/Resolution Consultants	Completed on: 04/30/2014
Reviewed by:	Paula DiMattei/Resolution Consultants	File Name: PC14031 VOCs

### SUMMARY

The samples listed below were collected by Resolution Consultants from the NAS JRB Willow Grove, PA site on March 13, 2014.

Sample ID	Matrix/Sample Type
OEB-01-0-031314	Equipment blank
OWS-S-08D-031314	Field Duplicate of OWS-S-08-031314
OWS-S-01-031314	Soil
OWS-S-02-031314	Soil
OWS-S-03-031314	Soil
OWS-S-04-031314	Soil
OWS-S-05-031314	Soil
OWS-S-06-031314	Soil
OWS-S-07-031314	Soil
OWS-S-08-031314	Soil
TB-01-031314	Trip Blank

Data validation activities were conducted with reference to

- DoD Quality Systems Manual (QSM) for Environmental Laboratories, version 4.2 (10/2010) (October 2010);
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846, specifically SW-846 Method 8260B, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (USEPA, 1996);
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008);
- the project-specific Sampling and Analysis Plan; and
- laboratory quality control (QC) limits, as applicable.

The National Data Validation Functional Guidelines were modified to accommodate the non-CLP methodologies. In the absence of method-specific information, laboratory quality control (QC) limits, DoD QSM 4.2, or project-specific requirements, Resolution Consultants professional judgment was used as appropriate.

## REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody (COC)/sample integrity)
- ✓ Holding times and sample preservation
- ✓ GC/MS performance checks
- ✓ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks/trip blanks/equipment blanks
- ✓ Surrogate spike recoveries
- ✓ Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✓ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- X Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. The symbol (X) indicates that a QC nonconformance resulted in the qualification of data. Any QC nonconformance that resulted in the qualification of data is discussed below. In addition, nonconformances or other issues that were noted during validation, but did not result in qualification of data, may be discussed for informational purposes only.

The data appear valid as reported and may be used for decision making purposes. Selected data points were qualified as estimated due to nonconformances of certain QC criteria (see discussion below). Qualified sample results are presented in Table 1.

## RESULTS

### Data Completeness

The data package was reviewed and found to meet acceptance criteria for completeness:

- The COCs were reviewed for completeness of information relevant to the samples and requested analyses, and for signatures indicating transfer of sample custody.
- The laboratory sample login sheet(s) were reviewed for issues potentially affecting sample integrity, including the condition of sample containers upon receipt at the laboratory.
- Completeness of analyses was verified by comparing the reported results to the COC requests.

### **Holding Times/Sample Preservation**

Sample preservation and preparation/analysis holding times were reviewed for conformance with the QC acceptance criteria. The QC acceptance criteria were met.

### **GC/MS Performance Checks**

The data were reviewed to ensure that the 4-bromofluorobenzene (BFB) tuning was performed at the correct frequency and that the method acceptance criteria were met. All QC acceptance criteria were met.

### **Initial Calibration/Continuing Calibration Verification**

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration (ICAL) percent relative standard deviation (%RSD), correlation coefficient (r)/coefficient of determination (r<sup>2</sup>), and/or response factor method acceptance criteria were met;
- the initial calibration verification standard (ICV) percent recovery acceptance criteria were met;
- the continuing calibration verification standard (CCV) method percent difference or percent drift (%Ds) and RF acceptance criteria were met; and
- the retention time method acceptance criteria were met.

All QC acceptance criteria were met.

### **Laboratory Blanks/Equipment Blanks/Trip Blanks**

Laboratory method blanks, equipment rinsate and trip blanks were evaluated as to whether there were contaminants detected above the detection limit (DL).

Data validation qualifications for individual samples are based on the maximum contaminant concentration detected in all associated blanks.

Detected results in blanks are not discussed in this data validation report if the associated results were nondetect or if qualification of sample results was not required.

The QC acceptance criteria were met and/or qualification of the sample results was not required. There were no detected target compounds reported in trip blank sample TB-01-031314 or equipment blank sample OEB-01-0-031314.

### **Surrogate Spike Recoveries**

The surrogate recoveries (%Rs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

### **MS/MSD Results**

The MS/MSD %Rs and relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met and/or no qualification of the data was required.

### **LCS/LCSD Results**

The LCS/LCSD %Rs and/or relative percent differences (RPDs) were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met and/or no qualification of the data was required.

### **Field Duplicate Results**

Field duplicate RPDs were reviewed for conformance with the Resolution Consultants QC criterion of  $\leq 50\%$  for solid matrices. This criterion applies if both results were greater than five times the limit of quantitation (LOQ).

Nonconformances are summarized in Attachment A in Table A-1. Data qualification to the analytes associated with the specific field duplicate RPDs was as follows:

Criteria	RPD	Action	
		Detected	Nondetected
Sample and duplicate are nondetect results	Not calculable (NC)	No qualification	No qualification
Sample and duplicate results $\geq 5 \times \text{LOQ}$	>30 (aqueous) >50 (solids)	J	Not Applicable
Sample and duplicate results $< 5 \times \text{LOQ}$	>60 (aqueous) >100 (solids)	J	Not Applicable

Qualified sample results are shown in Table 1.

### **Internal Standard Results**

The internal standard (IS) recoveries were reviewed for conformance with the QC acceptance criteria. All QC acceptance criteria were met.

### **Sample Results/Reporting Issues**

All compounds detected at concentrations less than the limit of quantitation (LOQ) but greater than the DL were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation.

The percent solids data were reviewed to ensure that NFG 2008 specified criteria were met. All percent solids criteria were met.

### **QUALIFICATION ACTIONS**

Sample results qualified as a result of validation actions are summarized in Table 1. All actions are described above.

### **ATTACHMENTS**

Attachment A: Nonconformance Summary Tables

Attachment B: Qualifier Codes and Explanations

Attachment C: Reason Codes and Explanations

**Table 1 - Data Validation Summary of Qualified Data**

<b>Sample ID</b>	<b>Matrix</b>	<b>Compound</b>	<b>Result</b>	<b>LOD</b>	<b>LOQ</b>	<b>Units</b>	<b>Validation Qualifiers</b>	<b>Validation Reason</b>
OWS-S-08-031314	SO	ACETONE	2.5	2.2	18	UG/KG	J	fd
OWS-S-08D-031314	SO	ACETONE	22	2.3	19	UG/KG	J	fd

## Attachment A

Table A-1 - Field Duplicates

Sample ID	Duplicate ID	Compound	Sample Result	Qual	Duplicate Result	Qual	LOD	LOQ	Units	RPD
OWS-S-08-031314	OWS-S-08D-031314	ACETONE	2.5	J	22		2.2	18	UG/KG	159.2

**Attachment B****Qualifier Codes and Explanations**

<b>Qualifier</b>	<b>Explanation</b>
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
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.

### Attachment C

#### Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate RPDs
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration (EMPC)
l	LCS or OPR recoveries
lc	Labeled compound recovery
ld	Laboratory duplicate RPDs
lp	Laboratory control sample/laboratory control sample duplicate RPDs
m	Matrix spike recovery
md	Matrix spike/matrix spike duplicate RPDs
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column RPD
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	ICS results