

Data Validation Report
Remedial Investigation at RVAAP-66 Facility Wide Groundwater
Semi-Annual Sampling Event for January 2017

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Contract Number: W9133L-14-D-0008

Task Order Number: 0003

Laboratory SDG 280-92979-1

Prepared For:



National Guard Bureau

NGB-ZC-AQ
111 South George Mason Drive
Building 2, 4th Floor
Arlington, VA 22204-1373

Prepared By:

TEC-WESTON Joint Venture

2496 Old Ivy Road, Suite 300
Charlottesville, VA 22903-4895

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

TEC-WESTON Joint Venture has completed this Data Validation Report. Data validation was performed by the Validator and Secondary QC Review was performed by a Senior Chemist. Signatures indicate the report is approved for release.

Erica Fisher, Validator, TEC-WESTON JV

Date

Peter Chapman, Senior Chemist, TEC-WESTON JV

Date

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INTRODUCTION

This report summarizes the results of the **EPA Stage 2B** data validation performed on groundwater samples and quality control (QC) sample data for the Remedial Investigation for RVAAP-66, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio. Results are reported in laboratory sample delivery group (SDG) **280-92979-1**.

TestAmerica, Inc., Denver, Colorado performed the analyses listed in the table below:

Parameters	Analytical Method	Laboratory Location
Volatile Organic Compounds (VOCs)	8260B	Denver, CO
Semivolatile Organic Compounds (SVOCs)	8270D	Denver, CO
Polycyclic Aromatic Hydrocarbons (PAHs)	8270D SIM	Denver, CO
Organochlorine Pesticides	8081B	Denver, CO
Polychlorinated Biphenyls (PCBs)	8082A	Denver, CO
Explosives	8330B	Denver, CO
Metals	6010C/6020A/7470A	Denver, CO
Total Cyanide	9012B	Denver, CO

The data were reviewed using guidance and quality control criteria documented in the *Draft Remedial Investigation Work Plan for Groundwater and Environmental Services for RVAAP-66 Facility-Wide Groundwater, Appendix A: Sampling Analysis Plan, A.2: Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio Attachment A Data Validation Evaluation Sheets (January 2016)* which are based on the *Department of Defense Quality Systems Manual (DoD QSM), Version 5.0*; *USEPA National Functional Guidelines for Organic Data Review (EPA 2014)*; and *USEPA National Functional Guidelines for Inorganic Data Review (EPA 2014)*, the analytical methods, and professional judgment.

During data validation, qualifiers are assigned to assist in proper data interpretation. If values are estimated, data may be used for site evaluation purposes but reasons for data qualification should be taken into consideration when interpreting sample concentrations. Data that have been rejected (R) should not be used for any purpose. Results with no qualifiers meet all data quality goals as outlined in the UFP-QAPP.

The data was reviewed and validated by calculating Relative Percent Difference (RPD) between spiked sample values according to the *USEPA National Functional Guidelines for Organic Data Review (EPA 2014)* and *USEPA National Functional Guidelines for Inorganic Data Review (EPA 2014)*. Therefore, the RPDs were calculated using the percent recovery values as stated in the above referenced USEPA documents. SW-846 Methods were utilized for this project and they recommend using the actual spiked sample values to calculate RPD values. However, the laboratory used varying spike amounts due to sample aliquot and percent moisture differences which lead to variations in the spike amounts making it very difficult to compare the spiked sample values. These differences would have created poor precision results for the spiked sample values that were not necessarily indicative of the data quality. The use of comparing spike recovery values in this case was a much better indicator of analytical precision.

The following samples were validated:

Sample ID	Laboratory ID	Sample Date	Matrix	QC Sample	VOCs	SVOCs	PAHs	Pesticides	PCBs	Explosives	Metals	Cyanide
LL3mw-246-011117-GW	280-92979-1	01/11/17	Groundwater						✓			
LL3mw-244-011117-GW	280-92979-2	01/11/17	Groundwater	MS/MSD					✓			
LL3mw-500-011117-GW	280-92979-3	01/11/17	Groundwater	Field Duplicate					✓			
FWGmw-022-011117-GW	280-92982-1	01/11/17	Groundwater		✓	✓	✓	✓	✓	✓	✓	✓
TRIP BLANK 1-011117	280-92982-2	01/11/17	Water		✓				✓			
FGWmw-019-011117-GW	280-92982-3	01/11/17	Groundwater		✓	✓	✓	✓	✓	✓	✓	✓
TRIP BLANK 2-011117	280-92982-4	01/11/17	Water		✓							
WBGmw-006-011017-GW	280-92983-1	01/10/17	Groundwater						✓			
WBGmw-020-011017-GW	280-92983-2	01/10/17	Groundwater						✓			
WBGmw-021-011017-GW	280-92983-3	01/10/17	Groundwater						✓			
WBGmw-015-011017-GW	280-92983-4	01/10/17	Groundwater		✓					✓		✓
TRIP BLANK-011017	280-92983-5	01/10/17	Water		✓							
LL1mw-089-011217-GW	280-93047-1	01/12/17	Groundwater		✓	✓	✓	✓	✓	✓	✓	✓
FWGmw-500-011217-GW	280-93047-2	01/12/17	Groundwater	Field Duplicate	✓	✓	✓	✓	✓	✓	✓	✓
RQLmw-009-011317-GW	280-93047-3	01/13/17	Groundwater						✓			
FWGmw-023-011217-GW	280-93047-4	01/12/17	Groundwater	MS/MSD	✓	✓	✓	✓	✓	✓	✓	✓
NTAmw-120-011217-GW	280-93047-5	01/12/17	Groundwater		✓	✓	✓	✓	✓	✓	✓	✓
LL2mw-272-011217-GW	280-93047-6	01/12/17	Groundwater		✓	✓	✓	✓	✓	✓	✓	✓
RQLmw-015-011317-GW	280-93047-7	01/13/17	Groundwater						✓			
TRIP BLANK-011317-GW	280-93047-8	01/13/17	Water		✓							

Note: LL3mw-500-011117-GW is a field duplicate of parent sample LL3mw-244-011117-GW.

FWGmw-500-011217-GW is a field duplicate of parent sample FWGmw-023-011217-GW.

DATA VALIDATION REPORT

1.1 DATA PACKAGE COMPLETENESS

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative. All requested target analytes were reported for each sample.

1.2 DEFINITIONS

Detection limit (DL): The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration with 99% confidence. At the DL, the false positive rate is 1%. A DL may be used as the lowest concentration for reliably reporting a detection of a specific matrix with a specific method with 99% confidence.

Limit of detection (LOD): The smallest concentration of a substance that must be present in a sample in order to be detected at the DL with 99% confidence. At the LOD, the false negative rate is 1%. An LOD may be used as the lowest concentration for reliably reporting a non-detect of a specific analyte in a specific matrix with a specific method with 99% confidence.

Limits of Quantitation (LOQ): The smallest concentration that produces a quantitative result with known and recorded precision and bias. For DoD/DOE projects, the LOQ shall be set at or above the concentration of the lowest initial calibration standard and within the calibration range.

The following validation flags and reason codes were applied:

Validation Flag	Reason Code	Description
J	IC	Estimated detection; initial calibration verification did not meet acceptance criteria.
J	CC	Estimated detection; continuing calibration verification did not meet acceptance criteria.
J	M	Estimated detection; MS/MSD percent recovery or RPD exceedance.
UJ	CC	Estimated non-detection; continuing calibration verification did not meet acceptance criteria.
UJ	IC	Estimated non-detection; initial calibration verification did not meet acceptance criteria.
UJ	I	Estimated non-detection; matrix interference
UJ	M	Estimated non-detection; MS/MSD percent recovery or RPD exceedance.

Validation Flag	Reason Code	Description
U	B	Not detected; target analyte was detected in the method or calibration blank.
R	M	Rejected, data is not usable; MS/MSD percent recovery <10%.
R	L	Rejected, data is not usable; LCS/LCSD percent recovery <10%.

1.3 SAMPLE RECEIPT

The samples were received by the laboratory on January 12, 2017 and January 14, 2017; the samples were received in good condition, under chain-of-custody, and custody seals intact. Samples were properly preserved and cooler temperatures were less than 6°C.

The container label for one of two 1 liter amber containers submitted for sample LL3mw-246-011117-GW (280-92979-1) did not list the sample time. The sample time was logged as 1040, per the chain of custody.

Samples FWGmw-019-01117-GW, LL2mw-272-011217-GW, and RQLmw-015-011317-GW were received by the laboratory without a sample collection time documented on the chain of custody. The sample times were logged as 1240, 1450, and 1252, respectively, per the sample time recorded on the container labels.

A trip blank associated with the 93047 samples was submitted for analyses, but not listed on the chain of custody. The trip blank was logged as TRIP BLANK-011317-GW with a sample date and time of 01/12/16 at 10:25.

1.4 TECHNICAL DATA VALIDATION

1.4.1 Volatile Organic Compounds by Method 8260B

The following parameters were evaluated and met the required criteria. No validation flags were assigned based on the following:

- Holding times
- LODs and LOQs
- Laboratory control samples
- Surrogate recoveries
- Instrument tuning
- Initial calibration verification
- Continuing calibration verification
- Internal standard recoveries

All analytical or quality parameters requiring further discussion for Method 8260B are described in the sections below.

1.4.1.1 Method Blanks

Methylene chloride was detected in method blanks MB 280-359454/6 (0.496 µg/L) and MB 280-359629/6 (1.13 µg/L). Methylene chloride was detected in samples TRIP BLANK-011017 (0.66 µg/L), FWGmw-500-011217-GW (2.4 µg/L), NTAmw-120-011217-GW (2.2 µg/L), and LL2mw-272-011217-GW (2.2 µg/L) at concentrations below the LOQ. These sample results were qualified as non-detect at the LOQ (U B).

1.4.1.2 Trip Blanks

Methylene chloride (0.66 µg/L) was detected in TRIP BLANK-011017 at a concentration below the LOQ (5.0 µg/L). This result was qualified as non-detect due to method blank contamination; therefore, no qualification was necessary. See section 1.4.1.1 for method blank contamination details.

Chlorobenzene was detected in TRIP BLANK-011017 (0.46 µg/L), TRIP BLANK 1-011117 (0.35 µg/L), TRIP BLANK 2-011117 (0.39 µg/L), and TRIP BLANK-011317-GW (0.49 µg/L) at a concentration below the LOQ (1.0 µg/L). All associated sample results were non-detect for chlorobenzene; therefore, no qualification was necessary.

Acetone (2.0 µg/L) was detected in TRIP BLANK-011317-GW at a concentration below the LOQ (10 µg/L). Acetone was also detected in associated sample FWGmw-500-011217-GW (1.9 µg/L) at a concentration below the LOQ. This result was qualified as non-detect at the LOQ (U B).

1.4.1.3 Matrix Spike/Matrix Spike Duplicate

An MS/MSD was performed on sample FWGmw-023-011217-GW. All MS/MSD recoveries and RPDs were within control limits with the exception of the exceedances presented in the following table:

Parent Sample	Analyte	MS %R	MSD %R	%R Limits	RPD	RPD Limits	Assigned Flags
FWGmw-023-011217-GW	cis-1,3-Dichloropropene	67	75	75-124	11	20	None
	Ethylbenzene	51	55	79-121	4	20	J M
	Total xylenes	8	11	79-121	2	20	R M

%R = percent recovery

Bolded values are outside control limits.

The MSD recovery and RPD were within limits for cis-1,3-dichloropropene; therefore, no qualification was necessary.

The MS and MSD recoveries for ethylbenzene and total xylenes were below QC limits. The associated parent sample results for ethylbenzene were qualified as estimated (J M). However, due to the low recovery (<10%) in the MS, the sample results for total xylenes are rejected (R M).

1.4.1.4 Field Duplicates

One field duplicate (FWGmw-500-011217-GW) was collected and analyzed for VOCs. For detections greater than 5x the LOQ in both samples, an RPD was calculated. For detections less than 5x the LOQ, the difference in values was compared to \pm the LOQ. The following table shows the detections in the parent and field duplicate sample:

Primary/Duplicate Sample ID	Analyte	Primary Sample Result ($\mu\text{g/L}$)	Field Duplicate Result ($\mu\text{g/L}$)	LOQ ($\mu\text{g/L}$)	RPD (%)	RPD Limit (%) ¹
FWGmw-023-011217-GW/ FWGmw-500-011217-GW	Chloroform	0.94 J	1.3	1	N/A	\pm LOQ
	Ethylbenzene	3.3	1.4	1	N/A	\pm LOQ
	Total xylenes	15	7.3	2	N/A	\pm LOQ
	Acetone	10 U	1.9 J	10	N/A	\pm LOQ

¹ The RPD limit is 20% for detections greater than 5x the LOQ; \pm the LOQ for detections less than 5x the LOQ.

J Laboratory flag indicating the result is less than the LOQ and is estimated.

U Laboratory flag indicating the result is not detected.

N/A Not applicable

All calculated RPDs and difference in detections met criteria. No validation flags were assigned.

1.4.2 Semivolatile Organic Compounds by Method 8270D

The following parameters were evaluated and met the required criteria. No validation flags were assigned:

- Holding times
- LODs and LOQs
- Method blanks
- Instrument tuning
- Initial calibration verification
- Continuing calibration verification
- Internal standard recoveries

All analytical or quality parameters requiring further discussion for Method 8270D are described in the sections below.

1.4.2.1 Surrogate Recoveries

Several surrogates recovered below the QC limits in sample FWGmw-023-011217-GW MS. These exceedances are outlined in the table below:

Sample ID	Surrogate	%R	%R QC Limits
FWGmw-023-011217-GW MS	2,4,6-Tribromophenol	23	43-140
	2-Fluorophenol	5	19-119
	Nitrobenzene-d5	41	44-120
	Phenol-d5	9	10-115
	Therphenyl-d14	44	50-134

All surrogate recoveries in the FWGmw-023-011217-GW parent sample were within QC limits; therefore, no qualification was necessary.

1.4.2.2 Laboratory Control Sample/Laboratory Control Sample Duplicates

Hexachlorocyclopentadiene (0%) recovered below the QC limits (10-120%) in LCS 280-359052/2-A associated with samples LL1mw-089-011217-GW, FWGmw-500-011217-GW, FWGmw-023-011217-GW, NTAmw-120-011217-GW, and LL2mw-272-011217-GW. All associated sample results were rejected due to the extremely low (<10%) LCS recovery (R L). It is noted that hexachlorocyclopentadiene is a poor performer for this method.

1.4.2.3 Matrix Spike/Matrix Spike Duplicates

An MS/MSD was performed on sample FWGmw-023-011217-GW. All MS/MSD recoveries and RPDs were within control limits with the exception of the exceedances presented in the following table:

Parent Sample	Analyte	MS %R	MSD %R	%R QC Limits	RPD	RPD Limits	Assigned Flags
FWGmw-023-011217-GW	1,2,4-Trichlorobenzene	35	65	29-116	59	20	None
	1,2-Dichlorobenzene	25	63	32-111	84	20	UJ M
	1,3-Dichlorobenzene	21	61	28-110	95	20	UJ M
	1,4-Dichlorobenzene	23	62	29-112	92	20	UJ M
	2,2'-oxybis[1-chloropropane]	38	73	37-130	62	20	None
	2,4,5-Trichlorophenol	22	87	53-123	120	20	UJ M
	2,4,6-Trichlorophenol	21	92	50-125	126	20	UJ M

2,4-Dichlorophenol	16	78	47-121	132	20	UJ M
2,4-Dimethylphenol	44	65	31-124	39	20	None
2,4-Dinitrophenol	0	86	23-143	N/A	20	R M
2-Choronaphthalene	62	82	40-116	26	20	None
2-Chlorophenol	8	71	38-117	160	20	R M
2-Methylnaphthalene	53	75	40-121	34	20	None
2-Methylphenol	25	74	30-117	98	20	UJ M
2-Nitrophenol	11	74	47-123	146	20	UJ M
3 & 4 Methylphenol	23	77	29-110	108	20	UJ M
4,6-Dinitro-2-methylphenol	13	88	44-137	148	20	UJ M
4-Chloro-3-methylphenol	33	84	52-119	86	20	UJ M
4-Nitrophenol	7	100	59-129	175	20	R M
Benzoic acid	0	64	41-120	N/A	20	R M
Benzyl alcohol	55	84	31-112	40	20	None
Bis(2-chloroethoxy)methane	52	74	48-120	33	20	None
Bis(2-chloroethyl)ether	38	74	43-118	64	20	UJ M
Diethyl phthalate	40	93	56-125	79	20	UJ M
Dimethyl phthalate	35	90	45-127	87	20	UJ M
Di-n-butyl phthalate	67	91	59-127	29	20	None
Di-n-octyl phthalate	69	84	51-140	18	20	None
Hexachlorobutadiene	28	62	22-124	74	20	UJ M
Hexachlorocyclopentadiene	0	0	10-120	N/A	20	R M
Hexachloroethane	20	58	21-115	97	20	UJ M
Isophorone	59	78	42-124	27	20	None
N-Nitrosodi-n-propylamine	54	81	49-119	39	20	None
N-Nitrosodiphenylamine	48	87	51-123	57	20	UJ M
Pentachlorophenol	17	86	35-138	134	20	UJ M
Phenol	9	72	61-120	156	20	R M

%R = percent recovery

Bolded values are outside control limits.

The parent sample results were qualified based on the assigned flags column in the table above.

Analytes with a recovery of <10% in the MS/MSD were rejected in the parent sample.

1.4.2.4 Field Duplicates

One field duplicate (FWGmw-500-011217-GW) was collected and analyzed for SVOCs. All parent and field duplicate sample results were non-detect; therefore, no RPDs were calculated.

1.4.3 Polycyclic Aromatic Hydrocarbons by Method 8270D SIM

The following parameters were evaluated and met the required criteria. No validation flags were assigned:

- Holding times
- LODs and LOQs
- Method blanks
- Surrogate recoveries
- Field duplicates
- Instrument tuning
- Initial calibration verification
- Continuing calibration verification
- Internal standard recoveries

All analytical or quality parameters requiring further discussion for Method 8270D SIM are described in the sections below.

1.4.3.1 Laboratory Control Samples

Chrysene (125%) recovered above the QC limits (57-120%) in LCS 280-359272/2-A associated with samples LL1mw-089-011217-GW, FWGmw-500-011217-GW, FWGmw-023-011217-GW, NTAmw-120-011217-GW, and LL2mw-272-011217-GW. All associated sample results were non-detect; therefore, no qualification was necessary.

1.4.3.2 Matrix Spike/Matrix Spike Duplicate

An MS/MSD was performed on sample FWGmw-023-011217-GW. All MS/MSD recoveries and RPDs were within control limits with the exception of the exceedances presented in the following table:

Parent Sample	Analyte	MS %R	MSD %R	%R QC Limits	RPD	RPD Limits	Assigned Flags
FWGmw-023-011217-GW	Anthracene	113	121	53-119	16	20	None
	Chrysene	122	127	57-120	10	20	None
	Fluoranthene	119	122	58-120	8	20	None
	Naphthalene	69	82	43-114	21	20	None
	Phenanthrene	112	116	53-115	10	20	None

%R = percent recovery

Bolded values are outside control limits.

All anthracene, chrysene, fluoranthene, and phenanthrene parent sample results were non-detect; therefore, no qualification was necessary.

Although the RPD exceeded QC limits for naphthalene, the MS and MSD recoveries were within limits; therefore, no qualification was necessary.

1.4.3.3 Field Duplicates

One field duplicate (FWGmw-500-011217-GW) was collected and analyzed for PAHs. For detections greater than 5x the LOQ in both samples, an RPD was calculated. For detections less than 5x the LOQ, the difference in values was compared to \pm the LOQ. The following table shows the detections in the parent and field duplicate sample:

Primary/Duplicate Sample ID	Analyte	Primary Sample Result ($\mu\text{g/L}$)	Field Duplicate Result ($\mu\text{g/L}$)	LOQ ($\mu\text{g/L}$)	RPD (%)	RPD Limit (%) ¹
FWGmw-023-011217-GW/ FWGmw-500-011217-GW	Naphthalene	0.055 J	0.061 J	0.10	N/A	\pm LOQ

¹ The RPD limit is 20% for detections greater than 5x the LOQ; \pm the LOQ for detections less than 5x the LOQ.

J Laboratory flag indicating the result is less than the LOQ and is estimated.

U Laboratory flag indicating the result is not detected.

N/A Not applicable

All calculated RPDs and difference in detections met criteria. No validation flags were assigned.

1.4.4 Organochlorine Pesticides by Method 8081B

The following parameters were evaluated and met the required criteria:

- Holding times
- LODs and LOQs
- Surrogate recoveries
- Dilutions
- Method blank
- MS/MSD recoveries and RPDs
- Field duplicate
- Initial calibration
- Initial calibration verification
- Internal standards
- Endrin/DDT breakdown check
- Second column confirmation

All analytical or quality issues for Method 8081B are described in the sections below.

1.4.4.1 Laboratory Control Samples

gamma-Chlordane recovered outside of control limits in the LCS on the primary column, but recovered within control limits on the secondary column. The analyte was reported from the secondary column and was non-detect in all associated samples; therefore, no qualification was necessary.

1.4.4.2 Continuing Calibration Verification

Several analytes were recovered outside of the QC limits in the calibration verifications bracketing the samples. The following table presents the continuing calibration verification exceedances:

Calibration Verification	Associated Samples	Analyte	%D	%D QC Limits	Assigned Flags	Samples Qualified
CCV 280-359992/45	LL1mw-089-011217-GW	Hexachlorobenzene	21.4	±20	None	None
	FWGmw-500-011217-GW	Methoxychlor	23.4	±20	None	None
	FWGmw-023-011217-GW					
	NTAmw-120-011217-GW					
	LL2mw-272-011217-GW	Endrin ketone	21.2	±20	None	None
CCVIS 280-359079/13	FWGmw-022-011117-GW	Heptachlor	22.2	±20	None	None
	FWGmw-019-011117-GW					
CCV 280-359079/24	FWGmw-022-011117-GW	Heptachlor	24.9	±20	None	None
	FWGmw-019-011117-GW					

CCV = continuing calibration verification

All sample results associated with the exceedances in the above table were non-detect; therefore, no qualification was necessary.

1.4.4.3 Field Duplicates

One field duplicate (FWGmw-500-011217-GW) was collected and analyzed for pesticides. All parent and field duplicate sample results were non-detect; therefore, no RPDs were calculated.

1.4.5 Polychlorinated Biphenyls (PCBs) by Method 8082A

The following parameters were evaluated and met the required criteria:

- Holding times
- LODs and LOQs
- Surrogate recoveries
- Dilutions
- Method blank
- LCS/LCSD recoveries & RPDs
- MS/MSD recoveries and RPDs
- Field duplicate
- Initial calibration
- Initial calibration verification
- Continuing calibration verification
- Second column confirmation

All analytical or quality issues for Method 8082A are described in the sections below.

1.4.5.1 Sample Preparation

Samples LL1mw-089-011217-GW, FWGmw-500-011217-GW, RQLmw-009-011317-GW, FWGmw-023-011217-GW, NTAmw-120-011217-GW, LL2mw-272-011217-GW, and RQLmw-011317-GW underwent a sulfuric acid clean up prior to analysis to reduce matrix interferences.

1.4.5.2 Internal Standard Recoveries

The internal standard exceeded the control limits in sample FWGmw-022-011117-GW on the secondary column due to matrix interference. The internal standard recovered within limits on the primary column; therefore, no qualification was necessary.

1.4.5.3 Matrix Interferences

Sample FWGmw-022-011117-GW had chromatographic interferences that impacted the identification and quantitation of target analytes and possibly cause negatively biased results. All associated analytes were non-detect in the sample. These results were qualified as estimated (UJ I).

1.4.5.4 Field Duplicates

Two field duplicates (LL3mw-500-011117-GW & FWGmw-500-011217-GW) were collected and analyzed for PCBs. All parent and field duplicate sample results were non-detect; therefore, no RPDs were calculated.

1.4.6 Explosives by Method 8330B

The following parameters were evaluated and met the required criteria. No validation flags were assigned:

- Holding times
- LODs and LOQs
- Initial calibration verification
- 2nd column confirmation

All analytical or quality parameters requiring further discussion for Method 8330B are described in the sections below.

1.4.6.1 Method Blanks

1,3,5-Trinitrobenzene (0.240 µg/L), 2-nitrotoluene (0.101 µg/L), and RDX (0.125 µg/L) were detected in the method blank at concentrations below their respective LOQs (1.0 µg/L, 0.40 µg/L, 0.20 µg/L). RDX was detected in sample FWGmw-023-011216-GW (0.19 µg/L) at a concentration below the LOQ. This sample result was qualified as non-detect at the LOQ (U B). All other associated samples were either non-detect or had detections above the LOQ for 1,3,5-trinitrobenzene, 2-nitrotoluene, and RDX; therefore, no qualification was necessary.

Nitrobenzene (0.506 µg/L) was detected in the method blank at a concentration above the LOQ (0.40 µg/L). All associated sample results were non-detect for nitrobenzene; therefore, no qualification is necessary.

1.4.6.2 Laboratory Control Samples

Several analytes were recovered outside of the QC limits on the secondary column. All analytes recovered within the limits on the primary column; therefore, no qualification was necessary.

1.4.6.3 Surrogate Recoveries

Surrogate 1,2-dinitrobenzene (77%) was recovered below the recovery limits (83-119%) in sample FWGmw-023-011217-GW MS. All surrogate recoveries in the FWGmw-023-011217-GW parent sample were within QC limits; therefore, no qualification was necessary.

Surrogate 1,2-dinitrobenzene was recovered below the recovery limits (83-119%) on the secondary column in samples FWGmw-500-011217-GW (82%) and LL2mw-272-011217-GW (67%). The surrogate recoveries for these samples were within recovery limits on the primary column, therefore, no qualification was necessary.

1.4.6.4 Matrix Spike/Matrix Spike Duplicates

An MS/MSD was performed on sample FWGmw-023-011217-GW. All recoveries and RPDs were within QC limits with the exception of the exceedances outlined in the table below:

Parent Sample	Analyte	MS %R	MSD %R	%R Limits	RPD	RPD Limits	Assigned Flags
FWGmw-023-011217-GW	2-Nitrotoluene	58	74	70-127	24	20	UJ M

3-Nitrotoluene	65	79	73-125	20	20	None
2,6-Dinitrotoluene	75	89	77-127	16	20	None
4-Amino-2,6-dinitrotoluene	72	87	76-125	19	20	None
4-Nitrotoluene	65	77	71-127	16	20	None

%R = percent recovery

Bolded values are outside control limits

The MS recovery and RPD were outside of the QC limits for 2-nitrotoluene. This analyte in the associated parent sample was qualified as estimated (UJ M).

The MS recovery was outside of the QC limits 3-nitrotoluene, 2,6-dinitrotoluene, 4-aminio-2,6-dinitrotoluene, and 4-nitrotoluene. The MSD recoveries and RPDs were within the QC limits for these analytes; therefore, no qualification was necessary.

1.4.6.5 Field Duplicates

One field duplicate (FWGmw-500-011217-GW) was collected and analyzed for explosives. RDX was detected in the parent and field duplicate samples. The RDX result in the field duplicate was qualified as non-detect due to method blank contamination and all other analytes were non-detect in the parent and field duplicate samples; therefore, no RPDs were calculated.

1.4.6.6 Continuing Calibration Verifications

Several analytes were recovered outside of the QC limits in the calibration verifications bracketing the samples. The following table presents the continuing calibration verification exceedances:

Calibration Verification	Associated Samples	Analyte	%D	%D Limits	Assigned Flags
CCV 280-359503/53	FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	2-Nitrotoluene	-22.9	±20	UJ CC
CCV 280-359022/7	FWGmw-022-011117-GW FWGmw-019-011117-GW WBGmw-015-011017-GW	Tertyl	-31.6	±20	UJ CC
CCV 280-359022/15	FWGmw-022-011117-GW FWGmw-019-011117-GW WBGmw-015-011017-GW LL1mw-089-011217-GW	Tertyl	-31.3	±20	UJ CC
	FWGmw-500-011217-GW FWGmw-023-011217-GW				

	NTAmw-120-011217-GW LL2mw-272-011217-GW				
CCV 280-359022/24	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	Tertyl	-31.4	±20	UJ CC
CCV 280-359499/31	FWGmw-022-011117-GW FWGmw-019-011117-GW WBGmw-015-011017-GW LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	2-Nitrotoluene 4-Nitrotoluene 3-Nitrotoluene	-27.6 -20.9 -26.7	±20 ±20 ±20	UJ CC

All of the analytes in the associated sampled were non-detect and have therefore been qualified as estimated (UJ CC).

1.4.7 Total Metals by Method 6010C/6020A/7470A

The following parameters were evaluated and met the required criteria. No validation flags were assigned:

- Holding times
- LODs and LOQs
- LCS recoveries
- Method blanks
- Low level calibration check standard
- Instrument tuning
- Field duplicate

All analytical or quality parameters requiring further discussion for Methods 6010C, 6020A, and/or 7470A are described in the sections below.

1.4.7.1 Calibration Blanks

Several analytes were detected in the calibration blanks bracketing the samples. The following table presents the initial and continuing calibration blank detections:

Calibration Blank ID	Associated Samples	Analyte	Blank Detection (µg/L)	LOQ (µg/L)	Assigned Flags	Samples Qualified
ICB 280-358984/13	FWGmw-022-011117-GW FGWmw-019-011117-GW	Magnesium	20.1	500	None	None

ICB 280-359180/11	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	Antimony	0.895	6	U B	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW
CCB 280-35962/86	FWGmw-022-011117-GW FGWmw-019-011117-GW	Calcium	137	1000	None	None
		Iron	58.7	5400	None	None
		Sodium	390	5600	None	None
CCB 280-359086/39	FWGmw-022-011117-GW FGWmw-019-011117-GW	Antimony	0.462	6.0		FGWmw-019-011117-GW
		Thallium	0.056	0.2		FWGmw-022-011117-GW
CCB 280-359180/146	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	Silver	0.034	5.0	None	None
		Thallium	0.066	1.0	U B	LL1mw-089-011217-GW
CCB 280-359180/219	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW	Thallium	0.062	1.0	U B	LL1mw-089-011217-GW
CCB 280-359180/231	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	Thallium	0.074	1.0	U B	LL1mw-089-011217-GW
CCB 280-359180/236	NTAmw-120-011217-GW LL2mw-272-011217-GW	Thallium	0.059	1.0	None	None

CCB = continuing calibration blank

ICB = initial calibration blank

Detections less than the LOQ in associated samples were qualified as not detected at the LOQ (U B).

1.4.7.2 Initial/Continuing Calibration Verification

Several analytes recovered outside of the low level initial/continuing calibration verification acceptance criteria. These exceedances are outlined in the table below:

Calibration Verification ID	Associated Samples	Analyte	%R	%R Limits	Assigned Flags	Sampled Qualified
ICVL 280-359086/7	FWGmw-022-011117-GW FGWmw-019-011117-GW	Barium	129	80-120	J IC	FWGmw-022-011117-GW GWmw-019-011117-GW
		Cadmium	122	80-120	UJ IC	FWGmw-022-011117-GW GWmw-019-011117-GW
CCVL 280-359086/29	FWGmw-022-011117-GW FGWmw-019-011117-GW	Beryllium	122	80-120	UJ CC	FWGmw-022-011117-GW GWmw-019-011117-GW
		Manganese	131	80-120	J CC	GWmw-019-011117-GW FWGmw-022-011117-GW
CCVL 280-359086/40	FWGmw-022-011117-GW FGWmw-019-011117-GW	Manganese	57	80-120	J CC	GWmw-019-011117-GW FWGmw-022-011117-GW
CCVL 280-359180/135	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW	Barium	127	80-120	J CC	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW
CCVL 280-359180/232	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW	Barium	130	80-120	J CC	LL1mw-089-011217-GW FWGmw-500-011217-GW FWGmw-023-011217-GW NTAmw-120-011217-GW LL2mw-272-011217-GW
CCVL 280-359180/237	NTAmw-120-011217-GW LL2mw-272-011217-GW	Beryllium	121	80-120	UJ CC	NTAmw-120-011217-GW LL2mw-272-011217-GW

%R = percent recovery

Detections and non-detections were qualified as estimated (J/UJ IC/CC).

1.4.7.1 Interference Check Standards

Manganese was detected in the interference check standards A (ISC-A) at concentrations (1.23 µg/L and 1.24 µg/L) greater than the LOD (0.95 µg/L). The laboratory note that manganese is a trace impurity and is not indicative of matrix interference. Based on reviewer's professional judgment, no qualification was necessary.

1.4.7.2 Matrix Spike/Matrix Spike Duplicates

An MS/MSD was performed on sample FWGmw-022-011117-GW MS. All MS/MSD recoveries and RPDs were within control limits with the exception of the exceedances presented in the following table:

Parent Sample	Analyte	MS %R	MSD %R	%R QC Limits	RPD	RPD Limits	Assigned Flags
FWGmw-022-011117-GW MS	Aluminum	178	179	86-115	2	20	J M
	Calcium	79	88	87-113	3	20	None
	Barium	108	118	86-114	1	20	None
	Iron	86	75	87-115	3	20	J M
	Manganese	74	65	87-115	1	20	J M

%R = percent recovery

Bolded values are outside control limits.

The MS and MSD recoveries were above the QC limits for aluminum. Therefore, aluminum in the associated parent sample is qualified as estimated (J M). Because one MS/MSD recovery and the RPD were within control limits for barium and calcium, no qualifications were deemed necessary. The iron and manganese recoveries in the MS and MSD were below the QC limits. Therefore, iron and manganese are qualified as estimated (J M) in the associated parent sample.

1.4.7.3 Post-Digestion Spike

A PDS was performed on sample FWGmw-022-011117-GW. All recoveries were within control limits with the exception of calcium, which recovered below (78%) the QC limit of 80-120%. However, as the MS, MSD and PDS calcium recoveries were within the range of 75-125%, no qualification is considered to be required.

1.4.7.4 Contract Required Quantitation Limit Check Standards

The check standard on Contract Required Quantitation Limit (CRQL) CRI 280-359180/13 recovered above the QC limits of 80-120% for antimony (124%), copper (129%) and zinc (178%). However, no qualification is considered to be necessary.

1.4.7.5 Field Duplicates

One field duplicate, FWGmw-500-011217-GW, associated with parent sample FWGmw-023-011217-GW were analyzed for total metals. For detections greater than 5x the LOQ in both samples, an RPD was calculated. For detections less than 5x the LOQ, the difference in values was compared to ± the LOQ. The following table shows the detections in the parent and field duplicate samples:

Primary/Duplicate Sample ID	Analyte	Primary Sample Result (µg/L)	Field Duplicate Result (µg/L)	LOQ (µg/L)	RPD (%)	RPD Limit (%) ¹
FWGmw-023-011217-GW / FWGmw-500-011217-GW	Aluminum	25 J	23 J	300	NA	± LOQ
	Calcium	85000 J	84000	1000	1	20
	Iron	3000 J	2700	100	10	20
	Magnesium	23000	23000	500	NA	± LOQ
	Potassium	2400 J	2400 J	3000	NA	± LOQ
	Sodium	11000	11000	5000	NA	± LOQ
	Antimony	4.8 J	5.6 J	6.0	NA	± LOQ
	Arsenic	150	150	5.0	0	20
	Barium	52	53	3.0	2	20
	Cobalt	24	24	1.0	0	20
	Manganese	440 J	410	3.5	7	20
	Nickel	33	36	3.0	9	20
Zinc	3.2	2.2	20	NA	± LOQ	

¹ The RPD limit is 20% for detections greater than 5x the LOQ; ± the LOQ for detections less than 5x the LOQ.

J Laboratory flag indicating the result is less than the LOQ and is estimated.

N/A Not applicable

All calculated RPDs and difference in detections met criteria. No validation flags were assigned.

1.4.8 Total Cyanide by Method 9012B

The following parameters were evaluated and met the required criteria. No validation flags were assigned:

- Holding times
- LODs and LOQs
- Method blanks
- LCS recoveries
- MS/MSD recoveries and RPDs
- Field duplicate
- Initial calibration verification
- Continuing calibration verification
- Low and high level control samples
- Initial calibration blank
- Continuing calibration blanks

No analytical or quality parameters requiring further discussion for Method 9012B were identified.

1.4.8.1 Field Duplicate

One field duplicate (FWGmw-500-011217-GW) was collected and analyzed for total cyanide, associated with parent sample FWGmw-023-011217-GW. For detections greater than 5x the LOQ in both samples, an RPD is calculated. For detections less than 5x the LOQ, the difference in values is compared to \pm the LOQ. The following table shows the detections in parent and field duplicate samples:

Primary/Duplicate Sample ID	Analyte	Primary Sample Result ($\mu\text{g/L}$)	Field Duplicate Result ($\mu\text{g/L}$)	LOQ ($\mu\text{g/L}$)	RPD (%)	RPD Limit (%) ¹
FWGmw-023-011217-GW/ FWGmw-500-011217-GW	Cyanide	5.0 U	3.7 J	10	N/A	\pm LOQ

¹ The RPD limit is 20% for detections greater than 5x the LOQ; \pm the LOQ for detections less than 5x the LOQ.

J Laboratory flag indicating the result is less than the LOQ and is estimated.

U Laboratory flag indicating the result is non-detect.

N/A Not applicable

All calculated RPDs and difference in detections met criteria. No validation flags were assigned.

DATA VALIDATION TABLE

SDG	Field Sample ID	Lab Sample ID	Matrix	Parameter	CAS Number	Units	Result	Lab Flag	DV Flag	Detection	LOQ	LOD	MDL	Analytical Method	Reason Code
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1016	12674-11-2	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1221	11104-28-2	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1232	11141-16-5	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1242	53469-21-9	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1248	12672-29-6	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1254	11097-69-1	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	PCB-1260	11096-82-5	µg/L	0.10	u	uj	n	0.15	0.10	0.043	PCBs	I
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u	uj	n	0.21	0.21	0.090	Explosives and Propellants	CC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u	uj	n	0.42	0.21	0.088	Explosives and Propellants	CC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	4-Nitrotoluene	99-99-0	µg/L	0.42	u	uj	n	0.42	0.42	0.21	Explosives and Propellants	CC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.25	0.21	0.083	Explosives and Propellants	CC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Aluminum	7429-90-5	µg/L	510	j	j	y	300	70	18	Metals	M
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Iron	7439-89-6	µg/L	3400	v	j	y	100	85	22	Metals	M
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Barium	7440-39-3	µg/L	72	v	j	y	3.0	0.95	0.29	Metals	IC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Beryllium	7440-41-7	µg/L	0.30	u	uj	n	1.0	0.30	0.080	Metals	CC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Cadmium	7440-43-9	µg/L	1.0	u	uj	n	1.0	1.0	0.27	Metals	IC
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Manganese	7439-96-5	µg/L	890	q	j	y	3.5	0.95	0.31	Metals	CC M
280-92979-1	FWGmw-022-011117-GW	280-92982-1	Water	Thallium	7440-28-0	µg/L	0.077	j	u	n	1.0	0.20	0.050	Metals	B
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u	uj	n	0.43	0.21	0.092	Explosives and Propellants	CC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u	uj	n	0.43	0.21	0.090	Explosives and Propellants	CC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	4-Nitrotoluene	99-99-0	µg/L	0.43	u	uj	n	1.1	0.43	0.21	Explosives and Propellants	CC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.26	0.21	0.085	Explosives and Propellants	CC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	Antimony	7440-36-0	µg/L	3.5	j	u	y	6.0	1.0	0.40	Metals	B
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	Barium	7440-39-3	µg/L	41	v	j	y	3.0	0.95	0.29	Metals	IC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	Beryllium	7440-41-7	µg/L	0.30	u	uj	n	1.0	0.30	0.080	Metals	CC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	Cadmium	7440-43-9	µg/L	1.0	u	uj	n	1.0	1.0	0.27	Metals	IC
280-92979-1	FGWmw-019-011117-GW	280-92982-3	Water	Manganese	7439-96-5	µg/L	220	q	j	y	3.5	0.95	0.31	Metals	CC
280-92979-1	WBGmw-015-011017-GW	280-92983-4	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u	uj	n	0.43	0.21	0.091	Explosives and Propellants	CC
280-92979-1	WBGmw-015-011017-GW	280-92983-4	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u	uj	n	0.43	0.21	0.089	Explosives and Propellants	CC
280-92979-1	WBGmw-015-011017-GW	280-92983-4	Water	4-Nitrotoluene	99-99-0	µg/L	0.43	u	uj	n	1.1	0.43	0.21	Explosives and Propellants	CC
280-92979-1	WBGmw-015-011017-GW	280-92983-4	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.26	0.21	0.084	Explosives and Propellants	CC
280-92979-1	TRIP BLANK-011017	280-92983-5	Water	Methylene chloride	75-09-2	µg/L	0.66	j	u	n	5	0.8	0.32	VOCs	B
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	Hexachlorocyclopentadiene	77-47-4	µg/L	32	u q	r	n	53	32	11	SVOCs	L
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u	uj	n	0.43	0.21	0.091	Explosives and Propellants	CC
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u	uj	n	0.43	0.21	0.089	Explosives and Propellants	CC
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	4-Nitrotoluene	99-99-0	µg/L	0.43	u	uj	n	1.1	0.43	0.21	Explosives and Propellants	CC
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.26	0.21	0.085	Explosives and Propellants	CC
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	Antimony	7440-36-0	µg/L	0.61	j	u	n	6.0	1.0	0.40	Metals	B

SDG	Field Sample ID	Lab Sample ID	Matrix	Parameter	CAS Number	Units	Result	Lab Flag	DV Flag	Detection	LOQ	LOD	MDL	Analytical Method	Reason Code
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	Barium	7440-39-3	µg/L	6.6	v	j	y	3.0	0.95	0.29	Metals	CC
280-92979-1	LL1mw-089-011217-GW	280-93047-1	Water	Thallium	7440-28-0	µg/L	0.14	j	u	n	1.0	0.20	0.050	Metals	B
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	Acetone	67-64-1	µg/L	1.9	j	u	n	10	6.4	1.9	VOCs	B
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	Methylene chloride	75-09-2	µg/L	2.4	j	u	n	5	0.8	0.32	VOCs	B
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	Hexachlorocyclopentadiene	77-47-4	µg/L	29	u q	r	n	49	29	9.8	SVOCs	L
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u q	uj	n	0.42	0.21	0.091	Explosives and Propellants	CC
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u	uj	n	0.42	0.21	0.088	Explosives and Propellants	CC
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	4-Nitrotoluene	99-99-0	µg/L	0.42	u	uj	n	1.1	0.42	0.21	Explosives and Propellants	CC
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.25	0.21	0.084	Explosives and Propellants	CC
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	Antimony	7440-36-0	µg/L	5.6	j	u	n	6.0	1.0	0.40	Metals	B
280-92979-1	FWGmw-500-011217-GW	280-93047-2	Water	Barium	7440-39-3	µg/L	53	v	j	y	3.0	0.95	0.29	Metals	CC
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Ethylbenzene	100-41-4	µg/L	3.3	j	j	y	1.0	0.4	0.16	VOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Xylenes, total	1330-20-7	µg/L	15	j	r	y	2.0	0.8	0.19	VOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	1,2-Dichlorobenzene	95-50-1	µg/L	0.49	u j	uj	n	9.9	0.49	0.23	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	1,3-Dichlorobenzene	541-73-1	µg/L	0.99	u j	uj	n	9.9	0.99	0.30	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	1,4-Dichlorobenzene	106-46-7	µg/L	0.99	u j	uj	n	9.9	0.99	0.32	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2,4,5-Trichlorophenol	95-95-4	µg/L	0.99	u j	uj	n	20	0.99	0.44	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2,4,6-Trichlorophenol	88-06-2	µg/L	0.99	u j	uj	n	20	0.99	0.29	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2,4-Dichlorophenol	120-83-2	µg/L	2.0	u j	uj	n	9.9	2.0	0.63	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2,4-Dinitrophenol	51-28-5	µg/L	30	u j	r	n	79	30	9.9	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2-Chlorophenol	95-57-8	µg/L	4.3	u j	r	n	9.9	4.3	2.0	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2-Methylphenol	95-48-7	µg/L	2.0	u j	uj	n	9.9	2.0	0.97	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2-Nitrophenol	88-75-5	µg/L	0.99	u j	uj	n	20	0.99	0.38	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	3 & 4 Methylphenol	15831-10-4	µg/L	0.49	u j	uj	n	20	0.49	0.25	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	8.7	u j	uj	n	79	8.7	3.9	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	4-Chloro-3-methylphenol	59-50-7	µg/L	4.9	u j	uj	n	20	4.9	2.4	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	4-Nitrophenol	100-02-7	µg/L	3.9	u j	r	n	49	3.9	1.2	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Benzoic acid	65-85-0	µg/L	30	u j	r	n	79	30	9.9	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Bis(2-chloroethyl)ether	111-44-4	µg/L	0.99	u j	uj	n	20	0.99	0.40	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Diethyl phthalate	84-66-2	µg/L	0.99	u j	uj	n	20	0.99	0.38	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Dimethyl phthalate	131-11-3	µg/L	0.49	u j	uj	n	20	0.49	0.21	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Hexachlorobutadiene	87-68-3	µg/L	9.9	u j	uj	n	30	9.9	3.3	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Hexachlorocyclopentadiene	77-47-4	µg/L	30	u q j	r	n	49	30	9.9	SVOCs	L M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Hexachloroethane	67-72-1	µg/L	4.3	u j	uj	n	9.9	4.3	2.1	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	N-Nitrosodiphenylamine	86-30-6	µg/L	0.99	u j	uj	n	9.9	0.99	0.43	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Pentachlorophenol	87-86-5	µg/L	59	u j	uj	n	79	59	20	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Phenol	108-95-2	µg/L	4.3	u j	r	n	9.9	4.3	2.0	SVOCs	M
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u j	uj	n	0.42	0.21	0.091	Explosives and Propellants	M CC
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u j	uj	n	0.42	0.21	0.088	Explosives and Propellants	CC
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	RDX	121-82-4	µg/L	0.19	j	u	n	0.21	0.13	0.055	Explosives and Propellants	B

SDG	Field Sample ID	Lab Sample ID	Matrix	Parameter	CAS Number	Units	Result	Lab Flag	DV Flag	Detection	LOQ	LOD	MDL	Analytical Method	Reason Code
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	4-Nitrotoluene	99-99-0	µg/L	0.42	u j	uj	n	1.1	0.42	0.21	Explosives and Propellants	CC
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.25	0.21	0.083	Explosives and Propellants	CC
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Antimony	7440-36-0	µg/L	4.8	j	u	n	6.0	1.0	0.40	Metals	B
280-92979-1	FWGmw-023-011217-GW	280-93047-4	Water	Barium	7440-39-3	µg/L	52	v	j	y	3.0	0.95	0.29	Metals	CC
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	Methylene chloride	75-09-2	µg/L	2.2	j	u	n	5	0.8	0.32	VOCs	B
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	Hexachlorocyclopentadiene	77-47-4	µg/L	31	u q	r	n	52	31	10	SVOCs	L
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	2-Nitrotoluene	88-72-2	µg/L	0.21	u	uj	n	0.43	0.21	0.091	Explosives and Propellants	CC
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	3-Nitrotoluene	99-08-1	µg/L	0.21	u	uj	n	0.43	0.21	0.089	Explosives and Propellants	CC
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	4-Nitrotoluene	99-99-0	µg/L	0.43	u	uj	n	1.1	0.43	0.21	Explosives and Propellants	CC
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	Tetryl	479-45-8	µg/L	0.21	u	uj	n	0.26	0.21	0.085	Explosives and Propellants	CC
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	Barium	7440-39-3	µg/L	29	v	j	y	3.0	0.95	0.29	Metals	CC
280-92979-1	NTAmw-120-011217-GW	280-93047-5	Water	Beryllium	7440-41-7	µg/L	0.30	u	uj	n	1.0	0.30	0.080	Metals	CC
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	Hexachlorocyclopentadiene	77-47-4	µg/L	32	u q	r	n	53	32	11	SVOCs	L
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	2-Nitrotoluene	88-72-2	µg/L	0.22	u q	uj	n	0.44	0.22	0.094	Explosives and Propellants	CC
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	3-Nitrotoluene	99-08-1	µg/L	0.22	u	uj	n	0.44	0.22	0.091	Explosives and Propellants	CC
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	4-Nitrotoluene	99-99-0	µg/L	0.44	u m q	uj	n	1.1	0.44	0.21	Explosives and Propellants	CC
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	Tetryl	479-45-8	µg/L	0.22	u	uj	n	0.26	0.22	0.087	Explosives and Propellants	CC
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	Barium	7440-39-3	µg/L	34	v	j	y	3.0	0.95	0.29	Metals	CC
280-92979-1	LL2mw-272-011217-GW	280-93047-6	Water	Beryllium	7440-41-7	µg/L	0.30	u	uj	n	1.0	0.30	0.080	Metals	CC

µg/L - micrograms per liter