

**Data Validation Report**  
**Remedial Investigation at RVAAP-66 Facility Wide Groundwater**  
**Semi-Annual & Quarterly Sampling Event for April/May 2017**

**Former Ravenna Army Ammunition Plant**  
**Portage and Trumbull Counties, Ohio**

**Contract Number: W9133L-14-D-0008**

**Task Order Number: 0003**

**Laboratory SDG 280-96510-1**

**Prepared For:**



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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 Validation Chemist and Secondary QC Review was performed by a Senior Chemist. Signatures indicate the report is approved for release.



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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) **280-96510-1**.

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
Nitroguanidine	8330	Sacramento, CA
Metals	6010C/6020A/7470A	Denver, CO
Perchlorate	6860	Denver, CO
Alkalinity	2320B	Denver, CO
Total Cyanide	9012B	Denver, CO
Hexavalent Chromium	7196A	Denver, CO
Nitrocellulose	353.2	Sacramento, CA

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 (phthalates)	SVOCs (full list)	PAHs	Pesticides	PCBs	Explosives	Nitroguanidine	Perchlorate	Metals	Alkalinity	Total Cyanide	Hexavalent Chromium	Nitrocellulose
LL 1mw-088-042817-GW	280-96510-1	04/28/17	Groundwater			✓			✓		✓			✓	✓			
LL 1mw-088-042817-GF	280-96510-2	04/28/17	Groundwater	Field filtered										✓				
LL 1mw-503-042817-GW	280-96510-3	04/28/17	Groundwater	Field duplicate		✓			✓		✓			✓	✓			
LL 1mw-503-042817-GF	280-96510-4	04/28/17	Groundwater	Field duplicate/field filtered										✓				
LL 3mw-246-042817-GW	280-96510-5	04/28/17	Groundwater	MS/MSD		✓					✓			✓				
LL 3mw-504-042817-GW	280-96510-6	04/28/17	Groundwater	Field duplicate		✓					✓			✓				
LL 12mw-189-042817-GW	280-96510-7	04/28/17	Groundwater					✓			✓			✓				
LL 2mw-059-042817-GW	280-96510-8	04/28/17	Groundwater			✓					✓			✓				
LL 10mw-005-042817-GW	280-96510-9	04/28/17	Groundwater		✓			✓			✓			✓				
FW Gmw-017-042817-GW	280-96510-10	04/28/17	Groundwater		✓			✓			✓			✓				✓
FW Gmw-021-042817-GW	280-96510-11	04/28/17	Groundwater		✓			✓			✓			✓				✓
FW Gmw-024-042817-GW	280-96510-12	04/28/17	Groundwater		✓			✓			✓			✓				✓
TB-042817	280-96510-13	04/28/17	Groundwater	Trip blank	✓													
SC Pmw-006-042817-GW	280-96510-14	04/28/17	Groundwater															
CB Pmw-008-042817-GW	280-96510-15	04/28/17	Groundwater			✓												✓
CB Pmw-009-042817-GW	280-96510-16	04/28/17	Groundwater			✓												✓

Additional analyses reported for sample CBPmw-008-042817-GW are reported and validated under separate cover.

Sample LL 1mw-503-042817-GW is the field duplicate of sample LL 1mw-088-042817-GW.

Sample LL 1mw-503-042817-GF is the field duplicate of sample LL 1mw-088-042817-GF.

Sample LL 3mw-504-042817-GW is the field duplicate of sample LL 3mw-246-042817-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 SAMPLE RECEIPT

The samples were received by the laboratory on April 29, 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.

Nitroguanidine and nitrocellulose analyses were performed by TestAmerica Sacramento.

After receipt by the laboratory, the cooler containing sample FWGmw-021-042817-GW was inadvertently placed with coolers from another project. As such, the hexavalent chromium was not performed within holding time. The hexavalent chromium analysis was cancelled and was resampled.

One of seven coolers received by the laboratory did not have the temperature recorded upon receipt.

The nitric acid preserved container for metals analysis for sample LL2mw-059-042817-GW was inadvertently not placed in the cooler for shipment by the field crew. The sample bottle was kept at the required temperature until the field crew sent out the next shipment was sent to the laboratory on 05/01/17. The sample container arrived at the laboratory on 05/02/17 and was logged with the rest of the sample volume for LL2mw-059-042817-GW.

No sample volume was received for perchlorate analysis for sample LL3mw-246-042817-GW. This sample volume was resampled at a later date.

The chain of custody did not list a sample date and time for the trip blank sample TB-042817. The sample date and time was logged as the earliest associated sample date and time.



### 1.3 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
U	B	Non-detection at the LOQ; target analyte detected in blank.
UJ	S	Estimated non-detection; surrogate outlier.
UJ	H	Estimated non-detection; holding time exceedance.
UJ	CC	Estimated non-detection; continuing calibration criteria not met.
J	S	Estimated detection; surrogate outlier.
J	H	Estimated detection; holding time exceedance.
J	IC	Estimated detection; initial calibration criteria not met.
J	CC	Estimated detection; continuing calibration criteria not met.

### 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
- LCS recoveries
- Method blanks
- Surrogate recoveries
- LODs and LOQs
- Instrument tuning

- Internal standard area counts
- Initial calibration
- Initial calibration verification
- Closing calibration verification
- Trip blank

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

#### **1.4.1.1 Continuing Calibration Verification**

Acetone (20.6%D) recovered above control limits ( $\pm 20\%$ D) in the continuing calibration verification CCV 280-373393/5. All associated acetone detections in the associated samples were qualified as estimated (J CC).

Bromomethane (-22.1%D), chloroethane (-20.5%D), and chloromethane (-26.0%D) recovered below control limits ( $\pm 20\%$ D) in the continuing calibration verification CCV 280-373387/2. All associated bromomethane, chloroethane, and chloromethane sample results were qualified as estimated (UJ CC).

#### **1.4.2 Semivolatile Organic Compounds by Method 8270D**

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

- Holding times
- Method blanks
- LCS recoveries
- MS/MSD recoveries and RPDs
- LODs and LOQs
- Instrument tuning
- Internal standard area counts
- Initial calibration
- Initial calibration verification
- Continuing calibration verification
- Closing calibration verification
- Field duplicates

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

#### **1.4.2.1 Surrogate Recoveries**

Surrogate 2,4,6-tribromophenol (42%) recovered below the control limits (43-140%) in sample LL10mw-005-042817-GW. All associated sample results were qualified as estimated (UJ S).

### 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 based on the following:

- Holding times
- Method blanks
- Laboratory control samples
- LODs and LOQs
- Instrument tuning
- Internal standard area counts
- Initial calibration
- Initial calibration verification
- Closing calibration verification

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

#### 1.4.3.1 Surrogate Recoveries

Surrogate 2-fluorobiphenyl (52%) recovered below the control limits (53-106%) in sample FWGmw-017-042817-GW. All associated sample results were qualified as estimated (UJ S).

Surrogates 2-fluorobiphenyl (33%), terphenyl-d14 (42%), and nitrobenzene-d5 (37%) recovered below their respective control limits (53-106%, 58-132%, 55-111%) in sample LL12mw-189-042817-GW. All associated sample results were qualified as estimated (J/UJ S).

### 1.4.4 Organochlorine Pesticides by Method 8081B

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

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

All analytical or quality parameters requiring further discussion for Method 8081B are described in the sections below.

#### **1.4.4.1 Continuing Calibration Verification**

Endrin (25%D) and toxaphene (28%D) recovered above control limits ( $\pm 20\%$ D) in the continuing calibration verification. All associated samples were non-detect for endrin and toxaphene; therefore, no qualification was necessary.

#### **1.4.5 Polychlorinated Biphenyls by Method 8082A**

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

- Holding times
- LODs and LOQs
- Surrogate recoveries
- Method blank
- LCS recoveries
- MS/MSD recoveries and RPDs
- Initial calibration
- Initial calibration verification
- Continuing calibration verification
- Internal standards
- Second column confirmation

All analytical or quality parameters requiring further discussion for Method 8082A are described in the sections below.

#### **1.4.5.1 Analyst Error**

It was noted in the case narrative that the analyst did not record the pH of samples FWGmw-017-042817-GW, FWGmw-021-042817-GW, and FWGmw-024-042817-GW. Based on professional judgement, no qualifications were made.

#### **1.4.6 Explosives by Method 8330B**

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

- Holding times
- LCS recoveries
- Surrogate recoveries
- Initial calibration
- Initial calibration verification
- Initial calibration blank
- Continuing calibration verification
- Continuing calibration blank
- LODs and LOQs
- Initial calibration verification
- 2<sup>nd</sup> column confirmation
- Field Duplicates

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

#### **1.4.6.1 Sample Preparation**

Samples LL12mw-189-042817-GW, FWGmw-021-042817-GW, and FWGmw-024-042817-GW were filtered prior to analysis to reduce matrix interferences.

#### **1.4.6.2 Method Blanks**

3-Nitrotoluene (0.122 µg/L) was detected in the method blank at a concentration below the LOQ (0.4 µg/L). 3-Nitrotoluene was also detected in sample LL1mw-088-042817-GW (0.16 µg/L) at a concentration below the LOQ. This sample result was qualified as non-detect at the LOQ (U B).

#### **1.4.6.3 Matrix Spike/Matrix Spike Duplicate**

An MS/MSD was performed on sample LL3mw-246-042817-GW. 4-Nitrotoluene (128%) recovered above the control limits (71-127%) in the MS. 4-Nitrotoluene was non-detect in the parent sample; therefore, no qualification was necessary.

#### **1.4.7 Nitroguanidine by Method 8330**

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

- Holding times
- Method blanks
- LCS recoveries
- Initial calibration
- Initial calibration verification
- Initial calibration blank
- Continuing calibration verification
- Continuing calibration blank
- LODs and LOQs
- Initial calibration verification

No analytical or quality parameters required further discussion for Method 8330.

#### **1.4.8 Perchlorate by Method 6860**

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

- Holding times
- LODs and LOQs
- LCS recoveries
- Method blank

- Initial calibration verification
- Initial calibration blank
- Continuing calibration verification
- Continuing calibration blank
- Detection limit check
- Interference check standards

No analytical or quality parameters required further discussion for Method 6860.

#### 1.4.9 Total Metals by Method 6010C/6020A/7470A

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

- Holding times
- LODs and LOQs
- LCS recoveries
- Post digestion spike
- Serial dilution
- Initial calibration blanks
- Contract required detection limit standard
- Instrument tuning
- Field duplicates

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

##### 1.4.9.1 Method Blanks

Potassium (441 µg/L), sodium (269 µg/L), and beryllium (0.0980 µg/L) were detected in the method blank at concentrations below their respective LOQs (3000 µg/L, 5000 µg/L, 1.0 µg/L). Potassium was detected at a concentration below the LOQ in samples LL1mw-088-042817-GF (2800 µg/L), LL3mw-246-042817-GW (1300 µg/L), LL3mw-504-042817-GW (1000 µg/L), LL2mw-059-042817-GW (440 µg/L), LL10mw-005-042817-GW (500 µg/L), FWGmw-017-042817-GW (1600 µg/L), FWGmw-021-042817-GW (930 µg/L), and FWGmw-024-042817-GW (690 µg/L). Sodium was detected at a concentration below the LOQ in samples LL3mw-246-042817-GW (3300 µg/L), LL3mw-504-042817-GW (3400 µg/L), LL2mw-059-042817-GW (2800 µg/L), LL10mw-005-042817-GW (3700 µg/L), and FWGmw-021-042817-GW (3100 µg/L). Beryllium was detected at a concentration below the LOQ in samples LL1mw-088-042817-GW (0.15 µg/L) and LL3mw-504-042817-GW (0.25 µg/L). These sample results were qualified as non-detect at the LOQ (U B). All other associated sample results were either non-detect or at a concentration above the LOQ; therefore, no qualification was necessary.

### 1.4.9.2 Continuing calibration Blanks

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

Calibration Blank	Associated Samples	Analyte	Blank Detection (µg/L)	LOQ (µg/L)	Assigned Flags	Samples Qualified
CCB 280-373110/91	LL1mw-088-042817-GW LL3mw-246-042817-GW	Sodium	148	5000	U B	LL3mw-246-042817-GW
CCB 280-373288/188	LL2mw-059-042817-GW	Potassium	290	3000	U B	LL2mw-059-042817-GW
CCB 280-372581/71	LL1mw-088-042817-GW LL1mw-088-042817-GF LL1mw-503-042817-GW LL1mw-503-042817-GF	Beryllium	0.089	1	U B	LL1mw-088-042817-GW
CCB 280-372581/92	LL3mw-246-042817-GW LL3mw-504-042817-GW	Beryllium	0.135	1	U B	LL3mw-504-042817-GW
	LL10mw-005-042817-GW FWGmw-017-042817-GW FWGmw-021-042817-GW	Manganese	0.34	3.5	U B	LL3mw-246-042817-GW LL3mw-504-042817-GW
CCB 280-373522/13-A	LL3mw-504-042817-GW LL2mw-059-042817-GW LL10mw-005-042817-GW FWGmw-017-042817-GW FWGmw-021-042817-GW FWGmw-024-042817-GW	Mercury	0.0367	0.2	U B	LL3mw-504-042817-GW LL2mw-059-042817-GW LL10mw-005-042817-GW FWGmw-021-042817-GW

CCB = continuing calibration blank

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

### 1.4.9.3 Initial/Continuing Calibrations Verifications

Iron (127%) recovered above control limits (80-120%) in the low-level initial calibration verification ICVL 280-373110/8. All associated iron detections were qualified as estimated (J IC).

Sodium (121%) recovered above control limits (80-120%) in the low-level continuing calibration verification CCVL 280-373110/106. All associated sodium detections were qualified as estimated (J CC).

Beryllium recovered above control limits (80-120%) in the low-level continuing calibration verifications CCVL 280-372581/93 (134%) and CCVL 280-372581/106 (132%). All associated samples were non-detect or qualified as non-detect for beryllium; therefore, no qualification was necessary.

Barium (124%) recovered above control limits (80-120%) in the low-level continuing calibration verification CCVL 280-372581/106. All associated barium detections were qualified as estimated (J CC).

#### **1.4.9.4 Matrix Spike/Matrix Spike Duplicate**

Sodium (116%) recovered above control limits (87-115%) in the MS. The MSD recovery and RPD were within control limits; therefore, no qualification was necessary.

#### **1.4.9.5 Interference Check Solutions**

Manganese (1.15 µg/L) was detected in the interference check standard A (ISC-A) at a concentration greater than the LOD (1 µg/L). The lab confirmed this element is a trace impurity and is consistent with concentrations found by the manufacturer of the ICS-A solution. Based on reviewer's professional judgment, no qualification was necessary.

#### **1.4.10 Nitrocellulose by Method 353.2**

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

- Holding times
- LODs and LOQs
- LCS recoveries
- MS/MSD recoveries and RPDs
- Method blank
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank

No analytical or quality parameters required further discussion for Method 353.2.



#### **1.4.11 Hexavalent Chromium by Method 7196A**

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

- LODs and LOQs
- LCS recoveries
- Method blank
- MS/MSD recoveries and RPDs
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank

All analytical or quality issues requiring further discussion for Method 7196A are described in the sections below.

##### **1.4.11.1 Holding Times**

Samples FWGmw-017-042817-GW and FWGmw-024-042817-GW were received by the laboratory with insufficient time remaining to perform the analysis within holding time. The samples were analyzed within 2x holding time. The hexavalent chromium results in these samples were qualified as estimated (J/UJ H).

#### **1.4.12 Total Cyanide by Method 9012B**

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

- Holding times
- LODs and LOQs
- LCS recoveries
- MS/MSD recoveries and RPDs
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank

All analytical or quality issues requiring further discussion for Method 9012B are described in the sections below.

##### **1.4.12.1 Method Blanks**

Total cyanide (2.85 µg/L) was detected in the method blank at a concentration below the LOQ (10 µg/L). All associated samples were non-detect for total cyanide; therefore, no qualification was necessary.

### **1.4.13 Alkalinity by Method 2320B**

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

- Holding times
- LODs and LOQs
- LCS recoveries
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank
- Field duplicates

All analytical or quality issues requiring further discussion for Method 2320B are described in the sections below.

#### **1.4.13.1 Method Blanks**

Alkalinity (2.91 mg/L) was detected in the method blank at a concentration below the LOQ (5.0 mg/L). All associate sample had alkalinity detections above the LOQ; therefore, no qualification was necessary.

**DATA VALIDATION TABLE**

SDG	Field Sample ID	Lab Sample ID	Matrix	Parameter	CAS Number	Units	Result	Lab Flag	DV Flag	Detection	LOQ	LOD	MDL	Analytic Method	Reason Code
280-96510-1	LL1mw-088-042817-GW	280-96510-1	Ground Water	Iron	7439-89-6	µg/L	2100	v	j	y	100	85	22	Metals	IC
280-96510-1	LL1mw-088-042817-GW	280-96510-1	Ground Water	Sodium	7440-23-5	µg/L	31000	v	j	y	5000	350	120	Metals	CC
280-96510-1	LL1mw-088-042817-GW	280-96510-1	Ground Water	Barium	7440-39-3	µg/L	44	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	LL1mw-088-042817-GW	280-96510-1	Ground Water	Beryllium	7440-41-7	µg/L		j	u	n	1	0.3	0.08	Metals	B
280-96510-1	LL1mw-088-042817-GW	280-96510-1	Ground Water	3-Nitrotoluene	99-08-1	µg/L	0.43	j	u	n	0.43	0.21	0.089	Explosives	B
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Iron	7439-89-6	µg/L	740	v	j	y	100	85	22	Metals	IC
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Sodium	7440-23-5	µg/L	13000	v	j	y	5000	350	120	Metals	CC
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Barium	7440-39-3	µg/L	130	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Chromium, hexavalent	18540-29-9	µg/L	4	u	uj	n	20	4	4	Hexavalent Chromium	H
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Bromomethane	74-83-9	µg/L	0.8	u	uj	n	2	0.8	0.21	VOCs	CC
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Chloroethane	75-00-3	µg/L	1.6	u	uj	n	2	1.6	0.41	VOCs	CC
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Chloroethane	74-87-3	µg/L	0.8	u	uj	n	2	0.8	0.3	VOCs	CC
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Acenaphthene	83-32-9	µg/L	0.04	u	uj	n	0.1	0.04	0.0042	PAHs	S
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Acenaphthylene	208-96-8	µg/L	0.04	u	uj	n	0.1	0.04	0.0051	PAHs	S
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Anthracene	120-12-7	µg/L	0.04	u	uj	n	0.1	0.04	0.0056	PAHs	S
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Fluoranthene	206-44-0	µg/L	0.04	u	uj	n	0.1	0.012	0.0048	PAHs	S
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Fluorene	86-73-7	µg/L	0.04	u	uj	n	0.1	0.04	0.0055	PAHs	S
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Phenanthrene	85-01-8	µg/L	0.02	u	uj	n	0.1	0.02	0.0094	PAHs	S
280-96510-1	FWGmw-017-042817-GW	280-96510-10	Ground Water	Pyrene	129-00-0	µg/L	0.02	u	uj	n	0.1	0.02	0.0061	PAHs	S
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Iron	7439-89-6	µg/L	940	v	j	y	100	85	22	Metals	IC
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Sodium	7440-23-5	µg/L	5000	j	u	n	5000	350	120	Metals	B
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Barium	7440-39-3	µg/L	15	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Mercury	7439-97-6	µg/L	0.2	j	u	n	0.2	0.08	0.027	Metals	B
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Bromomethane	74-83-9	µg/L	0.8	u	uj	n	2	0.8	0.21	VOCs	CC
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Chloroethane	75-00-3	µg/L	1.6	u	uj	n	2	1.6	0.41	VOCs	CC
280-96510-1	FWGmw-021-042817-GW	280-96510-11	Ground Water	Chloromethane	74-87-3	µg/L	0.8	u	uj	n	2	0.8	0.3	VOCs	CC
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Iron	7439-89-6	µg/L	1700	v	j	y	100	85	22	Metals	IC
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Sodium	7440-23-5	µg/L	5500	v	j	y	5000	350	120	Metals	CC
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Barium	7440-39-3	µg/L	8.7	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Chromium, hexavalent	18540-29-9	µg/L	4.6	j	uj	y	20	4	4	Hexavalent Chromium	H
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Bromomethane	74-83-9	µg/L	0.8	u	uj	n	2	0.8	0.21	VOCs	CC
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Chloroethane	75-00-3	µg/L	1.6	u	uj	n	2	1.6	0.41	VOCs	CC
280-96510-1	FWGmw-024-042817-GW	280-96510-12	Ground Water	Chloromethane	74-87-3	µg/L	0.8	u	uj	n	2	0.8	0.3	VOCs	CC
280-96510-1	FB-042817	280-96510-13	Ground Water	Bromomethane	74-83-9	µg/L	0.8	u	uj	n	2	0.8	0.21	VOCs	CC
280-96510-1	FB-042817	280-96510-13	Ground Water	Chloroethane	75-00-3	µg/L	1.6	u	uj	n	2	1.6	0.41	VOCs	CC
280-96510-1	FB-042817	280-96510-13	Ground Water	Chloromethane	74-87-3	µg/L	0.8	u	uj	n	2	0.8	0.3	VOCs	CC
280-96510-1	LL1mw-088-042817-GF	280-96510-2	Ground Water	Iron	7439-89-6	µg/L	1500	v	j	y	100	85	22	Metals	IC
280-96510-1	LL1mw-088-042817-GF	280-96510-2	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	LL1mw-088-042817-GF	280-96510-2	Ground Water	Sodium	7440-23-5	µg/L	27000	v	j	y	5000	350	120	Metals	CC
280-96510-1	LL1mw-088-042817-GF	280-96510-2	Ground Water	Barium	7440-39-3	µg/L	38	v	j	y	3	0.95	0.29	Metals	CC

SDG	Field Sample ID	Lab Sample ID	Matrix	Parameter	CAS Number	Units	Result	Lab Flag	DV Flag	Detection	LOQ	LOD	MDL	Analytic Method	Reason Code
280-96510-1	LL1mw-503-042817-GW	280-96510-3	Ground Water	Iron	7439-89-6	µg/L	2000	v	j	y	100	85	22	Metals	IC
280-96510-1	LL1mw-503-042817-GW	280-96510-3	Ground Water	Sodium	7440-23-5	µg/L	28000	v	j	y	5000	350	120	Metals	CC
280-96510-1	LL1mw-503-042817-GW	280-96510-3	Ground Water	Barium	7440-39-3	µg/L	41	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	LL1mw-503-042817-GF	280-96510-4	Ground Water	Iron	7439-89-6	µg/L	1500	v	j	y	100	85	22	Metals	IC
280-96510-1	LL1mw-503-042817-GF	280-96510-4	Ground Water	Sodium	7440-23-5	µg/L	28000	v	j	y	5000	350	120	Metals	CC
280-96510-1	LL1mw-503-042817-GF	280-96510-4	Ground Water	Barium	7440-39-3	µg/L	41	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	LL3mw-246-042817-GW	280-96510-5	Ground Water	Iron	7439-89-6	µg/L	85	u	j	n	100	85	22	Metals	IC
280-96510-1	LL3mw-246-042817-GW	280-96510-5	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	LL3mw-246-042817-GW	280-96510-5	Ground Water	Sodium	7440-23-5	µg/L	5000	j	u	n	5000	350	120	Metals	B
280-96510-1	LL3mw-246-042817-GW	280-96510-5	Ground Water	Barium	7440-39-3	µg/L	15	v	j	n	3	0.95	0.29	Metals	CC
280-96510-1	LL3mw-246-042817-GW	280-96510-5	Ground Water	Manganese	7439-96-5	µg/L	3.5	j	u	n	3.5	0.95	0.31	Metals	B
280-96510-1	LL3mw-504-042817-GW	280-96510-6	Ground Water	Iron	7439-89-6	µg/L	85	u	j	n	100	85	22	Metals	IC
280-96510-1	LL3mw-504-042817-GW	280-96510-6	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	LL3mw-504-042817-GW	280-96510-6	Ground Water	Barium	7440-39-3	µg/L	5000	j	u	n	5000	350	120	Metals	B
280-96510-1	LL3mw-504-042817-GW	280-96510-6	Ground Water	Beryllium	7440-41-7	µg/L	1	j q	u	n	1	0.3	0.08	Metals	B
280-96510-1	LL3mw-504-042817-GW	280-96510-6	Ground Water	Manganese	7439-96-5	µg/L	3.5	j	u	n	3.5	0.95	0.31	Metals	B
280-96510-1	LL3mw-504-042817-GW	280-96510-6	Ground Water	Mercury	7439-97-6	µg/L	0.2	j	u	n	0.2	0.08	0.027	Metals	B
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Aceaphthylene	83-32-9	µg/L	0.046	u q	uj	n	0.11	0.046	0.0048	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Anthracene	208-96-8	µg/L	0.046	u q	uj	n	0.11	0.046	0.0059	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Benz(a)anthracene	120-12-7	µg/L	0.014	u q	uj	n	0.11	0.014	0.0048	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Benz(b)fluoranthene	56-55-3	µg/L	0.014	u q	uj	n	0.11	0.014	0.0079	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Benz(a)pyrene	50-32-8	µg/L	0.014	u q	uj	n	0.11	0.014	0.0079	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Benz(b)fluoranthene	205-99-2	µg/L	0.014	u q	uj	n	0.11	0.014	0.0036	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Benz(g,h)perylene	191-24-2	µg/L	0.014	u q	uj	n	0.11	0.014	0.0071	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Benz(k)fluoranthene	207-08-9	µg/L	0.014	u q	uj	n	0.11	0.014	0.0072	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Chrysene	218-01-9	µg/L	0.014	u q	uj	n	0.11	0.014	0.0038	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Dibenz(a,h)anthracene	53-70-3	µg/L	0.014	u q	uj	n	0.11	0.014	0.0047	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Fluorene	206-44-0	µg/L	0.014	u q	uj	n	0.11	0.014	0.0055	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Fluorene	86-73-7	µg/L	0.046	u q	uj	n	0.11	0.046	0.0063	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Indeno(1,2,3-cd)pyrene	193-39-5	µg/L	0.046	u q	uj	n	0.11	0.046	0.0052	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Naphthalene	91-20-3	µg/L	0.018	j q	j	y	0.11	0.014	0.0092	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Phenanthrene	85-01-8	µg/L	0.023	u q	uj	n	0.11	0.023	0.011	PAHs	S
280-96510-1	LL12mw-189-042817-GW	280-96510-7	Ground Water	Pyrene	129-00-0	µg/L	0.023	u q	uj	n	0.11	0.023	0.007	PAHs	S
280-96510-1	LL2mw-059-042817-GW	280-96510-8	Ground Water	Iron	7439-89-6	µg/L	130	v	j	y	100	85	22	Metals	IC
280-96510-1	LL2mw-059-042817-GW	280-96510-8	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	LL2mw-059-042817-GW	280-96510-8	Ground Water	Sodium	7440-23-5	µg/L	5000	j	u	n	5000	350	120	Metals	B
280-96510-1	LL2mw-059-042817-GW	280-96510-8	Ground Water	Barium	7440-39-3	µg/L	4.3	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	LL2mw-059-042817-GW	280-96510-8	Ground Water	Mercury	7439-97-6	µg/L	0.2	j	u	n	0.2	0.08	0.027	Metals	B
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Iron	7439-89-6	µg/L	140	v	j	y	100	85	22	Metals	IC
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Potassium	7440-09-7	µg/L	3000	j	u	n	3000	940	240	Metals	B
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Sodium	7440-23-5	µg/L	5000	j	u	n	5000	350	120	Metals	B
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Barium	7440-39-3	µg/L	29	v	j	y	3	0.95	0.29	Metals	CC
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Mercury	7439-97-6	µg/L	0.2	j	u	n	0.2	0.08	0.027	Metals	B
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Acetone	67-64-1	µg/L	10	q	j	y	10	6.4	1.9	VOCs	CC
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Bromomethane	74-83-9	µg/L	0.8	u	uj	n	2	0.8	0.21	VOCs	CC

SDG	Field Sample ID	Lab Sample ID	Matrix	Parameter	CAS Number	Units	Result	Lab Flag	DV Flag	Detection	LOQ	LOD	MDL	Analytic Method	Reason Code
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Chloroethane	75-00-3	µg/L	1.6	u	uj	n	2	1.6	0.41	VOCs	CC
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Chloromethane	74-87-3	µg/L	0.8	u	uj	n	2	0.8	0.3	VOCs	CC
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	2,4,5-Trichlorophenol	95-95-4	µg/L	0.97	u q	uj	n	19	0.97	0.44	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	2,4,6-Trichlorophenol	88-06-2	µg/L	0.97	u q	uj	n	19	0.97	0.28	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	2,4-Dinitrophenol	51-28-5	µg/L	2.9	u q	uj	n	78	2.9	9.7	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	4,6-Dinitro-2-methylphenol	534-52-1	µg/L	8.5	u q	uj	n	78	8.5	3.9	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	4-Chloro-3-methylphenol	59-50-7	µg/L	4.8	u q	uj	n	19	4.8	2.3	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	4-Nitrophenol	100-02-7	µg/L	3.9	u q	uj	n	48	3.9	1.2	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Carbazole	86-74-8	µg/L	0.97	u q	uj	n	9.7	0.97	0.42	SVOCs	S
280-96510-1	LL10mw-005-042817-GW	280-96510-9	Ground Water	Pentachlorophenol	87-86-5	µg/L	58	u q	uj	n	78	58	19	SVOCs	S