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 280-96291-1

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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.

Travis Withers
2017.05.25 08:46:16 -06'00'

Travis Withers, Validation Chemist, TEC-WESTON JV Date

5/25/17

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) **280-96291-1**.

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

Parameters	Analytical Method	Laboratory Location
Polycyclic Aromatic Hydrocarbons (PAHs)	8270D SIM	Denver, CO
Explosives	8330B	Denver, CO
Total Cyanide	9012B	Denver, CO
Nitrate/Nitrite/Sulfate/Chloride	9056A	Denver, CO
Hexavalent Chromium	7196A	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	PAHs	Explosives	Total Cyanide	Hexavalent Chromium
LL3mw-244-042417-GW	280-96291-1	04/24/2017	Groundwater					✓
BKGmw-006-042417-GW	280-96291-2	04/24/2017	Groundwater					✓
LL3mw-234-042417-GW	280-96291-3	04/24/2017	Groundwater				✓	
LL3mw-237-042417-GW	280-96291-4	04/24/2017	Groundwater			✓		
LL4mw-200-042417-GW	280-96291-5	04/24/2017	Groundwater		✓		✓	
LL4mw-193-042417-GW	280-96291-6	04/24/2017	Groundwater	MS/MSD		✓	✓	

Additional analyses reported for samples LL3mw-234-042417-GW and LL4mw-193-042417-GW are reported and validated under separate cover.
Some samples were analyzed for natural attenuation parameters. Natural attenuation parameters are reported, but not validated in accordance with the QAPP.

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 25, 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.

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.

1.4 TECHNICAL DATA VALIDATION

1.4.1 Polycyclic Aromatic Hydrocarbons (PAHs) by Method 8270D SIM

The following parameters were evaluated and met the required criteria:

- Holding times
- Surrogate recoveries
- Dilutions
- LODs and LOQs
- Method blank
- MS/MSD recoveries and RPD
- Field duplicate
- Instrument tuning
- Internal standards
- Initial calibration
- Initial calibration verification
- Continuing calibration verification
- Closing calibration verification

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

1.4.1.1 Laboratory Control Samples

Chrysene (121%) was recovered above the QC limits (57-120) in the LCS. All associated sample results were non-detect for chrysene; therefore, no qualification was necessary.

1.4.2 Explosives by Method 8330B

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
- 2nd column confirmation

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

1.4.2.1 Matrix Spike/Matrix Spike Duplicates

2-Nitrotoluene recovered within the recovery limits (70-127%) in the MS (93%) and MSD (117%), but the RPD (22%) was exceeded the QC limit (20%). Because the MS and MSD recoveries were within limits, no qualification was necessary.

1.4.3 Hexavalent Chromium by Method 7196A

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
- MS/MSD recoveries and RPDs
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank

No analytical or quality parameters required further discussion for Method 7196A.

1.4.4 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
- Method blanks
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank

No analytical or quality parameters required further discussion for Method 9012B.

No qualifications were made in this SDG.