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 280-96682-1

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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 08:44:43 -06'00'

Travis Withers, Validation Chemist, TEC-WESTON JV Date

5/24/17

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) **280-96682-1**.

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

Parameters	Analytical Method	Laboratory Location
Perchlorate	6860	Denver, CO
Alkalinity	2320	Denver, CO
Total Cyanide	9012B	Denver, CO
Sulfide	9034	Denver, CO
Nitrate/Nitrite/Sulfate	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	Perchlorate	Alkalinity	Total Cyanide	Hexavalent Chromium
RQLmw-012-050317-GW	280-96682-1	05/03/2017	Groundwater			✓	✓	✓
LL3mw-246-050317-GW	280-96682-2	05/03/2017	Groundwater		✓			
BKGmw-024-050317-GW	280-96682-3	05/03/2017	Groundwater		✓			
BKGmw-005-050317-GW	280-96682-4	05/03/2017	Groundwater					✓
FWGmw-005-050317-GW	280-96682-5	05/03/2017	Groundwater					✓
FWGmw-021-050317-GW	280-96682-6	05/03/2017	Groundwater					✓
LL1mw-084-050317-GW	280-96682-7	05/03/2017	Groundwater					✓

Additional analyses reported for sample RQLmw-012-050317-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 May 4, 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.

The following validation flags and reason codes were applied:

Validation Flag	Reason Code	Description
UJ	H	Estimated non-detection; holding time exceeded.

1.4 TECHNICAL DATA VALIDATION

1.4.1 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
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank
- Detection limit check
- Interference check standards

No analytical or quality parameters requiring further discussion were identified for Method 6860.

1.4.2 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
- Continuing calibration verification
- Detection limit check
- Interference check standards
- Laboratory duplicates

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

1.4.2.1 Method Blanks

Alkalinity (2.30 mg/L) was detected in the method blank at a concentration below the LOQ (5.0 mg/L). Alkalinity was detected in all associated sample at concentrations above the LOQ. No qualification was necessary.

1.4.2.2 Continuing Calibration Blanks

Alkalinity was detected in the calibration blanks CCB 280-372960/29 (2.17 mg/L) and CCB 280-372960/43 (2.15 mg/L) at concentrations below the LOQ (5.0 mg/L). Alkalinity was detected in all associated sample at concentrations above the LOQ. 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:

- 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 parameters requiring further discussion for Method 7196A are described in the sections below.

1.4.3.1 Holding Times

Sample RQLmw-012-050317-GW was received by the laboratory with insufficient time to perform the analysis within the 24-hour holding time. The sample was still analyzed within 2x the holding time; therefore, the result was qualified as estimated (UJ H).

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
- Initial calibration verification
- Continuing calibration verification
- Initial calibration blank
- Continuing calibration blank

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

1.4.4.1 Method Blanks

Total cyanide (2.22 µg/L) was detected in the method blank at a concentration below the LOQ (10 µg/L). Total cyanide was non-detect in all associated samples; 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	AnalyticMethod	Reason Code
280-96682-1	RQLmw-012-050317-GW	280-96682-1	Ground Water	Chromium, hexavalent	18540-29-9	µg/L	4	u h	uj	n	20	4	4	Hexavalent Chromium	H