

**Data Validation Summary Report, Revision 1  
Athens Well Field Capture Evaluation and Zero-Valent Iron  
Treatability Study  
Nevada Environmental Response Trust (NERT)  
Henderson, Nevada**

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July 23, 2019

2018 AWF Capture Evaluation and  
2018 ZVI Treatability Study DVSR and EDD, Revision 1  
Nevada Environmental Response Trust Site  
Henderson, Nevada

**2018 AWF Capture Evaluation and  
2018 ZVI Treatability Study,  
DVSR and EDD, Revision 1**

**Nevada Environmental Response Trust  
Site (Former Tronox LLC Site)  
Henderson, Nevada**

**Nevada Environmental Response Trust (NERT) Representative Certification**

I certify that this document and all attachments submitted to the Division were prepared at the request of, or under the direction or supervision of NERT. Based on my own involvement and/or my inquiry of the person or persons who manage the system(s) or those directly responsible for gathering the information or preparing the document, or the immediate supervisor of such person(s), the information submitted and provided herein is, to the best of my knowledge and belief, true, accurate, and complete in all material respects.

Office of the Nevada Environmental Response Trust

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**Name:** Jay A. Steinberg, not individually, but solely in his representative capacity as  
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**Company:** Le Petomane XXVII, Inc., not individually, but solely in its representative  
capacity as the Nevada Environmental Response Trust Trustee

**Date:** 7/23/19

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**Responsible Certified Environmental Manager (CEM) for this project**

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and, to the best of my knowledge, comply with all applicable federal, state and local statutes, regulations and ordinances.



**John M. Pekala, PG**  
**Principal**

July 23, 2019

**Date**

Certified Environmental Manager  
Ramboll US Corporation  
CEM Certificate Number: 2347  
CEM Expiration Date: September 20, 2020

## Table of Contents

Section	Title	Page No.
1.0	INTRODUCTION .....	1
2.0	METALS .....	6
2.1	Precision and Accuracy.....	6
2.2	Representativeness .....	7
2.3	Comparability .....	8
2.4	Completeness .....	8
2.5	Sensitivity .....	8
3.0	WET CHEMISTRY.....	8
3.1	Precision and Accuracy.....	8
3.2	Representativeness .....	9
3.3	Comparability .....	10
3.4	Completeness .....	10
3.5	Sensitivity .....	10
4.0	VARIANCES IN ANALYTICAL PERFORMANCE .....	10
5.0	SUMMARY OF PARCCS CRITERIA .....	10
5.1	Precision and Accuracy.....	10
5.2	Representativeness .....	10
5.3	Comparability .....	10
5.4	Completeness .....	11
5.5	Sensitivity .....	11
6.0	CONCLUSIONS AND RECOMMENDATIONS .....	11
7.0	REFERENCES .....	12

## **LIST OF TABLES**

- TABLE I – Sample Cross-Reference
- TABLE II – Stage 2A, Stage 2B & Stage 4 Validation Elements
- TABLE III – Stage 2A, Stage 2B & Stage 4 Validation Percentages
- TABLE IV – Reason Codes and Definitions
- TABLE V – Overall Qualified Results

## **ATTACHMENTS**

- ATTACHMENT A – Metals Data Validation Report
- ATTACHMENT B – Wet Chemistry Data Validation Report

## LIST OF ACRONYMS AND ABBREVIATIONS

AWF	Athens Well Field
CCB	Continuing Calibration Blank
CLPNFG	Contract Laboratory Program National Functional Guidelines
DL	Detection Limit
DNR	Do Not Report
DQO	Data Quality Objectives
DUP	Laboratory Duplicate
DVR	Data Validation Report
DVSR	Data Validation Summary Report
FD	Field Duplicate
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
LDC	Laboratory Data Consultants, Inc.
MDL	Method Detection Limit
MS/MSD	Matrix Spike / Matrix Spike Duplicate
NDEP	Nevada Department of Environmental Protection
NERT	Nevada Environmental Response Trust
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance / Quality Control
QAPP	Quality Assurance Project Plan
RPD	Relative Percent Difference
SDG	Sample Delivery Group
SQL	Sample Quantitation Limit
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
ZVI	Zero-Valent Iron
ug/Kg	Micrograms per Kilogram
mg/Kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
%RSD	Percent Relative Standard Deviation
%D	Percent Difference
%R	Percent Recovery

## 1.0 INTRODUCTION

This data validation summary report (DVSR) has been prepared by Laboratory Data Consultants, Inc. (LDC) to assess the validity and usability of laboratory analytical data associated with the Athens Well Field (AWF) Capture Evaluation and the Zero-Valent Iron (ZVI) Treatability Study conducted at the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada. The assessment was performed by Ramboll as a part of the *Quality Assurance Project Plan, Revision 2, Nevada Environmental Response Trust Site, Henderson, Nevada* dated October 2017 and included the collection and analyses of 268 environmental and quality control (QC) samples. The analyses were performed by the following methods:

Metals by Environmental Protection Agency (EPA) 200.7 and EPA SW 846 Methods 6010B/7471A

Wet Chemistry:

Hexavalent Chromium by EPA SW 846 Method 7199

pH by Standard Method 9045C

Chloride, Nitrate as Nitrogen, Nitrate as Nitrate, and Sulfate by EPA Method 300.0

Chlorate by EPA Method 300.1B

Perchlorate by EPA Method 314.0

Alkalinity by Standard Method 2320B

Total Dissolved Solids (TDS) by Standard Method 2540C

Ferrous Iron by Standard Method 3500-FE D

Ferric Iron by Calculation Method

Total Organic Carbon (TOC) by Standard Method 5310B

Laboratory analytical services were provided by TestAmerica, Inc. The samples were grouped into sample delivery groups (SDGs). The water and soil samples are associated with quality assurance and quality control (QA/QC) samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. Table I is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, matrix, and validation level. An individual sample may be on multiple rows if it is reported on more than one SDG or if its analytes were validated at different validation levels. Table II is a reference table that identifies the QC elements reviewed for each validation level per method, as applicable.

The laboratory analytical data were validated in accordance with procedures described in the Nevada Division of Environmental Protection (NDEP) *Data Validation Guidance* established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada, July 13, 2018. Consistent with the NDEP requirements, one hundred percent of the water analytical data were validated according to Stage 2A and approximately ninety percent of the soil analytical data were validated according to Stage 2B data validation procedures and approximately ten percent of the soil samples were validated according to Stage 4 data validation procedures. The number of samples and percentage of samples validated to Stage 2A, Stage 2B, and Stage 4 for each method is presented in Table III.

The analytical data were evaluated for QA/QC based on the following documents: *Quality Assurance Project Plan, Revision 2, NERT Site, Henderson, Nevada*, October 2017; a modified outline of the *USEPA National Functional Guidelines (NFGs) for Inorganic Superfund Data Review* (January 2017); *Standard Method for the Examination of Water and Wastewater 22<sup>nd</sup> edition (2012)*; and the *EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste*, update I, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IV, February 2007; update V, July 2014.

This report summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) relative to the project data

quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The PARCCS summary report evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Each analytical fraction has a separate section for each of the PARCCS criteria. These sections interpret specific QC deviations and their effects on both individual data points and the analyses as a whole. Section 5 presents a summary of the PARCCS criteria by comparing quantitative parameters with acceptability criteria defined in the project DQO's. Qualitative PARCCS criteria are also summarized in this section.

### **Precision and Accuracy of Environmental Data**

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sampling procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which affect the overall quality of a measurement. Errors for sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and complying with QC requirements. The sample matrix also is an important factor in the ability to obtain precise and accurate results within a given media.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. QA/QC samples include: method blanks, calibration blanks, matrix spike/matrix spike duplicates (MS/MSD), laboratory duplicates (DUP), laboratory control samples (LCS), field duplicates (FD), and equipment blanks (EB).

Before conducting the PARCCS evaluation, the analytical data were validated according to the NDEP Data Validation Guidance (July 2018), QAPP (October 2017), NFG (USEPA 2017), and EPA Methods. Samples not meeting the acceptance criteria were qualified with a flag, an abbreviation indicating a deficiency with the data. The following are flags used in data validation.

- J- Estimated The associated numerical value is an estimated quantity with a negative bias. The analyte was detected but the reported value may not be accurate or precise.
- J+ Estimated The associated numerical value is an estimated quantity with a positive bias. The analyte was detected but the reported value may not be accurate or precise.
- J Estimated The associated numerical value is an estimated quantity. It is not possible to assess the direction of the potential bias. The analyte was detected but the reported value may not be accurate or precise. The "J" qualification indicates the data fell outside the QC limits but the exceedance was not sufficient to cause rejection of the data.
- R Rejected The data is unusable (the analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte.
- U Nondetected Analyses were performed for the compound or analyte, but it was not detected.
- UJ Estimated/Nondetected Analyses were performed for the analyte, but it was not detected and the sample quantitation or detection limit is an estimated quantity due to poor accuracy or precision.
- DNR Do Not Report A more appropriate result is reported from another analysis or dilution.



- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

The hierarchy of flags is listed below:

- R > J The R flag will always take precedence over the J qualifier.
- J+ The high bias (J+) flag is applied only to detected results.
- J > J+ or J- A non-biased (J) flag will always supersede biased (J+ or J-) flags since it is not possible to assess the direction of the potential bias.
- J = J+ plus J- Adding biased (J+, J-) flags with opposite signs will result in a non-biased flag (J).
- UJ = U plus J The UJ flag is used when a non-detected (U) flag is added to a non-biased flag (J).

Table IV lists the reason codes used. Reason codes explain why flags have been applied and allow data users to assess if a result is usable with qualification due to QA/QC outliers or not usable when rejected due to QA/QC outliers. Reason codes are cumulative except when one of the flags is R then only the reason code associated to the R flag will be used.

Table V presents the overall qualified results after all the flags or validation qualifiers and associated reason codes have been applied.

Once the data are reviewed and qualified according to the QAPP, NFG, EPA and Standard Methods, the data set is then evaluated using PARCCS criteria. PARCCS criteria provide an evaluation of overall data usability. The following is a discussion of PARCCS criteria as related to the project DQOs.

**Precision** is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly but is calculated from reported concentrations.

Precision is expressed as the relative percent difference (RPD):

$$RPD = (D1-D2)/\{1/2(D1+D2)\} \times 100$$

where:

D1 = reported concentration for the sample

D2 = reported concentration for the duplicate

Precision is primarily assessed by calculating an RPD from the reported concentrations of the spiked compounds for each sample in the MS/MSD pair. In the absence of an MS/MSD pair, a laboratory duplicate or LCS/LCSD pair can be analyzed as an alternative means of assessing precision. An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using the RPD result as the evaluation criteria.

MS and MSD samples are field samples spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. A LCS is similar to an MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water or solid

matrix is used to prepare an LCS. The LCS measures laboratory efficiency in recovering target analytes from either matrix in the absence of matrix interferences.

DUPs measure laboratory precision. DUPs are replicate samples and are prepared by taking two aliquots from one sample container. The analytical results for DUPs are reported as the RPD between the results of the two aliquots.

Laboratory and field sampling precision are evaluated by calculating RPDs for field sample duplicate pairs. The sampler collects two field samples at the same location and under identically controlled conditions. The laboratory then analyzes the samples under identical conditions.

An RPD outside the numerical QC limit in the LCS/LCSD, MS/MSD, DUPs, or field duplicates indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample heterogeneity, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results may be reported in either the primary or duplicate samples at levels below the practical quantitation limit (PQL) or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicate pairs do not suggest a significant impact on the data quality.

**Accuracy** is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of MS, MSD, and LCS. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Accuracy is determined using the percent recoveries of MS and LCS analyses.

Percent recovery (%R) is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:

A = measured concentration in the spiked sample

B = measured concentration of the spike compound in the unspiked sample

C = concentration of the spike

The percent recovery of each analyte spiked in MS/MSD samples, and LCS/LCSD is evaluated with the acceptance criteria specified by the previously noted documents. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

**Representativeness** is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blanks, samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, initial calibration blanks (ICB), and continuing calibration blanks (CCB) and EBs.

A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments,

reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

Calibration blanks consist of acidified laboratory grade water, which are injected at the beginning and at a regular frequency during each 12 - hour sample analysis run. These blanks estimate residual contaminants from the previous sample or standards analysis and measure baseline shifts that commonly occur in emission and absorption spectroscopy.

Equipment blanks consist of analyte-free water poured over or through the sample collection equipment. The water is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated and measure efficiency of the decontamination procedure.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times will be specific for each method and matrix analyzed. Holding time exceedance can cause loss of sample constituents due to biodegradation, precipitation, volatilization, and chemical degradation.

**Comparability** is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCCS criteria, because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

**Completeness** is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 90 percent.

Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

where:

%C = percent completeness

T = total number of sample results

R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the QAPP, with the number determined above.

**Sensitivity** is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. This capability is established during the planning phase to meet the DQOs. It is important that calibration requirements, detection limits (DLs), and PQLs presented in the QAPP are achieved and that target analytes can be detected at concentrations necessary to support the DQOs. The method detection limits (MDLs) represent the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Sample quantitation limits (SQLs) are adjusted MDL values that reflect sample specific actions, such as dilutions or varying aliquot sizes. PQLs are the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration point for the analyte. The laboratory is

required to report detected analytes down to the SQL for this project. In addition, sample results are compared to method blank and field blank results to identify potential effects of laboratory background and field procedures on sensitivity.

The QA/QC criteria were met with the exceptions noted in the following sections for each analytical method.

## **2.0 METALS**

A total of nine (9) water samples were analyzed for metals by EPA Method 200.7. A total of 89 soil samples were analyzed for metals by EPA SW-846 Method 6010B and 45 soil samples were analyzed for mercury by EPA SW-846 Method 7471A. All metals data were assessed to be valid since none of the 944 total results were rejected due to holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the DQOs.

### **2.1 Precision and Accuracy**

#### **2.1.1 Instrument Calibration**

Initial and continuing calibration verification results provide a means of evaluating accuracy within a particular SDG. Correlation coefficient (r) and percent recovery (%R) are the two major parameters used to measure the effectiveness of instrument calibration. The correlation coefficient indicates the linearity of the calibration curve. %R is used to verify the ongoing calibration acceptability of the analytical system. The most critical of the two calibration parameters, r, has the potential to affect data accuracy across an SDG when it is outside the acceptable QC limits. %R exceedances suggest more routine instrumental anomalies, which typically impact all sample results for the affected analytes.

The correlation coefficients in the initial calibrations were within the acceptance criteria of  $\geq 0.995$ . The continuing calibration verifications %Rs were within the acceptance criteria of 90-110%.

#### **2.1.2 MS/MSD Samples**

Sixty-eight (68) results were qualified as detected estimated (J-) or non-detected estimated (UJ) due to MS/MSD %Rs below the laboratory acceptance criteria. Negative bias was removed for 22 of 68 results since these results were also qualified as estimated (J) due to MS/MSD RPD or field duplicate RPD above the QAPP acceptance criteria.

Forty-five (45) results were qualified as detected estimated (J+) due to MS/MSD %Rs above the laboratory acceptance criteria. Positive bias was removed for two of 45 results since these results were also qualified as estimated (J) due to MS/MSD RPD above the QAPP acceptance criteria.

Thirty-three (33) results were qualified as detected estimated (J) as a result of MS/MSD RPD above the QAPP acceptance criteria.

The details regarding the qualification of results are provided in Attachment A.

#### **2.1.3 LCS Samples**

All LCS %Rs met the laboratory acceptance criteria.

#### **2.1.4 ICP Interference Check Sample**

All ICP interference check %Rs met the method acceptance criteria.

### **2.1.5 ICP Serial Dilution**

All ICP serial dilution %Ds met the method acceptance criteria.

### **2.1.6 FD Samples**

Eight (8) results for field duplicate samples PZ-2D-62.0-20180713 and PZ-2D-62.0-20180713-FD were qualified as detected estimated (J) due to RPDs above the QAPP acceptance criteria. The details regarding the qualification of results are provided in Attachment A.

### **2.1.7 Sample Result Verification**

Raw data were evaluated for 22 samples for metals by EPA SW-846 Methods 6010B and 7471A. All reported sample results, detects and non-detects, were correctly calculated for these Stage 4 samples.

## **2.2 Representativeness**

### **2.2.1 Sample Preservation and Holding Times**

The evaluation of holding times to verify compliance with the method was conducted. All samples met the 28-day analysis holding time criteria for mercury and 180-day analysis holding time criteria for all other metals.

### **2.2.2 Blanks**

Method blanks, ICB/CCBs and an EB were collected and analyzed to evaluate representativeness. The concentration for an individual target compound in any of the types of QA/QC blanks was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results based on the following criteria.

Results Below the PQL - If a sample result and blank contaminant value were less than the PQL, the sample result was amended as estimated (J) at the reported concentration.

Results Above the PQL - If a sample result and blank contaminant value were greater than the PQL and the sample result was less than 10 times the blank contaminant value, the sample result was qualified as detected estimated (J+) at the reported concentration.

No Action - If blank contaminant values were less than the PQL and associated sample results were greater than the PQL, or if blank contaminant values were greater than the PQL and associated sample results were greater than 10 times the blank contaminant value, the result was not qualified.

#### **2.2.2.1 Method and Calibration Blanks**

No data were qualified due to the contaminants detected in the method blanks and ICB/CCBs.

#### **2.2.2.2 EB**

No data were qualified due to the contaminants detected in the equipment blank.

## **2.3 Comparability**

The laboratory used standard analytical methods for all of the analyses. In all cases, the SQLs attained were at or below the PQLs. Target compounds detected below the PQLs flagged (J) by the laboratory should be considered estimated. The comparability of the metals data is regarded as acceptable.

## **2.4 Completeness**

The completeness level attained for metal field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

## **2.5 Sensitivity**

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory PQLs met the specified requirements described in the QAPP.

## **3.0 WET CHEMISTRY**

A total of nine (9) water samples were analyzed for hexavalent chromium by EPA Method SW-846 7199, chloride and sulfate by EPA Method 300.0, chlorate by EPA Method 300.1B, perchlorate by EPA Method 314.0, alkalinity by Standard Method 2320B, TDS by Standard Method 2540C, ferrous iron by Standard Method 3500-FE D, ferric iron by Calculation Method, and TOC by Standard Method 5310B. A total of 89 soil samples were analyzed for hexavalent chromium by EPA Method SW-846 7199 and TDS by Standard Method 2540C, 45 soil samples were analyzed for pH by Standard Method 9045C, 215 soil samples were analyzed for nitrate as nitrate and nitrate as nitrogen by EPA Method 300.0 and 259 soil samples were analyzed for chlorate by EPA Method 300.1B and perchlorate by EPA Method 314.0. All wet chemistry data were assessed to be valid with the exception of eight (8) of the 1,288 total results which were rejected based on severely low MS/MSD %Rs. This section discusses the QA/QC supporting documentation as defined by the PARCCS criteria and evaluated based on the DQOs.

### **3.1 Precision and Accuracy**

#### **3.1.1 Instrument Calibration**

The correlation coefficients in the initial calibrations were within the acceptance criteria of  $\geq 0.995$ . The continuing calibration verifications %Rs were within the acceptance criteria of 90-110%.

#### **3.1.2 MS/MSD Samples**

Due to severely low MS/MSD %Rs (i.e.  $<30\%$ ), eight (8) perchlorate results were qualified as rejected (R). Additionally, eighty-nine (89) results were qualified as detected estimated (J-) or non-detected estimated (UJ) due to MS/MSD %Rs below the QAPP acceptance criteria. Negative bias was removed for 17 of 89 results since these results were also qualified as estimated (J) due to MS/MSD RPD above the QAPP acceptance criteria.

Seventeen (17) results were qualified as detected estimated (J+) due to MS/MSD %Rs above the QAPP acceptance criteria.

Twenty-two (22) results were qualified as detected estimated (J) as a result of MS/MSD RPDs above the QAPP acceptance criteria.

### **3.1.3 DUP Samples**

All DUP RPDs met the laboratory acceptance criteria.

### **3.1.4 LCS Samples**

All LCS %Rs met the laboratory acceptance criteria.

### **3.1.5 FD Samples**

The field duplicate RPDs met the QAPP acceptance criteria.

Given the additional uncertainty in results reported below the PQL, no data were qualified when the RPDs were outside the QAPP acceptance criteria and the associated results in either the primary or duplicate samples were below the PQL or not detected.

### **3.1.6 Sample Result Verification**

Raw data were evaluated for 22 soil samples for hexavalent chromium, pH and TDS and 42 soil samples for nitrate as nitrate, nitrate as nitrogen, chlorate and perchlorate. All reported sample results, detects and non-detects, were correctly calculated for these Stage 4 samples.

## **3.2 Representativeness**

### **3.2.1 Sample Preservation and Holding Times**

The evaluation of holding times to verify compliance with all wet chemistry methods was conducted. All samples met the 7-day analysis holding time criteria for water and soil samples analyzed for TDS, the 14-day analysis holding time criteria for water samples analyzed for alkalinity, the 28-day analysis holding time criteria for water samples analyzed for chlorate, chloride, perchlorate, sulfate, and TOC, the 28-day analysis holding time criteria for soil samples analyzed for chlorate, nitrate as nitrate, nitrate as nitrogen, perchlorate, and pH, and the 30-day analysis holding time criteria for soil samples analyzed for hexavalent chromium.

Five (5) hexavalent chromium results were qualified as detected estimated (J-) or non-detected estimated (UJ) due to an exceedance of holding time criteria. The analysis holding time criteria is 24 hours for water samples.

Eighteen (18) ferric and ferrous iron results were qualified as detected estimated (J-) or non-detected estimated (UJ) due to an exceedance of holding time criteria. The analysis holding time criteria is 48 hours for water samples.

### **3.2.2 Blanks**

Method blanks, ICB/CCBs and an EB were collected and analyzed to evaluate representativeness.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation based on the criteria presented in Section 2.2.2.

#### **3.2.2.1 Method and Calibration Blanks**

No data were qualified due to the contaminants detected in the ICB/CCBs.

### **3.2.2.2 EB**

No contaminants were detected in the equipment blank.

### **3.3 Comparability**

The laboratory used standard analytical methods for all of the analyses. In all cases, the SQLs attained were at or below the PQLs. Target compounds detected below the PQLs flagged (J) by the laboratory should be considered estimated. The comparability of the data is regarded as acceptable.

### **3.4 Completeness**

The completeness level attained for alkalinity, anions, chlorate, ferric and ferrous iron, hexavalent chromium, pH, TDS and TOC was 100 percent and 97.0 percent for perchlorate. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

### **3.5 Sensitivity**

The calibration was evaluated for instrument sensitivity and was determined to be technically acceptable. All laboratory PQLs met the specified requirements described in the QAPP.

## **4.0 VARIANCES IN ANALYTICAL PERFORMANCE**

The laboratory used standard analytical methods for all of the analyses throughout the project. No systematic variances in analytical performance were noted in the laboratory case narratives.

## **5.0 SUMMARY OF PARCCS CRITERIA**

The validation reports present the PARCCS results for all SDGs. Each PARCCS criterion is discussed in detail in the following sections.

### **5.1 Precision and Accuracy**

Precision and accuracy were evaluated using data quality indicators such as calibration, MS/MSD, DUP, LCS, and field duplicates. The precision and accuracy of the data set were considered acceptable after integration of result qualification.

All calibrations were performed as required and met the acceptance criteria. All MS/MSD and LCS percent recoveries and RPDs, and DUP and field duplicate RPDs met acceptance criteria with the exceptions noted in Sections 2.1.2, 2.1.6, and 3.1.2.

### **5.2 Representativeness**

All samples for each method and matrix were evaluated for holding time compliance. All holding times were met with the exceptions noted in Section 3.2.1. All samples were associated with a method blank and in each individual SDG. The representativeness of the project data is considered acceptable.

### **5.3 Comparability**

Sampling frequency requirements were met in obtaining necessary field duplicates and blanks. The laboratory used standard analytical methods for the analyses. The analytical results were reported in correct standard units. Sample integrity criteria were met. Sample preservation and holding times were



within QC criteria with the exceptions noted in Section 3.2.1. The overall comparability is considered acceptable.

#### 5.4 Completeness

Of the 2,232 total analytes reported, eight (8) sample results were rejected. The completeness for the SDGs is as follows:

<b>Parameter</b>	<b>Total Analytes</b>	<b>No. of Rejects</b>	<b>% Completeness</b>
Metals	944	0	100
Wet Chemistry:			
Alkalinity	36	0	100
Anions	448	0	100
Chlorate	268	0	100
FeII and FeIII	18	0	100
Hexavalent chromium	98	0	100
Perchlorate	268	8	97.0
pH	45	0	100
TDS	98	0	100
TOC	9	0	100
<b>Total</b>	<b>2,232</b>	<b>8</b>	<b>99.6</b>

The completeness percentage based on rejected data met the 90 percent DQO goal.

#### 5.5 Sensitivity

Sensitivity was achieved by the laboratory to support the DQOs. Calibration concentrations and PQLs met the project requirements and low-level contamination in the method and calibration blanks did not affect sensitivity.

### 6.0 CONCLUSIONS AND RECOMMENDATIONS

The analytical data quality assessment for the soil and groundwater sample laboratory analytical results generated during the AWF Capture Evaluation and ZVI Treatability Study at the NERT site in Henderson, Nevada established that the overall project requirements and completeness levels were met. Sample results that were found to be rejected (R) are unusable for all purposes. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Stage 2A, Stage 2B and Stage 4 data validation, all other results are considered valid and usable for all purposes.

## **7.0 REFERENCES**

American Public Health Association 2012. Standard Method for the Examination of Water and Wastewater (22nd ed.). Washington, DC: American Public Health Association; Rice, Baird, Eaton, and Clesceri.

NDEP 2018. NDEP Data Validation Guidance. July.

Ramboll 2017. Quality Assurance Project Plan, Revision 2, Nevada Environmental Response Trust Site, Henderson, Nevada. October.

USEPA 1996. EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste, update I, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IV, February 2007; update V, July 2014.

USEPA 2017. USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review. January.

## **TABLES**

**Table I. Sample Cross-Reference**

LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
42843	2018 Treatability Study	4402085881	ESB-22-10.0-20180410	440-208588-1	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-22-20.0-20180410	440-208588-2	4/10/2018	Stage 2B	Soil	FD1								X	X	X					
42843	2018 Treatability Study	4402085881	ESB-22-20.0-20180410-FD	440-208588-3	4/10/2018	Stage 2B	Soil	FD1								X	X	X					
42843	2018 Treatability Study	4402085881	ESB-22-30.0-20180410	440-208588-4	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-22-40.0-20180410	440-208588-5	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-21-10.0-20180410	440-208588-6	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-21-20.0-20180410	440-208588-7	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-21-30.0-20180410	440-208588-8	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-21-40.0-20180410	440-208588-9	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-20-10.0-20180410	440-208588-10	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402085881	ESB-20-20.0-20180410	440-208588-11	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ESB-20-30.0-20180410	440-208667-1	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ESB-20-40.0-20180410	440-208667-2	4/10/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ESB-19-10.0-20180411	440-208667-3	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ESB-19-20.0-20180411	440-208667-4	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ESB-19-30.0-20180411	440-208667-5	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-10.0-20180411	440-208667-6	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-11.0-20180411	440-208667-7	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-12.0-20180411	440-208667-8	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-13.0-20180411	440-208667-9	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-14.0-20180411	440-208667-10	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-15.0-20180411	440-208667-11	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-16.0-20180411	440-208667-12	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-17.0-20180411	440-208667-13	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-18.0-20180411	440-208667-14	4/11/2018	Stage 2B	Soil	FD2								X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-18.0-20180411-FD	440-208667-15	4/11/2018	Stage 2B	Soil	FD2								X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-19.0-20180411	440-208667-16	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-20.0-20180411	440-208667-17	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-21.0-20180411	440-208667-18	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-22.0-20180411	440-208667-19	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-23.0-20180411	440-208667-20	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-24.0-20180411	440-208667-21	4/11/2018	Stage 2B	Soil									X	X	X					

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LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
42843	2018 Treatability Study	4402086671	ES-33-25.0-20180411	440-208667-22	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-26.0-20180411	440-208667-23	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-27.0-20180411	440-208667-24	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-28.0-20180411	440-208667-25	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-29.0-20180411	440-208667-26	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-30.0-20180411	440-208667-27	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-31.0-20180411	440-208667-28	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-32.0-20180411	440-208667-29	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-33.0-20180411	440-208667-30	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-40.0-20180411	440-208667-31	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-50.0-20180411	440-208667-32	4/11/2018	Stage 2B	Soil	FD3								X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-50.0-20180411-FD	440-208667-33	4/11/2018	Stage 2B	Soil	FD3								X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-60.0-20180411	440-208667-34	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-70.0-20180411	440-208667-35	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-80.0-20180411	440-208667-36	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-90.0-20180411	440-208667-37	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-100.0-20180411	440-208667-38	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-110.0-20180411	440-208667-39	4/11/2018	Stage 2B	Soil	FD4								X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-110.0-20180411-FD	440-208667-40	4/11/2018	Stage 2B	Soil	FD4								X	X	X					
42843	2018 Treatability Study	4402086671	ES-33-120.0-20180411	440-208667-41	4/11/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-10.0-20180412	440-208827-1	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-20.0-20180412	440-208827-2	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-15.0-20180412	440-208827-3	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-16.0-20180412	440-208827-4	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-17.0-20180412	440-208827-5	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-18.0-20180412	440-208827-6	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-19.0-20180412	440-208827-7	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-25.0-20180412	440-208827-8	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-26.0-20180412	440-208827-9	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-27.0-20180412	440-208827-10	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-28.0-20180412	440-208827-11	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-29.0-20180412	440-208827-12	4/12/2018	Stage 2B	Soil									X	X	X					

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LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
42843	2018 Treatability Study	4402088271	ES-34-30.0-20180412	440-208827-13	4/12/2018	Stage 2B	Soil	FD5								X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-30.0-20180412-FD	440-208827-14	4/12/2018	Stage 2B	Soil	FD5								X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-31.0-20180412	440-208827-15	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-32.0-20180412	440-208827-16	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-33.0-20180412	440-208827-17	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-34.0-20180412	440-208827-18	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-35.0-20180412	440-208827-19	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-36.0-20180412	440-208827-20	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-37.0-20180412	440-208827-21	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-38.0-20180412	440-208827-22	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-40.0-20180412	440-208827-23	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-50.0-20180412	440-208827-24	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-60.0-20180412	440-208827-25	4/12/2018	Stage 2B	Soil	FD6								X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-60.0-20180412-FD	440-208827-26	4/12/2018	Stage 2B	Soil	FD6								X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-70.0-20180412	440-208827-27	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-80.0-20180412	440-208827-28	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-90.0-20180412	440-208827-29	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-100.0-20180412	440-208827-30	4/12/2018	Stage 2B	Soil	FD7								X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-100.0-20180412-FD	440-208827-31	4/12/2018	Stage 2B	Soil	FD7								X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-110.0-20180412	440-208827-32	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-34-120.0-20180412	440-208827-33	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-10.0-20180412	440-208827-34	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-20.0-20180412	440-208827-35	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-22.0-20180412	440-208827-36	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-23.0-20180412	440-208827-37	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-24.0-20180412	440-208827-38	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-25.0-20180412	440-208827-39	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-26.0-20180412	440-208827-40	4/12/2018	Stage 2B	Soil	FD8								X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-26.0-20180412-FD	440-208827-41	4/12/2018	Stage 2B	Soil	FD8								X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-27.0-20180412	440-208827-42	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-28.0-20180412	440-208827-43	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-29.0-20180412	440-208827-44	4/12/2018	Stage 2B	Soil									X	X	X					

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42843	2018 Treatability Study	4402088271	ES-35-30.0-20180412	440-208827-45	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-31.0-20180412	440-208827-46	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-32.0-20180412	440-208827-47	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-33.0-20180412	440-208827-48	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-34.0-20180412	440-208827-49	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-35.0-20180412	440-208827-50	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-36.0-20180412	440-208827-51	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-37.0-20180412	440-208827-52	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-38.0-20180412	440-208827-53	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-39.0-20180412	440-208827-54	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-40.0-20180412	440-208827-55	4/12/2018	Stage 2B	Soil	FD9								X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-40.0-20180412-FD	440-208827-56	4/12/2018	Stage 2B	Soil	FD9								X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-41.0-20180412	440-208827-57	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-42.0-20180412	440-208827-58	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-43.0-20180412	440-208827-59	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-44.0-20180412	440-208827-60	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088271	ES-35-45.0-20180412	440-208827-61	4/12/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-50.0-20180412	440-208897-1	4/12/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-60.0-20180412	440-208897-2	4/12/2018	Stage 4	Soil	FD10								X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-60.0-20180412-FD	440-208897-3	4/12/2018	Stage 4	Soil	FD10								X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-70.0-20180412	440-208897-4	4/12/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-80.0-20180413	440-208897-5	4/13/2018	Stage 4	Soil	FD11								X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-80.0-20180413-FD	440-208897-6	4/13/2018	Stage 4	Soil	FD11								X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-90.0-20180413	440-208897-7	4/13/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-100.0-20180413	440-208897-8	4/13/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-110.0-20180413	440-208897-9	4/13/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ES-35-120.0-20180413	440-208897-10	4/13/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ESB-23-10.0-20180413	440-208897-11	4/13/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ESB-23-20.0-20180413	440-208897-12	4/13/2018	Stage 4	Soil	FD12								X	X	X					
42843	2018 Treatability Study	4402088971	ESB-23-20.0-20180413-FD	440-208897-13	4/13/2018	Stage 4	Soil	FD12								X	X	X					
42843	2018 Treatability Study	4402088971	ESB-23-30.0-20180413	440-208897-14	4/13/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402088971	ESB-23-40.0-20180413	440-208897-15	4/13/2018	Stage 4	Soil									X	X	X					

**Table I. Sample Cross-Reference**

LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
42843	2018 Treatability Study	4402090411	ES-36-10.0-20180416	440-209041-1	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-20.0-20180416	440-209041-2	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-19.0-20180416	440-209041-3	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-21.0-20180416	440-209041-4	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-22.0-20180416	440-209041-5	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-23.0-20180416	440-209041-6	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-24.0-20180416	440-209041-7	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-25.0-20180416	440-209041-8	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-26.0-20180416	440-209041-9	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-27.0-20180416	440-209041-10	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-28.0-20180416	440-209041-11	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-29.0-20180416	440-209041-12	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-30.0-20180416	440-209041-13	4/16/2018	Stage 2B	Soil	FD13								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-30.0-20180416-FD	440-209041-14	4/16/2018	Stage 2B	Soil	FD13								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-31.0-20180416	440-209041-15	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-32.0-20180416	440-209041-16	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-33.0-20180416	440-209041-17	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-34.0-20180416	440-209041-18	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-35.0-20180416	440-209041-19	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-36.0-20180416	440-209041-20	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-37.0-20180416	440-209041-21	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-38.0-20180416	440-209041-22	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-39.0-20180416	440-209041-23	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-40.0-20180416	440-209041-24	4/16/2018	Stage 2B	Soil	FD14								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-40.0-20180416-FD	440-209041-25	4/16/2018	Stage 2B	Soil	FD14								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-41.0-20180416	440-209041-26	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-42.0-20180416	440-209041-27	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-50.0-20180416	440-209041-28	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-60.0-20180416	440-209041-29	4/16/2018	Stage 2B	Soil	FD15								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-60.0-20180416-FD	440-209041-30	4/16/2018	Stage 2B	Soil	FD15								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-70.0-20180416	440-209041-31	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-80.0-20180416	440-209041-32	4/16/2018	Stage 2B	Soil									X	X	X					



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LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
42843	2018 Treatability Study	4402090411	ES-36-90.0-20180416	440-209041-33	4/16/2018	Stage 2B	Soil	FD16								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-90.0-20180416-FD	440-209041-34	4/16/2018	Stage 2B	Soil	FD16								X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-100.0-20180416	440-209041-35	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-110.0-20180416	440-209041-36	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402090411	ES-36-120.0-20180416	440-209041-37	4/16/2018	Stage 2B	Soil									X	X	X					
42843	2018 Treatability Study	4402091741	ES-34-20.0-20180417	440-209174-1	4/17/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402091741	ES-34-21.0-20180417	440-209174-2	4/17/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402091741	ES-34-22.0-20180417	440-209174-3	4/17/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402091741	ES-34-23.0-20180417	440-209174-4	4/17/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402091741	ES-34-24.0-20180417	440-209174-5	4/17/2018	Stage 4	Soil									X	X	X					
42843	2018 Treatability Study	4402119361	ES-37-20180522	440-211936-1	5/22/2018	Stage 2A	Water		X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402119361	ES-36-20180522	440-211936-2	5/22/2018	Stage 2A	Water		X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402119361	ES-35-20180522	440-211936-3	5/22/2018	Stage 2A	Water		X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402120261	ES-33-20180523	440-212026-1	5/23/2018	Stage 2A	Water		X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402120261	ES-34-20180523	440-212026-2	5/23/2018	Stage 2A	Water	FD17	X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402120261	ES-34-20180523-FD	440-212026-3	5/23/2018	Stage 2A	Water	FD17	X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402120261	ES-38-20180523	440-212026-4	5/23/2018	Stage 2A	Water		X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402120261	ES-38-20180523-EB	440-212026-5	5/23/2018	Stage 2A	Water	EB	X				X		X		X	X	X	X	X	X	X
42843	2018 Treatability Study	4402120261	ES-39-20180523	440-212026-6	5/23/2018	Stage 2A	Water		X				X		X		X	X	X	X	X	X	X
43156	2018 AWF Capture	4402154341	PZ-1D-30.0-20180710	440-215434-1	7/10/2018	Stage 4	Soil	FD18			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-30.0-20180710-FD1	440-215434-2	7/10/2018	Stage 4	Soil	FD18			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-31.0-20180710	440-215434-3	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	440-215434-4	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-33.0-20180710	440-215434-5	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-34.0-20180710	440-215434-6	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-35.0-20180710	440-215434-7	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	440-215434-8	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	440-215434-9	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	440-215434-10	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-39.0-20180710	440-215434-11	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-40.0-20180710	440-215434-12	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-41.0-20180710	440-215434-13	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			

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LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
43156	2018 AWF Capture	4402154341	PZ-1D-42.0-20180710	440-215434-14	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	440-215434-15	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	440-215434-16	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	440-215434-17	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-46.0-20180710	440-215434-18	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	440-215434-19	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-48.0-20180710	440-215434-20	7/10/2018	Stage 4	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-49.0-20180710	440-215434-21	7/10/2018	Stage 4	Soil	FD19			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402154341	PZ-1D-49.0-20180710-FD2	440-215434-22	7/10/2018	Stage 4	Soil	FD19			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-42.0-20180713	440-215805-1	7/13/2018	Stage 2B	Soil	FD20			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-42.0-20180713-FD	440-215805-2	7/13/2018	Stage 2B	Soil	FD20			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-43.0-20180713	440-215805-3	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-44.0-20180713	440-215805-4	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-45.0-20180713	440-215805-5	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-46.0-20180713	440-215805-6	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-47.0-20180713	440-215805-7	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-48.0-20180713	440-215805-8	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-49.0-20180713	440-215805-9	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-50.0-20180713	440-215805-10	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-51.0-20180713	440-215805-11	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-52.0-20180713	440-215805-12	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-53.0-20180713	440-215805-13	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-54.0-20180713	440-215805-14	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-55.0-20180713	440-215805-15	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-56.0-20180713	440-215805-16	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-57.0-20180713	440-215805-17	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-58.0-20180713	440-215805-18	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-59.0-20180713	440-215805-19	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-60.0-20180713	440-215805-20	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-61.0-20180713	440-215805-21	7/13/2018	Stage 2B	Soil				X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	440-215805-22	7/13/2018	Stage 2B	Soil	FD21			X	X	X	X		X	X	X		X			
43156	2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	440-215805-23	7/13/2018	Stage 2B	Soil	FD21			X	X	X	X		X	X	X		X			

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LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
43156	2018 AWF Capture	4402163271	TRA-1-20.0-20180719	440-216327-1	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-21.0-20180719	440-216327-2	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-22.0-20180719	440-216327-3	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-23.0-20180719	440-216327-4	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-24.0-20180719	440-216327-5	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-25.0-20180719	440-216327-6	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-26.0-20180719	440-216327-7	7/19/2018	Stage 2B	Soil	FD22		X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-26.0-20180719-FD	440-216327-8	7/19/2018	Stage 2B	Soil	FD22		X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-27.0-20180719	440-216327-9	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-28.0-20180719	440-216327-10	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-29.0-20180719	440-216327-11	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-30.0-20180719	440-216327-12	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-31.0-20180719	440-216327-13	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-32.0-20180719	440-216327-14	7/19/2018	Stage 2B	Soil	FD23		X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-32.0-20180719-FD	440-216327-15	7/19/2018	Stage 2B	Soil	FD23		X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-33.0-20180719	440-216327-16	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-34.0-20180719	440-216327-17	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-35.0-20180719	440-216327-18	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-36.0-20180719	440-216327-19	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-37.0-20180719	440-216327-20	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-38.0-20180719	440-216327-21	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163271	TRA-1-39.0-20180719	440-216327-22	7/19/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-29.0-20180720	440-216362-1	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-30.0-20180720	440-216362-2	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-31.0-20180720	440-216362-3	7/20/2018	Stage 2B	Soil	FD24		X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-31.0-20180720-FD	440-216362-4	7/20/2018	Stage 2B	Soil	FD24		X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-32.0-20180720	440-216362-5	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-33.0-20180720	440-216362-6	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-34.0-20180720	440-216362-7	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-35.0-20180720	440-216362-8	7/20/2018	Stage 2B	Soil	FD25		X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-35.0-20180720-FD	440-216362-9	7/20/2018	Stage 2B	Soil	FD25		X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-36.0-20180720	440-216362-10	7/20/2018	Stage 2B	Soil			X			X				X	X		X			

**Table I. Sample Cross-Reference**

LDC	Sampling Event	SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Metals (200.7)	Chromium (6010B)	Metals (6010B)	Hg (7471A)	CrVI (7199)	pH (9045C)	Cl and SO <sub>4</sub> (300.0)	NO <sub>3</sub> -N/-NO <sub>3</sub> (300.0)	Chlorate (300.1B)	Perchlorate (314.0)	Alkalinity (2320B)	TDS (2540C)	FeII (3500-Fe D)	FeIII (Calculation)	TOC (5310B)
43156	2018 AWF Capture	4402163621	TRA-2-37.0-20180720	440-216362-11	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-38.0-20180720	440-216362-12	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-39.0-20180720	440-216362-13	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-40.0-20180720	440-216362-14	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-41.0-20180720	440-216362-15	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-42.0-20180720	440-216362-16	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-43.0-20180720	440-216362-17	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-44.0-20180720	440-216362-18	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-45.0-20180720	440-216362-19	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-46.0-20180720	440-216362-20	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-47.0-20180720	440-216362-21	7/20/2018	Stage 2B	Soil			X			X				X	X		X			
43156	2018 AWF Capture	4402163621	TRA-2-48.0-20180720	440-216362-22	7/20/2018	Stage 2B	Soil			X			X				X	X		X			

**Table II. Stage 2A, Stage 2B, and Stage 4 Validation Elements**

Quality Control Elements	Stage 2A	
	Metals	Wet Chemistry
Sample Receipt & Technical Holding Time	√	√
Instrument Performance Check	-	-
Initial Calibration (ICAL)	-	-
Initial Calibration Verification (ICV)	-	-
Continuing Calibration Verification (CCV)	-	-
Laboratory Blanks	√	√
Initial Calibration Blank and Continuing Calibration Blank (ICB/CCB)	√	√
Field Blanks	√	√
Inductively Coupled Plasma (ICP) Interference Check Sample	-	N/A
Surrogate Spikes/ Carrier Recovery	N/A	√
Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)	√	√
Laboratory Duplicate (DUP)	N/A	√
Laboratory Control Sample (LCS)/ Laboratory Control Sample Duplicate (LCSD)	√	√
Serial Dilution	√	N/A
Internal Standards	-	N/A
Field Duplicate	√	√
RPD Between Two Columns	N/A	N/A
Project Quantitation Limits (PQL) <sup>1</sup>	√	√
Multiple Results for One Sample	√	√
Target Compound Identification	-	-
Compound Quantitation/ Sample Result Verification	-	-
System Performance <sup>2</sup>	-	-
Overall Data Usability Assessment	√	√

√ = Reviewed for Stage 2A review

N/A = Not applicable to method or not performed during this sampling event

- = Not applicable for Stage 2A review

<sup>1</sup>PQLs verified for, Metals, and Wet Chemistry methods.

<sup>2</sup>System performance is a thorough review of the data acquisition that can yield indicators of degrading instrument performance affecting quality of data.

**Table II. Stage 2A, Stage 2B, and Stage 4 Validation Elements**

Quality Control Elements	Stage 2B	
	Metals	Wet Chemistry
Sample Receipt & Technical Holding Time	√	√
Instrument Performance Check	√	√
Initial Calibration (ICAL)	√	√
Initial Calibration Verification (ICV)	√	√
Continuing Calibration Verification (CCV)	√	√
Laboratory Blanks	√	√
Initial Calibration Blank and Continuing Calibration Blank (ICB/CCB)	√	√
Field Blanks	√	√
Inductively Coupled Plasma (ICP) Interference Check Sample	√	N/A
Surrogate Spikes/ Carrier Recovery	N/A	√
Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)	√	√
Laboratory Duplicate (DUP)	N/A	√
Laboratory Control Sample (LCS)/ Laboratory Control Sample Duplicate (LCSD)	√	√
Serial Dilution	√	N/A
Internal Standards	√	N/A
Field Duplicate	√	√
RPD Between Two Columns	N/A	N/A
Project Quantitation Limits (PQL) <sup>1</sup>	√	√
Multiple Results for One Sample	√	√
Target Compound Identification	-	-
Compound Quantitation/ Sample Result Verification	-	-
System Performance <sup>2</sup>	-	-
Overall Data Usability Assessment	√	√

√ = Reviewed for Stage 2B review

N/A = Not applicable to method or not performed during this sampling event

- = Not applicable for Stage 2A review

<sup>1</sup>PQLs verified for, Metals, and Wet Chemistry methods.

<sup>2</sup>System performance is a thorough review of the data acquisition that can yield indicators of degrading instrument performance affecting quality of data.

**Table II. Stage 2A, Stage 2B, and Stage 4 Validation Elements**

Quality Control Elements	Stage 4	
	Metals	Wet Chemistry
Sample Receipt & Technical Holding Time	√	√
Instrument Performance Check	√	√
Initial Calibration (ICAL)	√	√
Initial Calibration Verification (ICV)	√	√
Continuing Calibration Verification (CCV)	√	√
Laboratory Blanks	√	√
Initial Calibration Blank and Continuing Calibration Blank (ICB/CCB)	√	√
Field Blanks	√	√
Inductively Coupled Plasma (ICP) Interference Check Sample	√	N/A
Surrogate Spikes/ Carrier Recovery	N/A	√
Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)	√	√
Laboratory Duplicate (DUP)	N/A	√
Laboratory Control Sample (LCS)/ Laboratory Control Sample Duplicate (LCSD)	√	√
Serial Dilution	√	N/A
Internal Standards	√	N/A
Field Duplicate	√	√
RPD Between Two Columns	N/A	N/A
Project Quantitation Limits (PQL) <sup>1</sup>	√	√
Multiple Results for One Sample	√	√
Target Compound Identification	N/A	N/A
Compound Quantitation/ Sample Result Verification	√	√
System Performance <sup>2</sup>	N/A	N/A
Overall Data Usability Assessment	√	√

√ = Reviewed for Stage 4 review

N/A = Not applicable to method or not performed during this sampling event

- = Not applicable for Stage 2A review

<sup>1</sup>PQLs verified for, Metals, and Wet Chemistry methods.

<sup>2</sup>System performance is a thorough review of the data acquisition that can yield indicators of degrading instrument performance affecting quality of data.

**Table III. Stage 2A, Stage 2B & Stage 4 Validation Percentages**

Parameter	Number of Samples				Validation Percentage		
	(Water) Stage 2A	(Soil) Stage 2B	(Soil) Stage 4	(Soil) Total	(Water <sup>1</sup> ) Stage 2A (%)	(Soil) Stage 2B (%)	(Soil) Stage 4 (%)
Metals (200.7)	9	-	-	-	100	-	-
Metals (6010B)	-	67	22	89	-	75	25
Mercury (7471A)	-	23	22	45	-	51	49
Hexavalent Chromium (7199)	9	67	22	89	100	75	25
pH (9045C)	-	23	22	45	-	51	49
Chloride and Sulfate (300.0)	9	-	-	-	100	-	-
Nitrate as N and as NO3 (300.0)	-	173	42	215	-	80	20
Chlorate (300.1B)	9	217	42	259	100	84	16
Perchlorate (314.0)	9	217	42	259	100	84	16
Alkalinity (2320B)	9	-	-	-	100	-	-
TDS (2540C)	9	67	22	89	100	75	25
Ferrous Iron (3500-Fe D)	9	-	-	-	100	-	-
Ferric Iron (Calculation)	9	-	-	-	100	-	-
TOC (5310B)	9	-	-	-	100	-	-

Notes:

1. Consistent with NDEP guidance emailed on March 7, 2017, all water results have been validated to Stage 2A.



**Table IV. Reason Codes and Definitions**

<b>Reason Code</b>	<b>Explanation</b>
a	qualified due to low abundance ( radiochemical activity)
be	qualified due to equipment blank contamination
bf	qualified due to field blank contamination
bl	qualified due to lab blank contamination
bt	qualified due to trip blank contamination
bp	qualified due to pump blank contamination (wells w/o dedicated pumps, when contamination is detected in the Pump Blk)
br	qualified due to filter blank contamination (aqueous Hexavalent Chromium and Dissolved sample fractions)
c	qualified due to calibration problems
cp	qualified due to insufficient ingrowth (radiochemical only)
dc	dual column confirmation RPD exceeded
e	concentration exceeded the calibration range
fd	qualified due to field duplicate imprecision
h	qualified due to holding time exceedance
i	qualified due to internal standard areas
k	qualified as Estimated Maximum Possible Concentrations (dioxins and PCB congeners)
l	qualified due to LCS recoveries
ld	qualified due to lab duplicate imprecision (matrix duplicate, MSD, LCSD)
m	qualified due to matrix spike recoveries
nb	qualified due to negative lab blank contamination (nondetect results only)
nd	qualified due to non-detected target analyte
o	other
orr	other result reported
p	qualified as a false positive due to contamination during shipping
pH	sample preservation not within acceptance range
q	qualified due to quantitation problem
s	qualified due to surrogate recoveries
sd	serial dilution did not meet control criteria
sp	detected value reported >SQL <PQL
st	sample receipt temperature exceeded
t	qualified due to elevated helium tracer concentrations
vh	volatile headspace detected in aqueous sample containers submitted for VOC analysis
x	qualified due to low % solids
z	qualified due to ICS results

Table V. Overall Qualified Results

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 ZVI Treatability Study	4402085881	ESB-21-40.0-20180410	4/10/2018	E300	14797-55-8_N	Nitrate as N	1.2	J	1.1	1.5	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402085881	ESB-21-40.0-20180410	4/10/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.5	J	4.8	6.9	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-10.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	0.72		0.010	0.011	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-11.0-20180411	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	4.7	J	3.8	5.4	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-11.0-20180411	4/11/2018	E300	14797-55-8_N	Nitrate as N	1.1	J	0.86	1.2	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-11.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	0.64		0.010	0.011	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-12.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	0.37		0.011	0.011	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-13.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	1.2		0.013	0.013	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-14.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	1.1		0.013	0.013	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-16.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	2.9		0.076	0.080	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-17.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	2.5		0.072	0.075	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-18.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	1.9		0.066	0.070	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-19.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	1.8		0.069	0.073	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-20.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	1.0		0.013	0.013	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-21.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	1.1		0.013	0.014	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-22.0-20180411	4/11/2018	E300	14797-55-8_N	Nitrate as N	1.2	J	1.1	1.5	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-22.0-20180411	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.4	J	4.9	6.9	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-22.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	0.95		0.013	0.014	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-23.0-20180411	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.9	J	5.1	7.3	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-23.0-20180411	4/11/2018	E300	14797-55-8_N	Nitrate as N	1.3	J	1.2	1.6	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-23.0-20180411	4/11/2018	E300.1	14866-68-3	Chlorate	5.7	F1	0.15	0.58	mg/kg	J+	m	MS/MSD %R	136,137	75-125 %
2018 ZVI Treatability Study	4402086671	ES-33-23.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	0.94	F1	0.014	0.015	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ES-33-24.0-20180411	4/11/2018	E300	14797-55-8_N	Nitrate as N	1.3	J	1.2	1.6	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-24.0-20180411	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.6	J	5.2	7.4	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-50.0-20180411	4/11/2018	E300	14797-55-8_N	Nitrate as N	2.0	J	1.5	2.1	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-50.0-20180411	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	8.8	J	6.7	9.5	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-50.0-20180411-FD	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	8.3	J	6.3	9.0	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-50.0-20180411-FD	4/11/2018	E300	14797-55-8_N	Nitrate as N	1.9	J	1.4	2.0	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ES-33-70.0-20180411	4/11/2018	E300.1	14866-68-3	Chlorate	0.14	J	0.067	0.27	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ESB-19-20.0-20180411	4/11/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.4	J	4.9	7.0	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ESB-19-20.0-20180411	4/11/2018	E300	14797-55-8_N	Nitrate as N	1.2	J	1.1	1.5	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402086671	ESB-19-20.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	2.0		0.066	0.069	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ESB-19-30.0-20180411	4/11/2018	E314.0	14797-73-0	Perchlorate	0.18		0.012	0.012	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ESB-20-30.0-20180410	4/10/2018	E314.0	14797-73-0	Perchlorate	1.4		0.015	0.016	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402086671	ESB-20-40.0-20180410	4/10/2018	E314.0	14797-73-0	Perchlorate	1.3		0.013	0.014	mg/kg	J-	m	MS/MSD %R	51,55	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-110.0-20180412	4/12/2018	E300.1	14866-68-3	Chlorate	0.084	J	0.067	0.27	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-34-110.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		UF1	0.064	0.067	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-120.0-20180412	4/12/2018	E300.1	14866-68-3	Chlorate	0.30	J	0.078	0.31	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-34-16.0-20180412	4/12/2018	E300	14797-55-8_NO3	Nitrate as NO3	4.6	J	3.7	5.3	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-34-16.0-20180412	4/12/2018	E300	14797-55-8_N	Nitrate as N	1.0	J	0.85	1.2	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-34-16.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.53	F1	0.050	0.053	mg/kg	J-	m	MS/MSD %R	34,72	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-17.0-20180412	4/12/2018	E300	14797-55-8_NO3	Nitrate as NO3	3.8	J	3.8	5.4	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-34-17.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.24		0.020	0.022	mg/kg	J-	m	MS/MSD %R	34,72	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-18.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.82		0.12	0.12	mg/kg	J-	m	MS/MSD %R	34,72	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-19.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.73		0.061	0.064	mg/kg	J-	m	MS/MSD %R	34,72	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-31.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.4	F1	0.069	0.073	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-33.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.8		0.070	0.074	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-35.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	5.6		0.084	0.089	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-36.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	6.4		0.091	0.096	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-37.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	2.9		0.066	0.070	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-38.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	4.3		0.077	0.081	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %

Table V. Overall Qualified Results

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 ZVI Treatability Study	4402088271	ES-34-40.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	6.7		0.091	0.095	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-34-90.0-20180412	4/12/2018	E300.1	14866-68-3	Chlorate	0.16	J	0.065	0.26	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-35-20.0-20180412	4/12/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.2	J	3.7	5.4	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-35-20.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.36	F2F1	0.010	0.011	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-22.0-20180412	4/12/2018	E300	14797-55-8_N	Nitrate as N	0.87	J	0.83	1.1	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-35-22.0-20180412	4/12/2018	E300	14797-55-8_NO3	Nitrate as NO3	3.9	J	3.6	5.2	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-35-22.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.20		0.0099	0.010	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-23.0-20180412	4/12/2018	E300	14797-55-8_N	Nitrate as N	0.98	J	0.86	1.2	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-35-23.0-20180412	4/12/2018	E300	14797-55-8_NO3	Nitrate as NO3	4.3	J	3.8	5.4	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088271	ES-35-23.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.098		0.010	0.011	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-24.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.11		0.010	0.011	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-25.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.7		0.075	0.078	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-26.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.4		0.014	0.015	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-26.0-20180412-FD	4/12/2018	E314.0	14797-73-0	Perchlorate	1.3		0.014	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-27.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.55		0.014	0.015	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-28.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.2		0.014	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-29.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.2		0.014	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-30.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.88		0.013	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-31.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.75		0.013	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-32.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.47		0.013	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-33.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.61		0.013	0.013	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-34.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.52		0.014	0.014	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-35.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.9		0.076	0.080	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-36.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.91		0.013	0.013	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-37.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.70		0.012	0.012	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-38.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.3		0.074	0.078	mg/kg	J+	m	MS/MSD %R	239,223	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-39.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	1.2		0.015	0.015	mg/kg	J	m,ld	MS/MSD %R, RPD	26,-; 27	80-120; 20 %
2018 ZVI Treatability Study	4402088271	ES-35-40.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.071	0.074	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-40.0-20180412-FD	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.069	0.073	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-41.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.064	0.068	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-42.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.063	0.067	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-43.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.063	0.066	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-44.0-20180412	4/12/2018	E300.1	14866-68-3	Chlorate	16	F2	0.35	1.4	mg/kg	J	ld	MS/MSD RPD	29	25 %
2018 ZVI Treatability Study	4402088271	ES-35-44.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.067	0.070	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088271	ES-35-45.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate		U	0.062	0.065	mg/kg	R	m	MS/MSD %R	29,32	80-120 %
2018 ZVI Treatability Study	4402088971	ES-35-100.0-20180413	4/13/2018	E300.1	14866-68-3	Chlorate	0.078	J	0.069	0.28	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088971	ES-35-50.0-20180412	4/12/2018	E314.0	14797-73-0	Perchlorate	0.98		0.061	0.065	mg/kg	J+	m	MS/MSD %R	121,-	80-120 %
2018 ZVI Treatability Study	4402088971	ES-35-70.0-20180412	4/12/2018	E300.1	14866-68-3	Chlorate	0.098	J	0.077	0.31	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088971	ESB-23-10.0-20180413	4/13/2018	E314.0	14797-73-0	Perchlorate	1.5		0.10	0.11	mg/kg	J+	m	MS/MSD %R	121,-	80-120 %
2018 ZVI Treatability Study	4402088971	ESB-23-20.0-20180413	4/13/2018	E300	14797-55-8_NO3	Nitrate as NO3	4.0	J	3.7	5.3	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088971	ESB-23-20.0-20180413	4/13/2018	E300	14797-55-8_N	Nitrate as N	0.90	J	0.85	1.2	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088971	ESB-23-20.0-20180413	4/13/2018	E314.0	14797-73-0	Perchlorate	0.24		0.010	0.011	mg/kg	J+	m	MS/MSD %R	121,-	80-120 %
2018 ZVI Treatability Study	4402088971	ESB-23-20.0-20180413-FD	4/13/2018	E300	14797-55-8_N	Nitrate as N	0.87	J	0.85	1.2	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088971	ESB-23-20.0-20180413-FD	4/13/2018	E300	14797-55-8_NO3	Nitrate as NO3	3.9	J	3.7	5.3	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402088971	ESB-23-20.0-20180413-FD	4/13/2018	E314.0	14797-73-0	Perchlorate	0.27		0.010	0.011	mg/kg	J+	m	MS/MSD %R	121,-	80-120 %
2018 ZVI Treatability Study	4402088971	ESB-23-30.0-20180413	4/13/2018	E314.0	14797-73-0	Perchlorate	0.97		0.013	0.014	mg/kg	J+	m	MS/MSD %R	121,-	80-120 %
2018 ZVI Treatability Study	4402088971	ESB-23-40.0-20180413	4/13/2018	E314.0	14797-73-0	Perchlorate	1.5		0.13	0.14	mg/kg	J+	m	MS/MSD %R	121,-	80-120 %
2018 ZVI Treatability Study	4402090411	ES-36-100.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.072	0.076	mg/kg	UJ	m	MS/MSD %R	76,76	80-120 %
2018 ZVI Treatability Study	4402090411	ES-36-110.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		UF1	0.063	0.066	mg/kg	UJ	m	MS/MSD %R	76,76	80-120 %
2018 ZVI Treatability Study	4402090411	ES-36-120.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.061	0.064	mg/kg	UJ	m	MS/MSD %R	76,76	80-120 %
2018 ZVI Treatability Study	4402090411	ES-36-37.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	1.7		0.078	0.082	mg/kg	J-	m	MS/MSD %R	76,76	80-120 %

Table V. Overall Qualified Results

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 ZVI Treatability Study	4402090411	ES-36-38.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	3.0		0.17	0.18	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-39.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	3.4		0.17	0.18	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-40.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	3.7		0.17	0.18	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-40.0-20180416-FD	4/16/2018	E314.0	14797-73-0	Perchlorate	3.8		0.17	0.18	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-41.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	1.9		0.14	0.15	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-42.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	1.8		0.13	0.14	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-50.0-20180416	4/16/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.8	J	4.6	6.5	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402090411	ES-36-50.0-20180416	4/16/2018	E300	14797-55-8_N	Nitrate as N	1.3	J	1.0	1.4	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402090411	ES-36-50.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate	0.83		0.062	0.065	mg/kg	J-	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-60.0-20180416	4/16/2018	E300.1	14866-68-3	Chlorate	0.097	J	0.064	0.26	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402090411	ES-36-60.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.060	0.063	mg/kg	UJ	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-60.0-20180416-FD	4/16/2018	E300.1	14866-68-3	Chlorate	0.079	J	0.063	0.25	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402090411	ES-36-60.0-20180416-FD	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.060	0.063	mg/kg	UJ	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-70.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.067	0.071	mg/kg	UJ	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-80.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.066	0.070	mg/kg	UJ	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-90.0-20180416	4/16/2018	E300.1	14866-68-3	Chlorate	0.18	J	0.069	0.28	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402090411	ES-36-90.0-20180416	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.065	0.069	mg/kg	UJ	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402090411	ES-36-90.0-20180416-FD	4/16/2018	E300.1	14866-68-3	Chlorate	0.24	J	0.069	0.28	mg/kg	J	sp	< PQL		
2018 ZVI Treatability Study	4402090411	ES-36-90.0-20180416-FD	4/16/2018	E314.0	14797-73-0	Perchlorate		U	0.065	0.069	mg/kg	UJ	m	MS/MSD %R	76,76	80-120%
2018 ZVI Treatability Study	4402119361	ES-35-20180522	5/22/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	168	48 hours
2018 ZVI Treatability Study	4402119361	ES-35-20180522	5/22/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	168	48 hours
2018 ZVI Treatability Study	4402119361	ES-35-20180522	5/22/2018	SM5310B	7440-44-0	CARBON	0.89	J	0.65	1.0	mg/l	J	sp	< PQL		
2018 ZVI Treatability Study	4402119361	ES-36-20180522	5/22/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	168	48 hours
2018 ZVI Treatability Study	4402119361	ES-36-20180522	5/22/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	168	48 hours
2018 ZVI Treatability Study	4402119361	ES-37-20180522	5/22/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	168	48 hours
2018 ZVI Treatability Study	4402119361	ES-37-20180522	5/22/2018	SM3500	7439-89-6-FE3	Iron, Ferric	0.15		0.10	0.10	mg/l	J-	h	Holding time	168	48 hours
2018 ZVI Treatability Study	4402120261	ES-33-20180523	5/23/2018	E200.7	7439-89-6	Iron		U	0.25	0.50	mg/l	UJ	ld	MS/MSD RPD	21	20%
2018 ZVI Treatability Study	4402120261	ES-33-20180523	5/23/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-33-20180523	5/23/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-33-20180523	5/23/2018	SM5310B	7440-44-0	CARBON	0.87	J	0.65	1.0	mg/l	J	sp	< PQL		
2018 ZVI Treatability Study	4402120261	ES-33-20180523	5/23/2018	SW7199	18540-29-9	Chromium VI	8.5	H	0.25	2.0	ug/l	J-	h	Holding time	28.22	24 hours
2018 ZVI Treatability Study	4402120261	ES-34-20180523	5/23/2018	E200.7	7439-89-6	Iron		U	0.25	0.50	mg/l	UJ	ld	MS/MSD RPD	21	20%
2018 ZVI Treatability Study	4402120261	ES-34-20180523	5/23/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-34-20180523	5/23/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-34-20180523	5/23/2018	SW7199	18540-29-9	Chromium VI	64	H	0.25	2.0	ug/l	J-	h	Holding time	27.68	24 hours
2018 ZVI Treatability Study	4402120261	ES-34-20180523-FD	5/23/2018	E200.7	7439-89-6	Iron		U	0.25	0.50	mg/l	UJ	ld	MS/MSD RPD	21	20%
2018 ZVI Treatability Study	4402120261	ES-34-20180523-FD	5/23/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-34-20180523-FD	5/23/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-34-20180523-FD	5/23/2018	SM5310B	7440-44-0	CARBON	0.67	J	0.65	1.0	mg/l	J	sp	< PQL		
2018 ZVI Treatability Study	4402120261	ES-34-20180523-FD	5/23/2018	SW7199	18540-29-9	Chromium VI	64	H	0.25	2.0	ug/l	J-	h	Holding time	28.28	24 hours
2018 ZVI Treatability Study	4402120261	ES-38-20180523	5/23/2018	E200.7	7439-89-6	Iron		UF2F1	0.25	0.50	mg/l	UJ	ld	MS/MSD RPD	21	20%
2018 ZVI Treatability Study	4402120261	ES-38-20180523	5/23/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-38-20180523	5/23/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-38-20180523	5/23/2018	SM5310B	7440-44-0	CARBON	0.75	J	0.65	1.0	mg/l	J	sp	< PQL		
2018 ZVI Treatability Study	4402120261	ES-38-20180523	5/23/2018	SW7199	18540-29-9	Chromium VI	27	H	0.25	2.0	ug/l	J-	h	Holding time	27.33	24 hours
2018 ZVI Treatability Study	4402120261	ES-38-20180523-EB	5/23/2018	E200.7	7440-23-5	Sodium	0.34	J	0.26	0.50	mg/l	J	sp	< PQL		
2018 ZVI Treatability Study	4402120261	ES-38-20180523-EB	5/23/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-38-20180523-EB	5/23/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-38-20180523-EB	5/23/2018	SW7199	18540-29-9	Chromium VI		UH	0.25	2.0	ug/l	UJ	h	Holding time	26.97	24 hours
2018 ZVI Treatability Study	4402120261	ES-39-20180523	5/23/2018	E200.7	7439-89-6	Iron		U	0.25	0.50	mg/l	UJ	ld	MS/MSD RPD	21	20%
2018 ZVI Treatability Study	4402120261	ES-39-20180523	5/23/2018	SM3500	7439-89-6-FE2	Iron, Ferrous		UHF	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours

Table V. Overall Qualified Results

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 ZVI Treatability Study	4402120261	ES-39-20180523	5/23/2018	SM3500	7439-89-6-FE3	Iron, Ferric		U	0.10	0.10	mg/l	UJ	h	Holding time	144	48 hours
2018 ZVI Treatability Study	4402120261	ES-39-20180523	5/23/2018	SM5310B	7440-44-0	CARBON	0.90	J	0.65	1.0	mg/l	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	3.6		0.12	0.13	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	100		3.1	6.2	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	230		0.92	1.8	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.1	6.2	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710	7/10/2018	SW6010	7440-42-8	Boron	6.1	J	3.1	6.2	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710-FD1	7/10/2018	E314.0	14797-73-0	Perchlorate	3.6		0.12	0.12	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710-FD1	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.0	6.0	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710-FD1	7/10/2018	SW6010	7440-24-6	Strontium	110		3.0	6.0	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-30.0-20180710-FD1	7/10/2018	SW6010	7440-39-3	Barium	170		0.91	1.8	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-31.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	3.6		0.12	0.13	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-31.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	81		3.1	6.2	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-31.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.1	6.2	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-31.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	88		0.94	1.9	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-31.0-20180710	7/10/2018	SW6010	7440-42-8	Boron	4.8	J	3.1	6.2	mg/kg	J+	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	5.6		0.11	0.12	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	7/10/2018	SW6010	7440-42-8	Boron	5.8	J	3.0	6.0	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	110		3.0	6.0	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	130		0.90	1.8	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	7/10/2018	SW6010	7439-98-7	Molybdenum	2.1	J	1.2	2.4	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-32.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.0	6.0	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-33.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	33		1.9	2.0	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-33.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	180		5.0	9.9	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-33.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	5.0	9.9	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-33.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	800		1.5	3.0	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-33.0-20180710	7/10/2018	SW6010	7439-98-7	Molybdenum	3.0	J	2.0	4.0	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-34.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	20		1.3	1.4	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-34.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	190		3.5	7.0	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-34.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	790		1.0	2.1	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-34.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.5	7.0	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-35.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	32		1.4	1.4	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-35.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	160		7.1	14	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-35.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	7.1	14	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-35.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	78		2.1	4.3	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-35.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	2.6	J	1.4	2.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	27		1.3	1.4	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	150		6.9	14	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	6.9	14	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	120		2.1	4.1	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	1.4	J	1.4	2.7	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-36.0-20180710	7/10/2018	SW6010	7440-50-8	Copper	4.5	J	3.0	5.5	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.7	J	4.7	6.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	E300	14797-55-8_N	Nitrate as N	1.3	J	1.1	1.5	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	20		1.3	1.4	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	160		6.7	13	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	6.7	13	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	110		2.0	4.0	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	SW6010	7440-50-8	Copper	4.5	J	3.0	5.4	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-37.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	1.6	J	1.3	2.7	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	E300	14797-55-8_N	Nitrate as N	1.2	J	1.1	1.5	mg/kg	J	sp	< PQL		

**Table V. Overall Qualified Results**

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	E300	14797-55-8_NO3	Nitrate as NO3	5.2	J	4.8	6.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	15		0.26	0.28	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	2.1	J	1.4	2.7	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	150		2.0	4.1	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	6.8	14	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-38.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	170		6.8	14	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-39.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	13		0.27	0.28	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-39.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	170		7.0	14	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-39.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	7.0	14	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-39.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	210		2.1	4.2	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-39.0-20180710	7/10/2018	SW6010	7439-92-1	Lead	4.0	J	2.8	5.6	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-40.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	11		0.29	0.30	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-40.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	90		2.3	4.5	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-40.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	7.5	15	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-40.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	2.6	J	1.5	3.0	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-40.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	170		7.5	15	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-41.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	9.9		0.31	0.32	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-41.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	160		4.1	8.1	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-41.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	4.1	8.1	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-41.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	69		1.2	2.4	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-41.0-20180710	7/10/2018	SW6010	7440-67-7	Zirconium	15	J	8.1	16	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-42.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	5.3		0.14	0.14	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-42.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	7.3	15	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-42.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	200		2.2	4.4	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-42.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	180		7.3	15	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	2.9		0.14	0.15	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	180		7.3	15	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	7.3	15	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	210		2.2	4.4	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	7/10/2018	SW6010	7439-92-1	Lead	2.9	J	2.9	5.9	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-43.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	2.7	J	1.5	2.9	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	E300.1	14866-68-3	Chlorate	0.19	J	0.071	0.29	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	1.2		0.013	0.014	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	7.0	14	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	99		2.1	4.2	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	SW6010	7440-50-8	Copper	4.8	J	3.1	5.6	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	SW6010	7440-48-4	Cobalt	1.8	J	1.4	2.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-44.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	180		7.0	14	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	E300.1	14866-68-3	Chlorate	0.17	J	0.067	0.27	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	0.97		0.013	0.013	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	SW6010	7440-50-8	Copper	3.3	J	2.9	5.2	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	190		6.6	13	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	6.6	13	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	14		2.0	3.9	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-45.0-20180710	7/10/2018	SW6010	7440-02-0	Nickel	4.2	J	2.6	5.2	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-46.0-20180710	7/10/2018	E300.1	14866-68-3	Chlorate	0.24	J	0.082	0.33	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-46.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate		UF1	0.016	0.016	mg/kg	UJ	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-46.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	170		1.2	2.5	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-46.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	140		4.1	8.2	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-46.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	4.1	8.2	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	7/10/2018	E300.1	14866-68-3	Chlorate	0.16	J	0.098	0.39	mg/kg	J	sp	< PQL		

**Table V. Overall Qualified Results**

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate	0.038		0.019	0.020	mg/kg	J-	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	160		4.9	9.8	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	4.9	9.8	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	220		1.5	2.9	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-47.0-20180710	7/10/2018	SW7199	18540-29-9	Chromium VI	0.52	J	0.29	0.58	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-48.0-20180710	7/10/2018	E314.0	14797-73-0	Perchlorate		U	0.014	0.014	mg/kg	UJ	m	MS/MSD %R	76,74	80-120 %
2018 AWF Capture	4402154341	PZ-1D-48.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	38		1.1	2.2	mg/kg	J+	m	MS/MSD %R	205,204	75-125 %
2018 AWF Capture	4402154341	PZ-1D-48.0-20180710	7/10/2018	SW6010	7440-24-6	Strontium	110		3.6	7.3	mg/kg	J+	m	MS/MSD %R	-,127	75-125 %
2018 AWF Capture	4402154341	PZ-1D-48.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.6	7.3	mg/kg	UJ	m	MS/MSD %R	47,49	75-125 %
2018 AWF Capture	4402154341	PZ-1D-48.0-20180710	7/10/2018	SW7199	18540-29-9	Chromium VI	0.28	J	0.22	0.44	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710	7/10/2018	SW6010	7440-47-3	Chromium (total)	58	F2	0.70	1.4	mg/kg	J	ld	MS/MSD RPD	21	20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.5	7.0	mg/kg	UJ	m,ld	MS/MSD %R, RPD	43,55; 23	75-125; 20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710	7/10/2018	SW6010	7440-39-3	Barium	120		1.0	2.1	mg/kg	J	m,ld	MS/MSD %R, RPD	171,-; 22	75-125; 20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710	7/10/2018	SW6010	7439-96-5	Manganese	280		1.4	2.8	mg/kg	J	ld	MS/MSD RPD	25	20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710	7/10/2018	SW7199	18540-29-9	Chromium VI	0.26	J	0.21	0.42	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710-FD2	7/10/2018	SW6010	7440-39-3	Barium	120		1.0	2.1	mg/kg	J	m,ld	MS/MSD %R, RPD	171,-; 22	75-125; 20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710-FD2	7/10/2018	SW6010	7440-33-7	Tungsten		U	3.4	6.9	mg/kg	UJ	m,ld	MS/MSD %R, RPD	43,55; 23	75-125; 20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710-FD2	7/10/2018	SW6010	7440-47-3	Chromium (total)	52		0.69	1.4	mg/kg	J	ld	MS/MSD RPD	21	20 %
2018 AWF Capture	4402154341	PZ-1D-49.0-20180710-FD2	7/10/2018	SW6010	7439-96-5	Manganese	340		1.4	2.8	mg/kg	J	ld	MS/MSD RPD	25	20 %
2018 AWF Capture	4402158051	PZ-2D-42.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	99		0.96	1.9	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-42.0-20180713	7/13/2018	SW6010	7440-42-8	Boron	5.8	J	3.2	6.4	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-42.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.2	13	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-42.0-20180713-FD	7/13/2018	SW6010	7440-42-8	Boron	5.1	J	3.1	6.3	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-42.0-20180713-FD	7/13/2018	SW6010	7440-39-3	Barium	110		0.94	1.9	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-42.0-20180713-FD	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.1	13	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-43.0-20180713	7/13/2018	SW6010	7439-98-7	Molybdenum	1.3	J	1.1	2.3	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-43.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	2.8	11	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-43.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	87		0.84	1.7	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-44.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.1	12	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-44.0-20180713	7/13/2018	SW6010	7439-98-7	Molybdenum	2.3	J	1.2	2.5	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-44.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	71		0.94	1.9	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-45.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.3	13	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-45.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	78		0.98	2.0	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-46.0-20180713	7/13/2018	SW6010	7440-48-4	Cobalt	1.7	J	1.4	2.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-46.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	190		2.1	4.1	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-46.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	6.9	28	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-47.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.6	14	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-47.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	78		1.1	2.1	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-47.0-20180713	7/13/2018	SW6010	7439-98-7	Molybdenum	2.2	J	1.4	2.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-48.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	470		1.1	2.1	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-48.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.6	14	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-49.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.9	16	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-49.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	250		1.2	2.4	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-50.0-20180713	7/13/2018	SW6010	7440-48-4	Cobalt	2.3	J	1.4	2.8	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-50.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	53		2.1	4.2	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-50.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	7.0	28	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-51.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	6.8	27	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %
2018 AWF Capture	4402158051	PZ-2D-51.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	280		2.0	4.1	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20 %
2018 AWF Capture	4402158051	PZ-2D-51.0-20180713	7/13/2018	SW6010	7440-02-0	Nickel	3.8	J	2.7	5.5	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-52.0-20180713	7/13/2018	E300	14797-55-8_NO3	Nitrate as NO3	7.0	J	5.0	7.1	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402158051	PZ-2D-52.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	7.1	28	mg/kg	UJ	m	MS/MSD %R	58,60	75-125 %

Table V. Overall Qualified Results

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria	
2018 AWF Capture	4402158051	PZ-2D-52.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	150		2.1	4.3	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-52.0-20180713	7/13/2018	SW6010	7440-02-0	Nickel	3.6	J	2.8	5.7	mg/kg	J	sp	< PQL			
2018 AWF Capture	4402158051	PZ-2D-52.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.22	0.43	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-53.0-20180713	7/13/2018	E300	14797-55-8_N	Nitrate as N	1.5	J	1.4	1.9	mg/kg	J	sp	< PQL			
2018 AWF Capture	4402158051	PZ-2D-53.0-20180713	7/13/2018	E300	14797-55-8_NO3	Nitrate as NO3	6.5	J	6.0	8.5	mg/kg	J	sp	< PQL			
2018 AWF Capture	4402158051	PZ-2D-53.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	4.2	17	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-53.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	270		1.3	2.5	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-54.0-20180713	7/13/2018	E300	14797-55-8_N	Nitrate as N	1.4	J	1.4	1.9	mg/kg	J	sp	< PQL			
2018 AWF Capture	4402158051	PZ-2D-54.0-20180713	7/13/2018	E300	14797-55-8_NO3	Nitrate as NO3	6.1	J	6.1	8.7	mg/kg	J	sp	< PQL			
2018 AWF Capture	4402158051	PZ-2D-54.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	140		1.3	2.6	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-54.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	4.3	17	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-54.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.26	0.52	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-55.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	510		1.2	2.3	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-55.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.9	16	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-55.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.22	0.45	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-56.0-20180713	7/13/2018	E300.1	14866-68-3	Chlorate	0.17	J	0.030	0.30	mg/kg	J	sp	< PQL			
2018 AWF Capture	4402158051	PZ-2D-56.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	180		1.1	2.3	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-56.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.8	15	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-56.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.23	0.46	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-57.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		UF1	3.8	15	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-57.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	190	F1F2	1.1	2.3	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-57.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		UF1	0.23	0.46	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-58.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	230		2.3	4.6	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-58.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	7.7	31	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-58.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.23	0.46	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-59.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.5	14	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-59.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	110		1.0	2.1	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-59.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.21	0.42	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-60.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	290		1.2	2.5	mg/kg	J	m,ld	MS/MSD %R, RPD	-,24; 25	75-125; 20	%
2018 AWF Capture	4402158051	PZ-2D-60.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	4.1	16	mg/kg	UJ	m	MS/MSD %R	58,60	75-125	%
2018 AWF Capture	4402158051	PZ-2D-60.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.25	0.49	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-61.0-20180713	7/13/2018	E314.0	14797-73-0	Perchlorate		UF1	0.015	0.016	mg/kg	UJ	m	MS/MSD %R	36,41	80-120	%
2018 AWF Capture	4402158051	PZ-2D-61.0-20180713	7/13/2018	SW6010	7440-42-8	Boron	43	F1	4.0	8.0	mg/kg	J+	m	MS/MSD %R	127,-	75-125	%
2018 AWF Capture	4402158051	PZ-2D-61.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	190	F1	1.2	2.4	mg/kg	J-	m	MS/MSD %R	50,69	75-125	%
2018 AWF Capture	4402158051	PZ-2D-61.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		UF1	4.0	16	mg/kg	UJ	m	MS/MSD %R	36,33	75-125	%
2018 AWF Capture	4402158051	PZ-2D-61.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.24	0.48	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	E314.0	14797-73-0	Perchlorate		U	0.064	0.068	mg/kg	UJ	m	MS/MSD %R	36,41	80-120	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW6010	7440-48-4	Cobalt	11		0.67	1.3	mg/kg	J	fd	FD RPD	57	50	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW6010	7440-39-3	Barium	150		1.0	2.0	mg/kg	J	fd,m	FD RPD; MS/MSD %R	55; 50,69	50; 75-125	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW6010	7440-42-8	Boron	39		3.3	6.7	mg/kg	J+	m	MS/MSD %R	127,-	75-125	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.3	13	mg/kg	UJ	m	MS/MSD %R	36,33	75-125	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW6010	7439-92-1	Lead	12		1.3	2.7	mg/kg	J	fd	FD RPD	82	50	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW6010	7440-50-8	Copper	26		1.5	2.7	mg/kg	J	fd	FD RPD	67	50	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.20	0.41	mg/kg	UJ	m	MS/MSD %R	49,51	55-110	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	E314.0	14797-73-0	Perchlorate		U	0.062	0.065	mg/kg	UJ	m	MS/MSD %R	36,41	80-120	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW6010	7439-92-1	Lead	5.0		1.3	2.6	mg/kg	J	fd	FD RPD	82	50	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW6010	7440-50-8	Copper	13		1.5	2.6	mg/kg	J	fd	FD RPD	67	50	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW6010	7440-48-4	Cobalt	6.1		0.66	1.3	mg/kg	J	fd	FD RPD	57	50	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW6010	7440-39-3	Barium	85		0.99	2.0	mg/kg	J	fd,m	FD RPD; MS/MSD %R	55; 50,69	50; 75-125	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW6010	7440-42-8	Boron	44		3.3	6.6	mg/kg	J+	m	MS/MSD %R	127,-	75-125	%
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW6010	7440-33-7	Tungsten		U	3.3	13	mg/kg	UJ	m	MS/MSD %R	36,33	75-125	%



**Table V. Overall Qualified Results**

Sampling Event	SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Data Quality Indicator	Qualification Finding	Acceptance Criteria
2018 AWF Capture	4402158051	PZ-2D-62.0-20180713-FD	7/13/2018	SW7199	18540-29-9	Chromium VI		U	0.20	0.39	mg/kg	UJ	m	MS/MSD %R	49,51	55-110 %
2018 AWF Capture	4402163271	TRA-1-33.0-20180719	7/19/2018	SW7199	18540-29-9	Chromium VI	0.38	J	0.21	0.43	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402163621	TRA-2-36.0-20180720	7/20/2018	SW7199	18540-29-9	Chromium VI	0.17	J	0.16	0.33	mg/kg	J	sp	< PQL		
2018 AWF Capture	4402163621	TRA-2-45.0-20180720	7/20/2018	E314.0	14797-73-0	Perchlorate	18	F2^	1.5	1.6	mg/kg	J	ld	MS/MSD RPD	54	20 %
2018 AWF Capture	4402163621	TRA-2-46.0-20180720	7/20/2018	E314.0	14797-73-0	Perchlorate	5.5		0.13	0.14	mg/kg	J	ld	MS/MSD RPD	54	20 %
2018 AWF Capture	4402163621	TRA-2-47.0-20180720	7/20/2018	E314.0	14797-73-0	Perchlorate	4.1		0.13	0.14	mg/kg	J	ld	MS/MSD RPD	54	20 %
2018 AWF Capture	4402163621	TRA-2-48.0-20180720	7/20/2018	E314.0	14797-73-0	Perchlorate	2.6		0.13	0.14	mg/kg	J	ld	MS/MSD RPD	54	20 %

**ATTACHMENT A**  
**Metals Data Validation Report**

**Calcium, Iron, Magnesium, Potassium, and Sodium by Environmental Protection Agency (EPA) Method 200.7**

**Barium, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Silver, Strontium, Tungsten, Vanadium, and Zirconium by Environmental Protection Agency (EPA) Method 200.7 and EPA SW 846 Method 6010B**

**Mercury by SW 846 Method 7471A**

### **I. Sample Receipt and Technical Holding Times**

All samples were received in good condition.

All technical holding time requirements were met.

### **II. Instrument Calibration**

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

Instrument calibration data were not reviewed for Stage 2A validation.

### **III. ICP Interference Check Sample Analysis**

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

ICP Interference check sample (ICS) analysis data were not reviewed for Stage 2A validation.

### **IV. Laboratory Blanks**

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

<b>SDG</b>	<b>Blank ID</b>	<b>Analyte</b>	<b>Maximum Concentration</b>	<b>Associated Samples</b>
440-215434-1	ICB/CCB	Magnesium	0.0124 mg/L	PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-41.0-20180710** PZ-1D-47.0-20180710**

SDG	Blank ID	Analyte	Maximum Concentration	Associated Samples
440-215434-1	ICB/CCB	Magnesium	0.0150 mg/L	PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710**
440-215805-1	PB (prep blank)	Magnesium	5.72 mg/Kg	PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD
440-215805-1	ICB/CCB	Magnesium	0.0111 mg/L	PZ-2D-42.0-20180713 PZ-2D-42.0-20180713-FD PZ-2D-43.0-20180713 PZ-2D-44.0-20180713 PZ-2D-45.0-20180713 PZ-2D-47.0-20180713 PZ-2D-48.0-20180713 PZ-2D-49.0-20180713
440-215805-1	ICB/CCB	Magnesium	0.0125 mg/L	PZ-2D-53.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks.

## V. Field Blanks

Sample ES-38-20180523-EB\* (from SDG 440-212026-1) was identified as an equipment blank. No contaminants were found with the following exceptions:

SDG	Blank ID	Collection Date	Analyte	Concentration	Associated Samples
440-212026-1	ES-38-20180523-EB*	05/23/18	Sodium	0.34 mg/L	ES-38-20180523*

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
440-212026-1	ES-38-20180523MS/MSD* (ES-33-20180523* ES-34-20180523* ES-34-20180523-FD* ES-38-20180523* ES-39-20180523*)	Iron	-	144 (70-130)	NA	-
440-215434-1	PZ-1D-46.0-20180710MS/MSD** (PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-41.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710** PZ-1D-46.0-20180710** PZ-1D-47.0-20180710** PZ-1D-48.0-20180710**)	Barium Strontium	205 (75-125) -	204 (75-125) 127 (75-125)	J+ (all detects) J+ (all detects)	A
440-215434-1	PZ-1D-46.0-20180710MS/MSD** (PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-41.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710** PZ-1D-46.0-20180710** PZ-1D-47.0-20180710** PZ-1D-48.0-20180710**)	Tungsten	47 (75-125)	49 (75-125)	UJ (all non-detects)	A

SDG	Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
440-215434-1	PZ-1D-49.0-20180710MS/MSD** (PZ-1D-49.0-20180710** PZ-1D-49.0-20180710-FD2**)	Barium	171 (75-125)	-	J+ (all detects)	A
440-215434-1	PZ-1D-49.0-20180710MS/MSD** (PZ-1D-49.0-20180710** PZ-1D-49.0-20180710-FD2**)	Tungsten	43 (75-125)	55 (75-125)	UJ (all non-detects)	A
440-215805-1	PZ-2D-57.0-20180713MS/MSD (PZ-2D-42.0-20180713 PZ-2D-42.0-20180713-FD PZ-2D-43.0-20180713 PZ-2D-44.0-20180713 PZ-2D-45.0-20180713 PZ-2D-46.0-20180713 PZ-2D-47.0-20180713 PZ-2D-48.0-20180713 PZ-2D-49.0-20180713 PZ-2D-50.0-20180713 PZ-2D-51.0-20180713 PZ-2D-52.0-20180713 PZ-2D-53.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-57.0-20180713 PZ-2D-58.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713)	Barium  Tungsten	-  58 (75-125)	24 (75-125)  60 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
440-215805-1	PZ-2D-61.0-20180713MS/MSD (PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD)	Barium  Tungsten	50 (75-125)  36 (75-125)	69 (75-125)  33 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
440-215805-1	PZ-2D-61.0-20180713MS/MSD (PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD)	Boron	127 (75-125)	-	J+ (all detects)	A

For ES-38-20180523MS/MSD\* (from SDG 440-212026-1), no data were qualified for Calcium, Magnesium, Potassium, and Sodium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For PZ-2D-57.0-20180713MSD (from SDG 440-215805-1), although the percent recovery was severely low (<30) for Barium, the associated sample results were qualified as estimated (J/UJ) since the MS and Post Spike recoveries were within the QC limits for this analyte.

For PZ-1D-46.0-20180710MS/MSD\*\* (from SDG 440-215434-1), PZ-2D-57.0-20180713MS/MSD, and PZ-2D-61.0-20180713MS/MSD (both from SDG 440-215805-1), no data were qualified for Iron, Magnesium, Manganese, and Phosphorus percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For PZ-1D-49.0-20180710MS/MSD\*\* (from SDG 440-215434-1), no data were qualified for Iron, Magnesium, and Phosphorus percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
440-212026-1	ES-38-20180523MS/MSD* (ES-33-20180523* ES-34-20180523* ES-34-20180523-FD* ES-38-20180523* ES-39-20180523*)	Iron	21 (≤20)	UJ (all non-detects)	A
440-215434-1	PZ-1D-49.0-20180710MS/MSD** (PZ-1D-49.0-20180710** PZ-1D-49.0-20180710-FD2**)	Barium Chromium Manganese Tungsten	22 (≤20) 21 (≤20) 25 (≤20) 23 (≤20)	J (all detects) UJ (all non-detects)	A
440-215805-1	PZ-2D-57.0-20180713MS/MSD (PZ-2D-42.0-20180713 PZ-2D-42.0-20180713-FD PZ-2D-43.0-20180713 PZ-2D-44.0-20180713 PZ-2D-45.0-20180713 PZ-2D-46.0-20180713 PZ-2D-47.0-20180713 PZ-2D-48.0-20180713 PZ-2D-49.0-20180713 PZ-2D-50.0-20180713 PZ-2D-51.0-20180713 PZ-2D-52.0-20180713 PZ-2D-53.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-57.0-20180713 PZ-2D-58.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713)	Barium	25 (≤20)	J (all detects)	A

## VII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in these SDGs, and therefore duplicate analyses were not performed for these SDGs.

## VIII. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

## IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

## X. Field Duplicates

Samples ES-34-20180523\* and ES-34-20180523-FD\* (both from SDG 440-212026-1), samples PZ-1D-30.0-20180710\*\* and PZ-1D-30.0-20180710-FD1\*\* (both from SDG 440-215434-1), samples PZ-1D-49.0-20180710\*\* and PZ-1D-49.0-20180710-FD2\*\* (both from SDG 440-215434-1), samples PZ-2D-42.0-20180713 and PZ-2D-42.0-20180713-FD (both from SDG 440-215805-1), samples PZ-2D-62.0-20180713 and PZ-2D-62.0-20180713-FD (both from SDG 440-215805-1), samples TRA-1-26.0-20180719 and TRA-1-26.0-20180719-FD (both from SDG 440-216327-1), samples TRA-1-32.0-20180719 and TRA-1-32.0-20180719-FD (both from SDG 440-216327-1), samples TRA-2-31.0-20180720 and TRA-2-31.0-20180720-FD (both from SDG 440-216362-1), and samples TRA-2-35.0-20180720 and TRA-2-35.0-20180720-FD (both from SDG 440-216362-1) were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

SDG	Analyte	Concentration (mg/L)		RPD (Limits)	Flag	A or P
		ES-34-20180523*	ES-34-20180523-FD*			
440-212026-1	Calcium	630	590	7 (≤30)	-	-
	Potassium	230	210	9 (≤30)	-	-
	Magnesium	630	580	8 (≤30)	-	-
	Sodium	1300	1200	8 (≤30)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		PZ-1D-30.0-20180710**	PZ-1D-30.0-20180710-FD1**			
440-215434-1	Barium	230	170	30 (≤50)	-	-
	Boron	6.1	6.7	9 (≤50)	-	-
	Chromium	19	18	5 (≤50)	-	-
	Cobalt	4.2	4.5	7 (≤50)	-	-
	Copper	13	12	8 (≤50)	-	-



SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		PZ-1D-30.0-20180710**	PZ-1D-30.0-20180710-FD1**			
440-215434-1	Iron	14000	14000	0 (≤50)	-	-
	Lead	6.8	6.7	1 (≤50)	-	-
	Magnesium	7100	8200	14 (≤50)	-	-
	Manganese	130	130	0 (≤50)	-	-
	Nickel	10	10	0 (≤50)	-	-
	Phosphorus	680	740	8 (≤50)	-	-
	Strontium	100	110	10 (≤50)	-	-
	Vanadium	50	50	0 (≤50)	-	-
	Zirconium	30	27	11 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		PZ-1D-49.0-20180710**	PZ-1D-49.0-20180710-FD2**			
440-215434-1	Barium	120	120	0 (≤50)	-	-
	Boron	22	22	0 (≤50)	-	-
	Chromium	58	52	11 (≤50)	-	-
	Cobalt	6.0	9.0	40 (≤50)	-	-
	Copper	18	20	11 (≤50)	-	-
	Iron	16000	18000	12 (≤50)	-	-
	Lead	7.8	8.8	12 (≤50)	-	-
	Magnesium	36000	37000	3 (≤50)	-	-
	Manganese	280	340	19 (≤50)	-	-
	Nickel	16	18	12 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		PZ-1D-49.0-20180710**	PZ-1D-49.0-20180710-FD2**			
440-215434-1	Phosphorus	690	810	16 (≤50)	-	-
	Strontium	130	140	7 (≤50)	-	-
	Vanadium	68	72	6 (≤50)	-	-
	Zirconium	26	30	14 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		PZ-2D-42.0-20180713	PZ-2D-42.0-20180713-FD			
440-215805-1	Barium	99	110	11 (≤50)	-	-
	Boron	5.8	5.1	13 (≤50)	-	-
	Chromium	13	12	8 (≤50)	-	-
	Cobalt	4.2	4.3	2 (≤50)	-	-
	Copper	14	14	0 (≤50)	-	-
	Iron	15000	14000	7 (≤50)	-	-
	Lead	7.6	8.0	5 (≤50)	-	-
	Magnesium	7500	7800	4 (≤50)	-	-
	Manganese	240	260	8 (≤50)	-	-
	Nickel	12	11	9 (≤50)	-	-
	Phosphorus	1100	1100	0 (≤50)	-	-
	Strontium	290	320	10 (≤50)	-	-
	Vanadium	49	44	11 (≤50)	-	-
	Zirconium	20	20	0 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		PZ-2D-62.0-20180713	PZ-2D-62.0-20180713-FD			
440-215805-1	Barium	150	85	55 (≤50)	J (all detects)	A
	Boron	39	44	12 (≤50)	-	-
	Chromium	24	20	18 (≤50)	-	-
	Cobalt	11	6.1	57 (≤50)	J (all detects)	A
	Copper	26	13	67 (≤50)	J (all detects)	A
	Iron	20000	13000	42 (≤50)	-	-
	Lead	12	5.0	82 (≤50)	J (all detects)	A
	Magnesium	48000	44000	9 (≤50)	-	-
	Manganese	380	250	41 (≤50)	-	-
	Nickel	24	15	46 (≤50)	-	-
	Phosphorus	1400	900	43 (≤50)	-	-
	Strontium	180	120	40 (≤50)	-	-
	Vanadium	44	35	23 (≤50)	-	-
	Zirconium	35	31	12 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		TRA-1-26.0-20180719	TRA-1-26.0-20180719-FD			
440-216327-1	Chromium	21	17	21 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		TRA-1-32.0-20180719	TRA-1-32.0-20180719-FD			
440-216327-1	Chromium	11	9.9	11 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		TRA-2-31.0-20180720	TRA-2-31.0-20180720-FD			
440-216362-1	Chromium	9.1	11	19 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		TRA-2-35.0-20180720	TRA-2-35.0-20180720-FD			
440-216362-1	Chromium	11	8.4	27 (≤50)	-	-

### XI. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2A and Stage 2B validation.

### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in these SDGs.

Due to MS/MSD %R and RPD and field duplicate RPD, data were qualified as estimated in fifty-two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**NERT, ZVI Treatment Study & AWF Capture Evaluation  
Metals - Data Qualification Summary - SDGs 440-211939-1, 440-212026-1, 440-215434-1, 440-215805-1, 440-216327-1, 440-216362-1**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
440-212026-1	ES-33-20180523* ES-34-20180523* ES-34-20180523-FD* ES-38-20180523* ES-39-20180523*	Iron	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (RPD) (Id)
440-215434-1	PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-41.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710** PZ-1D-46.0-20180710** PZ-1D-47.0-20180710** PZ-1D-48.0-20180710**	Barium Strontium	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-215434-1	PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-41.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710** PZ-1D-46.0-20180710** PZ-1D-47.0-20180710** PZ-1D-48.0-20180710** PZ-1D-49.0-20180710** PZ-1D-49.0-20180710-FD2**	Tungsten	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-215434-1	PZ-1D-49.0-20180710** PZ-1D-49.0-20180710-FD2**	Barium	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
440-215805-1	PZ-2D-42.0-20180713 PZ-2D-42.0-20180713-FD PZ-2D-43.0-20180713 PZ-2D-44.0-20180713 PZ-2D-45.0-20180713 PZ-2D-46.0-20180713 PZ-2D-47.0-20180713 PZ-2D-48.0-20180713 PZ-2D-49.0-20180713 PZ-2D-50.0-20180713 PZ-2D-51.0-20180713 PZ-2D-52.0-20180713 PZ-2D-53.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-57.0-20180713 PZ-2D-58.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713 PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD	Barium  Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-215805-1	PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD	Boron	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-215434-1	PZ-1D-49.0-20180710** PZ-1D-49.0-20180710-FD2**	Barium Chromium Manganese Tungsten	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (RPD) (ld)
440-215805-1	PZ-2D-42.0-20180713 PZ-2D-42.0-20180713-FD PZ-2D-43.0-20180713 PZ-2D-44.0-20180713 PZ-2D-45.0-20180713 PZ-2D-46.0-20180713 PZ-2D-47.0-20180713 PZ-2D-48.0-20180713 PZ-2D-49.0-20180713 PZ-2D-50.0-20180713 PZ-2D-51.0-20180713 PZ-2D-52.0-20180713 PZ-2D-53.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-57.0-20180713 PZ-2D-58.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713	Barium	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (ld)
440-215805-1	PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD	Barium Cobalt Copper Lead	J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)

**NERT, ZVI Treatment Study & AWF Capture Evaluation  
Metals - Laboratory Blank Data Qualification Summary - SDGs 440-211939-1, 440-212026-1, 440-215434-1, 440-215805-1, 440-216327-1, 440-216362-1**

No Sample Data Qualified in these SDGs

**NERT, ZVI Treatment Study & AWF Capture Evaluation  
Metals - Field Blank Data Qualification Summary - SDGs 440-211939-1, 440-212026-1, 440-215434-1, 440-215805-1, 440-216327-1, 440-216362-1**

No Sample Data Qualified in these SDGs

**ATTACHMENT B**

**Wet Chemistry Data Validation Report**



**Chloride, Nitrate as Nitrogen, Nitrate as Nitrate, and Sulfate by Environmental Protection Agency (EPA) Method 300.0**  
**Chlorate by EPA Method 300.1B**  
**Perchlorate by EPA Method 314.0**  
**Hexavalent Chromium by EPA SW 846 Method 7199**  
**pH by EPA SW 846 Method 9045C**  
**Alkalinity by Standard Method 2320B**  
**Total Dissolved Solids by Standard Method 2540C**  
**Ferrous Iron by Standard Method 3500-FE D**  
**Ferric Iron by Calculation Method**  
**Total Organic Carbon by Standard Method 5310B**

**I. Sample Receipt and Technical Holding Times**

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

SDG	Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Affected Analyte	Flag	A or P
440-211936-1	ES-37-20180522* ES-36-20180522* ES-35-20180522*	Ferrous iron	7 days	48 hours	Ferrous iron Ferric iron	UJ (all non-detects) UJ (all non-detects)	P
440-212026-1	ES-33-20180523*	Ferrous iron Hexavalent chromium	6 days 28.22 hours	48 hours 24 hours	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P
440-212026-1	ES-34-20180523*	Ferrous iron Hexavalent chromium	6 days 27.68 hours	48 hours 24 hours	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P
440-212026-1	ES-34-20180523-FD*	Ferrous iron Hexavalent chromium	6 days 28.28 hours	48 hours 24 hours	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P
440-212026-1	ES-38-20180523*	Ferrous iron Hexavalent chromium	6 days 27.33 hours	48 hours 24 hours	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P
440-212026-1	ES-38-20180523-EB*	Ferrous iron Hexavalent chromium	6 days 26.97 hours	48 hours 24 hours	Ferrous iron Ferric iron Hexavalent chromium	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P
440-212026-1	ES-39-20180523*	Ferrous iron	6 days	48 hours	Ferrous iron Ferric iron	UJ (all non-detects) UJ (all non-detects)	P

## II. Initial Calibration

All criteria for the initial calibration of each method were met.

Initial calibration data were not reviewed for Stage 2A validation.

## III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

Continuing calibration data were not reviewed for Stage 2A validation.

## IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

SDG	Blank ID	Analyte	Maximum Concentration	Associated Samples
440-216327-1	ICB/CCB	Perchlorate	1.17 ug/L	TRA-1-26.0-20180719 TRA-1-26.0-20180719-FD
440-216362-1	ICB/CCB	Perchlorate	1.17 ug/L	TRA-2-45.0-20180720

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks.

## V. Field Blanks

Sample ES-38-20180523-EB\* (from SDG 440-212026-1) was identified as an equipment blank. No contaminants were found.

## VI. Surrogates

Surrogates were added to all samples as required by EPA Method 300.1B. Surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
440-208667-1	ES-33-23.0-20180411MS/MSD (ES-33-23.0-20180411)	Chlorate	136 (75-125)	137 (75-125)	J+ (all detects)	A
440-208667-1	ES-33-23.0-20180411MS/MSD (ESB-20-30.0-20180410 ESB-20-40.0-20180410 ESB-19-20.0-20180411 ESB-19-30.0-20180411 ES-33-10.0-20180411 ES-33-11.0-20180411 ES-33-12.0-20180411 ES-33-13.0-20180411 ES-33-14.0-20180411 ES-33-16.0-20180411 ES-33-17.0-20180411 ES-33-18.0-20180411 ES-33-19.0-20180411 ES-33-20.0-20180411 ES-33-21.0-20180411 ES-33-22.0-20180411 ES-33-23.0-20180411)	Perchlorate	51 (80-120)	55 (80-120)	J- (all detects)	A
440-208827-1	ES-35-20.0-20180412MS/MSD (ES-35-20.0-20180412 ES-35-22.0-20180412 ES-35-23.0-20180412 ES-35-24.0-20180412 ES-35-26.0-20180412 ES-35-26.0-20180412-FD ES-35-27.0-20180412 ES-35-28.0-20180412 ES-35-29.0-20180412 ES-35-30.0-20180412 ES-35-31.0-20180412 ES-35-32.0-20180412 ES-35-33.0-20180412 ES-35-34.0-20180412 ES-35-36.0-20180412 ES-35-37.0-20180412 ES-35-39.0-20180412)	Perchlorate	26 (80-120)	-	J- (all detects)	A
440-208827-1	ES-34-16.0-20180412MS/MSD (ES-34-16.0-20180412 ES-34-17.0-20180412 ES-34-18.0-20180412 ES-34-19.0-20180412)	Perchlorate	34 (80-120)	72 (80-120)	J- (all detects)	A
440-208827-1	ES-34-31.0-20180412MS/MSD (ES-34-31.0-20180412 ES-34-33.0-20180412 ES-34-35.0-20180412 ES-34-36.0-20180412 ES-34-37.0-20180412 ES-34-38.0-20180412 ES-34-40.0-20180412 ES-35-25.0-20180412 ES-35-35.0-20180412 ES-35-38.0-20180412)	Perchlorate	239 (80-120)	223 (80-120)	J+ (all detects)	A

SDG	Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
440-208827-1	ES-34-110.0-20180412MS/MSD (ES-34-110.0-20180412 ES-35-40.0-20180412 ES-35-40.0-20180412-FD ES-35-41.0-20180412 ES-35-42.0-20180412 ES-35-43.0-20180412 ES-35-44.0-20180412 ES-35-45.0-20180412)	Perchlorate	29 (80-120)	32 (80-120)	R (all non-detects)	A
440-208897-1	ES-35-100.0-20180413MS/MSD** (ES-35-50.0-20180412** ESB-23-10.0-20180413** ESB-23-20.0-20180413** ESB-23-20.0-20180413-FD** ESB-23-30.0-20180413** ESB-23-40.0-20180413**)	Perchlorate	121 (80-120)	-	J+ (all detects)	A
440-208897-1	ES-35-100.0-20180413MS/MSD** (ES-35-60.0-20180412** ES-35-60.0-20180412-FD** ES-35-70.0-20180412** ES-35-80.0-20180413** ES-35-80.0-20180413-FD** ES-35-90.0-20180413** ES-35-100.0-20180413** ES-35-110.0-20180413** ES-35-120.0-20180413**)	Perchlorate	121 (80-120)	-	NA	-
440-209041-1	ES-36-110.0-20180416MS/MSD (ES-36-37.0-20180416 ES-36-38.0-20180416 ES-36-39.0-20180416 ES-36-40.0-20180416 ES-36-40.0-20180416-FD ES-36-41.0-20180416 ES-36-42.0-20180416 ES-36-50.0-20180416 ES-36-60.0-20180416 ES-36-60.0-20180416-FD ES-36-70.0-20180416 ES-36-80.0-20180416 ES-36-90.0-20180416 ES-36-90.0-20180416-FD ES-36-100.0-20180416 ES-36-110.0-20180416 ES-36-120.0-20180416)	Perchlorate	76 (80-120)	76 (80-120)	J- (all detects) UJ (all non-detects)	A

SDG	Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
440-215434-1	PZ-1D-46.0-20180710MS/MSD** (PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-41.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710** PZ-1D-46.0-20180710** PZ-1D-47.0-20180710** PZ-1D-48.0-20180710**)	Perchlorate	76 (80-120)	74 (80-120)	J- (all detects) UJ (all non-detects)	A
440-215805-1	PZ-2D-61.0-20180713MS/MSD (PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD)	Perchlorate	36 (80-120)	41 (80-120)	UJ (all non-detects)	A
440-215805-1	PZ-2D-57.0-20180713MS/MSD (PZ-2D-52.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-57.0-20180713 PZ-2D-58.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713 PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD)	Hexavalent chromium	49 (55-110)	51 (55-110)	UJ (all non-detects)	A

For ESB-22-30.0-20180410MS/MSD (from SDG 440-208588-1), no data were qualified for Perchlorate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For ESB-20-30.0-20180410MS/MSD (from SDG 440-208667-1), ES-34-50.0-20180412MS/MSD (from SDG 440-208827-1), and ES-36-10.0-20180416MS/MSD (from SDG 440-209041-1), no data were qualified for Chlorate and Perchlorate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For ES-33-14.0-20180411MS/MSD (from SDG 440-208667-1), ES-33-27.0-20180411MS/MSD (from SDG 440-208667-1), ES-33-32.0-20180411MS/MSD (from SDG 440-208667-1), ES-34-10.0-20180412MS/MSD (from SDG 440-208827-1), ES-35-26.0-20180412-FDMS/MSD (from SDG 440-208827-1), ES-35-44.0-20180412MS/MSD (from SDG 440-208827-1), ES-35-45.0-20180412MS/MSD (from SDG 440-208827-1), ES-35-100.0-20180413MS/MSD\*\* (from SDG 440-208897-1), and ES-36-36.0-

20180416MS/MSD (from SDG 440-209041-1), no data were qualified for Chlorate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For TRA-2-45.0-20180720MS/MSD (from SDG 440-216362-1), no data were qualified for Perchlorate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For PZ-1D-30.0-20180710MS/MSD\*\*, PZ-1D-30.0-20180710-FD1MS/MSD\*\* (both from SDG 440-215434-1), PZ-2D-42.0-20180713MS/MSD (from SDG 440-215805-1), TRA-1-37.0-20180719MS/MSD (from SDG 440-216327-1), TRA-2-37.0-20180720MS/MSD, and TRA-2-48.0-20180720MS/MSD (both from SDG 440-216362-1), no data were qualified for Chlorate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For TRA-1-31.0-20180719MS/MSD (from SDG 440-216327-1) and TRA-2-32.0-20180720MS/MSD (from SDG 440-216362-1), no data were qualified for Chlorate and Perchlorate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Analyte	RPD (Limits)	Flag	A or P
440-208827-1	ES-35-44.0-20180412MS/MSD (ES-35-44.0-20180412)	Chlorate	29 (≤25)	J (all detects)	A
440-208827-1	ES-35-20.0-20180412MS/MSD (ES-35-20.0-20180412 ES-35-22.0-20180412 ES-35-23.0-20180412 ES-35-24.0-20180412 ES-35-26.0-20180412 ES-35-26.0-20180412-FD ES-35-27.0-20180412 ES-35-28.0-20180412 ES-35-29.0-20180412 ES-35-30.0-20180412 ES-35-31.0-20180412 ES-35-32.0-20180412 ES-35-33.0-20180412 ES-35-34.0-20180412 ES-35-36.0-20180412 ES-35-37.0-20180412 ES-35-39.0-20180412)	Perchlorate	27 (≤20)	J (all detects)	A
440-216362-1	TRA-2-45.0-20180720MS/MSD (TRA-2-45.0-20180720 TRA-2-46.0-20180720 TRA-2-47.0-20180720 TRA-2-48.0-20180720)	Perchlorate	54 (≤20)	J (all detects)	A

## VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

## IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

## X. Field Duplicates

Samples ESB-22-20.0-20180410 and ESB-22-20.0-20180410-FD (both from SDG 440-208588-1), samples ES-33-18.0-20180411 and ES-33-18.0-20180411-FD (both from SDG 440-208667-1), samples ES-33-50.0-20180411 and ES-33-50.0-20180411-FD (both from SDG 440-208667-1), samples ES-33-110.0-20180411 and ES-33-110.0-20180411-FD (both from SDG 440-208667-1), samples ES-34-30.0-20180412 and ES-34-30.0-20180412-FD (both from SDG 440-208827-1), samples ES-34-60.0-20180412 and ES-34-60.0-20180412-FD (both from SDG 440-208827-1), samples ES-34-100.0-20180412 and ES-34-100.0-20180412-FD (both from SDG 440-208827-1), samples ES-35-26.0-20180412 and ES-35-26.0-20180412-FD (both from SDG 440-208827-1), samples ES-35-40.0-20180412 and ES-35-40.0-20180412-FD (both from SDG 440-208827-1), samples ES-35-60.0-20180412\*\* and ES-35-60.0-20180412-FD\*\* (both from SDG 440-208897-1), samples ES-35-80.0-20180413\*\* and ES-35-80.0-20180413-FD\*\* (both from SDG 440-208897-1), samples ESB-23-20.0-20180413\*\* and ESB-23-20.0-20180413-FD\*\* (both from SDG 440-208897-1), samples ES-36-30.0-20180416 and ES-36-30.0-20180416-FD (both from SDG 440-209041-1), samples ES-36-40.0-20180416 and ES-36-40.0-20180416-FD (both from SDG 440-209041-1), samples ES-36-60.0-20180416 and ES-36-60.0-20180416-FD (both from SDG 440-209041-1), samples ES-36-90.0-20180416 and ES-36-90.0-20180416-FD (both from SDG 440-209041-1), samples ES-34-20180523\* and ES-34-20180523-FD\* (both from SDG 440-212026-1), samples PZ-1D-30.0-20180710\*\* and PZ-1D-30.0-20180710-FD1\*\* (both from SDG 440-215434-1), samples PZ-1D-49.0-20180710\*\* and PZ-1D-49.0-20180710-FD2\*\* (both from SDG 440-215434-1), samples PZ-2D-42.0-20180713 and PZ-2D-42.0-20180713-FD (both from SDG 440-215805-1), samples PZ-2D-62.0-20180713 and PZ-2D-62.0-20180713-FD (both from SDG 440-215805-1), samples TRA-1-26.0-20180719 and TRA-1-26.0-20180719-FD (both from SDG 440-216327-1), samples TRA-1-32.0-20180719 and TRA-1-32.0-20180719-FD (both from SDG 440-216327-1), samples TRA-2-31.0-20180720 and TRA-2-31.0-20180720-FD (both from SDG 440-216362-1), and samples TRA-2-35.0-20180720 and TRA-2-35.0-20180720-FD (both from SDG 440-216362-1) were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ESB-22-20.0-20180410	ESB-22-20.0-20180410-FD			
440-208588-1	Nitrate as N	1.9	1.8	5 (≤50)	-	-
	Nitrate as NO3	8.5	8.1	5 (≤50)	-	-
	Chlorate	2.9	2.8	4 (≤50)	-	-
	Perchlorate	2.8	3.3	16 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-33-18.0-20180411	ES-33-18.0-20180411-FD			
440-208667-1	Nitrate as N	2.4	2.3	4 (≤50)	-	-
	Nitrate as NO3	11	10	10 (≤50)	-	-
	Chlorate	15	15	0 (≤50)	-	-
	Perchlorate	1.9	1.5	24 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-33-50.0-20180411	ES-33-50.0-20180411-FD			
440-208667-1	Nitrate as N	2.0	1.9	5 (≤50)	-	-
	Nitrate as NO3	8.8	8.3	6 (≤50)	-	-
	Chlorate	8.5	8.0	6 (≤50)	-	-
	Perchlorate	1.6	1.6	0 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-33-110.0-20180411	ES-33-110.0-20180411-FD			
440-208667-1	Chlorate	2.0	2.0	0 (≤50)	-	-



SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-34-30.0-20180412	ES-34-30.0-20180412-FD			
440-208827-1	Nitrate as N	3.6	3.6	0 (≤50)	-	-
	Nitrate as NO3	16	16	0 (≤50)	-	-
	Chlorate	20	19	5 (≤50)	-	-
	Perchlorate	1.9	1.8	5 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-34-60.0-20180412	ES-34-60.0-20180412-FD			
440-208827-1	Chlorate	0.39	0.39	0 (≤50)	-	-
	Perchlorate	0.12	0.093	25 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-35-26.0-20180412	ES-35-26.0-20180412-FD			
440-208827-1	Nitrate as N	3.2	3.0	6 (≤50)	-	-
	Nitrate as NO3	14	13	7 (≤50)	-	-
	Chlorate	11	11	0 (≤50)	-	-
	Perchlorate	1.4	1.3	7 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-35-40.0-20180412	ES-35-40.0-20180412-FD			
440-208827-1	Nitrate as N	2.9	3.1	7 (≤50)	-	-
	Nitrate as NO3	13	14	7 (≤50)	-	-
	Chlorate	18	17	6 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-35-80.0-20180413**	ES-35-80.0-20180413-FD**			
440-208897-1	Chlorate	1.0	1.1	10 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ESB-23-20.0-20180413**	ESB-23-20.0-20180413-FD**			
440-208897-1	Nitrate as N	0.90	0.87	3 (≤50)	-	-
	Nitrate as NO3	4.0	3.9	3 (≤50)	-	-
	Chlorate	1.5	1.5	0 (≤50)	-	-
	Perchlorate	0.24	0.27	12 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-36-30.0-20180416	ES-36-30.0-20180416-FD			
440-209041-1	Nitrate as N	8.4	8.1	4 (≤50)	-	-
	Nitrate as NO3	37	36	3 (≤50)	-	-
	Chlorate	29	29	0 (≤50)	-	-
	Perchlorate	1.8	2.0	11 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-36-40.0-20180416	ES-36-40.0-20180416-FD			
440-209041-1	Nitrate as N	12	11	9 (≤50)	-	-
	Nitrate as NO3	53	49	8 (≤50)	-	-
	Chlorate	24	24	0 (≤50)	-	-
	Perchlorate	3.7	3.8	3 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-36-60.0-20180416	ES-36-60.0-20180416-FD			
440-209041-1	Chlorate	0.097	0.079	20 (≤50)	-	-

SDG	Analyte	Concentration (mg/Kg)		RPD (Limits)	Flag	A or P
		ES-36-90.0-20180416	ES-36-90.0-20180416-FD			
440-209041-1	Chlorate	0.18	0.24	29 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		ES-34-20180523*	ES-34-20180523-FD*			
440-212026-1	Chloride	1400 mg/L	1400 mg/L	0 (≤30)	-	-
	Sulfate	3900000 ug/L	3800000 ug/L	3 (≤30)	-	-
	Chlorate	52000 ug/L	52000 ug/L	0 (≤30)	-	-
	Perchlorate	7000 ug/L	6900 ug/L	1 (≤30)	-	-
	Hexavalent chromium	64 ug/L	64 ug/L	0 (≤30)	-	-
	Alkalinity as CaCO3	60000 ug/L	60000 ug/L	0 (≤30)	-	-
	Bicarbonate ion as HCO3	74000 ug/L	73000 ug/L	1 (≤30)	-	-
	Total dissolved solids	8400000 ug/L	8400000 ug/L	0 (≤30)	-	-
	Total organic carbon	1.0U mg/L	0.67 mg/L	200 (≤30)	NQ	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		PZ-1D-30.0-20180710**	PZ-1D-30.0-20180710-FD1**			
440-215434-1	Chlorate	6.0 mg/Kg	5.9 mg/Kg	2 (≤50)	-	-
	Nitrate as N	1.8 mg/Kg	1.6 mg/Kg	12 (≤50)	-	-
	Nitrate as NO3	7.9 mg/Kg	7.0 mg/Kg	12 (≤50)	-	-
	Perchlorate	3.6 mg/Kg	3.6 mg/Kg	0 (≤50)	-	-
	pH	8.1 mg/Kg	8.0 mg/Kg	1 (≤50)	-	-
	Total dissolved solids	260 mg/L	280 mg/L	7 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		PZ-1D-49.0-20180710**	PZ-1D-49.0-20180710-FD2**			
440-215434-1	Hexavalent chromium	0.26 mg/Kg	0.20U mg/Kg	NQ	-	-
	pH	7.8 SU	7.9 SU	1 (≤50)	-	-
	Total dissolved solids	190 mg/L	220 mg/L	15 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		PZ-2D-42.0-20180713	PZ-2D-42.0-20180713-FD			
440-215434-1	Chlorate	28 mg/Kg	28 mg/Kg	0 (≤50)	-	-
	Nitrate as N	2.7 mg/Kg	4.0 mg/Kg	39 (≤50)	-	-
	Nitrate as NO3	12 mg/Kg	18 mg/Kg	40 (≤50)	-	-
	Perchlorate	9.1 mg/Kg	11 mg/Kg	19 (≤50)	-	-
	pH	8.3 SU	8.3 SU	0 (≤50)	-	-
	Total dissolved solids	180 mg/L	170 mg/L	6 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		PZ-2D-62.0-20180713	PZ-2D-62.0-20180713-FD			
440-215434-1	pH	7.7 SU	7.8 SU	1 (≤50)	-	-
	Total dissolved solids	140 mg/L	150 mg/L	7 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		TRA-1-26.0-20180719	TRA-1-26.0-20180719-FD			
440-216327-1	Chlorate	0.86 mg/Kg	0.85 mg/Kg	1 (≤50)	-	-
	Perchlorate	2.5 mg/Kg	2.3 mg/Kg	8 (≤50)	-	-
	Total dissolved solids	270 mg/L	290 mg/L	7 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		TRA-1-32.0-20180719	TRA-1-32.0-20180719-FD			
440-216327-1	Chlorate	44 mg/Kg	43 mg/Kg	2 (≤50)	-	-
	Perchlorate	31 mg/Kg	33 mg/Kg	6 (≤50)	-	-
	Total dissolved solids	250 mg/L	260 mg/L	4 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		TRA-2-31.0-20180720	TRA-2-31.0-20180720-FD			
440-216362-1	Chlorate	36 mg/Kg	35 mg/Kg	3 (≤50)	-	-
	Perchlorate	21 mg/Kg	20 mg/Kg	5 (≤50)	-	-
	Total dissolved solids	190 mg/L	180 mg/L	5 (≤50)	-	-

SDG	Analyte	Concentration		RPD (Limits)	Flag	A or P
		TRA-2-35.0-20180720	TRA-2-35.0-20180720-FD			
440-216362-1	Chlorate	25 mg/Kg	26 mg/Kg	4 (≤50)	-	-
	Perchlorate	16 mg/Kg	17 mg/Kg	6 (≤50)	-	-
	Total dissolved solids	160 mg/L	170 mg/L	6 (≤50)	-	-

NQ = No data were qualified when either the primary or duplicate result was not detected or was below the practical quantitation limit (PQL).

### XI. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2A and Stage 2B validation.

### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

Due to MS/MSD %R, data were rejected in eight samples.

Due to technical holding time and MS/MSD %R and RPD, data were qualified as estimated in one-hundred sixteen samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be rejected (R) are unusable for all purposes. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**NERT, ZVI Treatment Study & AWF Capture Evaluation  
Wet Chemistry - Data Qualification Summary - SDGs 440-208588-1, 440-208667-1,  
440-208827-1, 440-208897-1, 440-209041-1, 440-209174-1, 440-211936-1, 440-  
212026-1, 440-215434-1, 440-215805-1, 440-216327-1, 440-216362-1**

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
440-211936-1	ES-37-20180522* ES-36-20180522* ES-35-20180522*	Ferrous iron Ferric iron	UJ (all non-detects) UJ (all non-detects)	P	Technical holding times (h)
440-212026-1	ES-33-20180523*	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
440-212026-1	ES-34-20180523*	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
440-212026-1	ES-34-20180523-FD*	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
440-212026-1	ES-38-20180523*	Ferrous iron Ferric iron Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
440-212026-1	ES-38-20180523-EB*	Ferrous iron Ferric iron Hexavalent chromium	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P	Technical holding times (h)
440-212026-1	ES-39-20180523*	Ferrous iron Ferric iron	UJ (all non-detects) UJ (all non-detects)	P	Technical holding times (h)
440-208667-1	ES-33-23.0-20180411	Chlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-208667-1	ESB-20-30.0-20180410 ESB-20-40.0-20180410 ESB-19-20.0-20180411 ESB-19-30.0-20180411 ES-33-10.0-20180411 ES-33-11.0-20180411 ES-33-12.0-20180411 ES-33-13.0-20180411 ES-33-14.0-20180411 ES-33-16.0-20180411 ES-33-17.0-20180411 ES-33-18.0-20180411 ES-33-19.0-20180411 ES-33-20.0-20180411 ES-33-21.0-20180411 ES-33-22.0-20180411 ES-33-23.0-20180411	Perchlorate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
440-208827-1	ES-35-20.0-20180412 ES-35-22.0-20180412 ES-35-23.0-20180412 ES-35-24.0-20180412 ES-35-26.0-20180412 ES-35-26.0-20180412-FD ES-35-27.0-20180412 ES-35-28.0-20180412 ES-35-29.0-20180412 ES-35-30.0-20180412 ES-35-31.0-20180412 ES-35-32.0-20180412 ES-35-33.0-20180412 ES-35-34.0-20180412 ES-35-36.0-20180412 ES-35-37.0-20180412 ES-35-39.0-20180412 ES-34-16.0-20180412 ES-34-17.0-20180412 ES-34-18.0-20180412 ES-34-19.0-20180412	Perchlorate	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-208827-1	ES-34-31.0-20180412 ES-34-33.0-20180412 ES-34-35.0-20180412 ES-34-36.0-20180412 ES-34-37.0-20180412 ES-34-38.0-20180412 ES-34-40.0-20180412 ES-35-25.0-20180412 ES-35-35.0-20180412 ES-35-38.0-20180412	Perchlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-208827-1	ES-34-110.0-20180412 ES-35-40.0-20180412 ES-35-40.0-20180412-FD ES-35-41.0-20180412 ES-35-42.0-20180412 ES-35-43.0-20180412 ES-35-44.0-20180412 ES-35-45.0-20180412	Perchlorate	R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-208897-1	ES-35-50.0-20180412** ESB-23-10.0-20180413** ESB-23-20.0-20180413** ESB-23-20.0-20180413-FD** ESB-23-30.0-20180413** ESB-23-40.0-20180413**	Perchlorate	J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)



SDG	Sample	Analyte	Flag	A or P	Reason (Code)
440-209041-1	ES-36-37.0-20180416 ES-36-38.0-20180416 ES-36-39.0-20180416 ES-36-40.0-20180416 ES-36-40.0-20180416-FD ES-36-41.0-20180416 ES-36-42.0-20180416 ES-36-50.0-20180416 ES-36-60.0-20180416 ES-36-60.0-20180416-FD ES-36-70.0-20180416 ES-36-80.0-20180416 ES-36-90.0-20180416 ES-36-90.0-20180416-FD ES-36-100.0-20180416 ES-36-110.0-20180416 ES-36-120.0-20180416	Perchlorate	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-208827-1	ES-35-44.0-20180412	Chlorate	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (ld)
440-208827-1	ES-35-20.0-20180412 ES-35-22.0-20180412 ES-35-23.0-20180412 ES-35-24.0-20180412 ES-35-26.0-20180412 ES-35-26.0-20180412-FD ES-35-27.0-20180412 ES-35-28.0-20180412 ES-35-29.0-20180412 ES-35-30.0-20180412 ES-35-31.0-20180412 ES-35-32.0-20180412 ES-35-33.0-20180412 ES-35-34.0-20180412 ES-35-36.0-20180412 ES-35-37.0-20180412 ES-35-39.0-20180412	Perchlorate	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (ld)
440-215434-1	PZ-1D-30.0-20180710** PZ-1D-30.0-20180710-FD1** PZ-1D-31.0-20180710** PZ-1D-32.0-20180710** PZ-1D-33.0-20180710** PZ-1D-34.0-20180710** PZ-1D-35.0-20180710** PZ-1D-36.0-20180710** PZ-1D-37.0-20180710** PZ-1D-38.0-20180710** PZ-1D-39.0-20180710** PZ-1D-40.0-20180710** PZ-1D-41.0-20180710** PZ-1D-42.0-20180710** PZ-1D-43.0-20180710** PZ-1D-44.0-20180710** PZ-1D-45.0-20180710** PZ-1D-46.0-20180710** PZ-1D-47.0-20180710** PZ-1D-48.0-20180710**	Perchlorate	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
440-215805-1	PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD	Perchlorate	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-215805-1	PZ-2D-52.0-20180713 PZ-2D-54.0-20180713 PZ-2D-55.0-20180713 PZ-2D-56.0-20180713 PZ-2D-57.0-20180713 PZ-2D-58.0-20180713 PZ-2D-59.0-20180713 PZ-2D-60.0-20180713 PZ-2D-61.0-20180713 PZ-2D-62.0-20180713 PZ-2D-62.0-20180713-FD	Hexavalent chromium	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R) (m)
440-216362-1	TRA-2-45.0-20180720 TRA-2-46.0-20180720 TRA-2-47.0-20180720 TRA-2-48.0-20180720	Perchlorate	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD) (ld)

**NERT, ZVI Treatment Study & AWF Capture Evaluation**

**Wet Chemistry - Laboratory Blank Data Qualification Summary - SDGs 440-208588-1, 440-208667-1, 440-208827-1, 440-208897-1, 440-209041-1, 440-209174-1, 440-211936-1, 440-212026-1, 440-215434-1, 440-215805-1, 440-216327-1, 440-216362-1**

No Sample Data Qualified in these SDGs

**NERT, ZVI Treatment Study & AWF Capture Evaluation**

**Wet Chemistry - Field Blank Data Qualification Summary - SDGs 440-208588-1, 440-208667-1, 440-208827-1, 440-208897-1, 440-209041-1, 440-209174-1, 440-211936-1, 440-212026-1, 440-215434-1, 440-215805-1, 440-216327-1, 440-216362-1**

No Sample Data Qualified in these SDGs