AECOM Environment

Prepared for:
Nevada Division of Environmental Protection
Las Vegas, NV

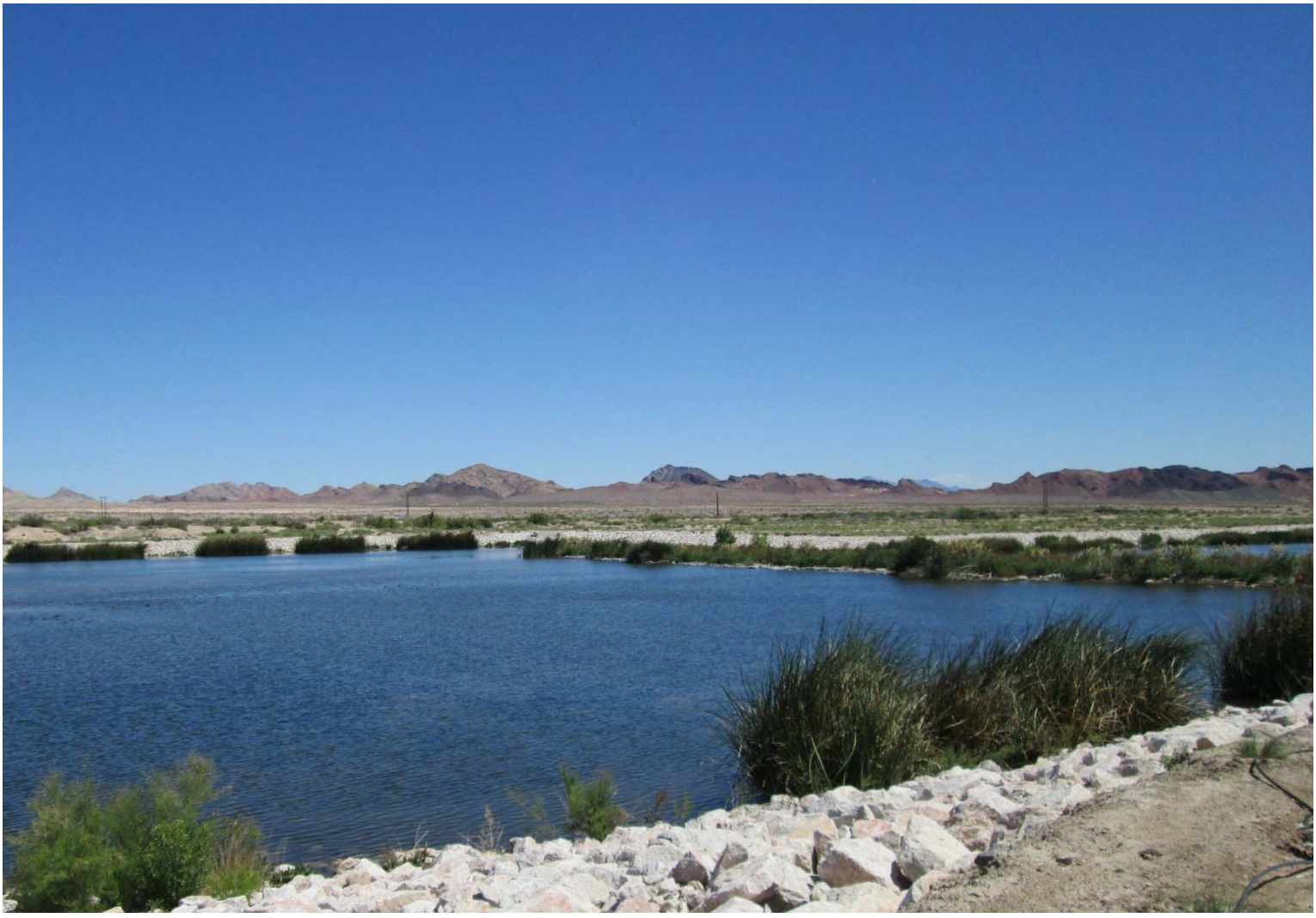
Prepared by:
AECOM
Camarillo, CA
60477365
July 2017 (Rev 1)

Data Validation Summary Report
May 2016 Groundwater Sampling

(Revision 1)

NERT Remedial Investigation – Downgradient Study Area
Nevada Environmental Response Trust Site
Henderson, Nevada

Final



AECOM Environment

Prepared for:
Nevada Division of Environmental Protection
Las Vegas, NV

Prepared by:
AECOM
Camarillo, CA
60477365
July 2017 (Rev 1)

Data Validation Summary Report
May 2016 Groundwater Sampling
(Revision 1)

Final

Prepared By Chad Roper

Reviewed By Lily Bayati

Contents

List of Appendices

List of Tables

List of Acronyms

CCB	Continuing Calibration Blank
DQO	Data Quality Objectives
DNR	Do Not Report
DUP	Duplicate
DVSR	Data Validation Summary Report
EB	Equipment Blank
EPA	United States Environmental Protection Agency
FB	Field Blank
FD	Field Duplicate
ICB	Initial Calibration Blank
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
LDC	Laboratory Data Consultants, Inc.
MS/MSD	Matrix Spike / Matrix Spike Duplicate
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
TIN	Total Inorganic Nitrogen
TOC	Total Organic Carbon
TOX	Total Organic Halides
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
%R	Percent Recovery

1.0 Introduction

This data validation summary report (DVSR) has been prepared by AECOM to assess the validity and usability of laboratory analytical data from the May 2016 Groundwater Sampling conducted in the Downgradient Study Area of the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada. This document was revised to address comments received by email on March 7, 2017. The responses to comments are provided in Appendix A of the Groundwater Sampling Technical Memorandum (AECOM, 2017). The assessment was performed by AECOM under their April 7, 2016, Quality Assurance Project Plan (QAPP) and included the collection and analyses of 79 environmental and quality control (QC) samples. The analyses were performed by the following methods:

- Dissolved Chromium by Environmental Protection Agency (EPA) Method 200.8
- Wet Chemistry:
  - Hexavalent Chromium by EPA Method 218.7
  - Chloride, and Bromide (Anions) by EPA Method 300.0
  - Chlorate by EPA Method 300.1B
  - Perchlorate by EPA Method 314.0
  - Total Dissolved Solids (TDS) by Standard Method 2540C

Laboratory analytical services were provided byTestAmerica, Inc (Irvine, California) and Silver State Analytical, Inc. (Las Vegas, Nevada). The samples were grouped into sample delivery groups (SDGs). The water samples are associated with quality assurance (QA)/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. **Table 1** is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, matrix, and validation level. **Table 2** 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 Verification and Validation Requirements - Supplement established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada, April 13, 2009. Approximately 90 percent of the analytical data (58 out of 64 primary samples = 90.6%) were validated according to Stage 2B data validation procedures and approximately 10 percent of the analytical data (6 out 64 primary samples = 9.4% for wet chemistry analyses and seven out of 64 primary samples = 11% for chromium analyses) were validated according to Stage 4 data validation. Although the number of wet chemistry analyses validated to Stage 4 was slightly less than the target, no impact on data quality is expected.

The analytical data were evaluated for QA/QC based on the following documents: AECOM's QAPP Downgradient Study Area, Henderson, Nevada, Revision, April 2016; NDEP's Revised Guidance on Qualifying Data due to Blank Contamination for the BMI Complex and Common Areas, January 5 2012; Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, August 2014; and the EPA's 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.

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 5.0 presents a summary of the PARCCS criteria by comparing quantitative parameters with acceptability criteria defined in the project DQOs. Qualitative PARCCS criteria are also summarized in this section.

1.1 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: equipment blanks (EBs), field blanks (FBs), field duplicates (FDs), method blanks, laboratory control samples/laboratory control sample duplicates (LCS/LCSDs), and matrix spike/matrix spike duplicates (MS/MSDs).

Before conducting the PARCCS evaluation, the analytical data were validated according to the QAPP (April 2016), Functional Guidelines (EPA 2004), and EPA SW 846 Test 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 result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample. 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.

R Rejected - The data is unusable (the compound or 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 - The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

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 nonbiased flag (J).
UJ = U plus J	The UJ flag is used when a non-detected (U) flag is added to J flag.

Table 3 lists the reason codes used. Reason codes explain why flags have been applied and identify possible limitations of data use. 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 4 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, functional guidelines, and EPA Test 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 measures the reproducibility of repetitive measurements. It is defined as the degree of mutual agreement among independent measurements as the result of repeated application of the sample analytical process under similar conditions.

Components of precision include analytical precision and total precision. Analytical precision is a measurement of the variability associated with duplicate or replicate analyses of the same sample in the laboratory, and is determined by analysis of laboratory quality control samples, such as duplicate control samples (LCSD or DCS), matrix spike duplicates (MSD), or sample duplicates. If the recoveries of analytes in the specified control samples are comparable within established control limits, then precision is within limits.

Total precision is a measurement of the variability associated with the entire sampling and analytical process. It is determined by analysis of duplicate or replicate field samples, and measures variability introduced by both the laboratory and field operations. Field duplicate samples are analyzed to assess field and analytical precision.

Duplicate results are assessed using the relative percent difference (RPD) between duplicate measurements. If the RPD for laboratory quality control samples exceeds the laboratory's statistically determined acceptance ranges, data will be qualified as described in the applicable validation procedure. If the RPD between primary and duplicate field samples exceeds 50 percent for groundwater, data will be qualified as described in the applicable validation procedure. The RPD will be calculated as follows:

$$RPD = 200\% \times \frac{X_2 - X_1}{X_2 + X_1}$$

where X1 is the smaller of the two observed values, and X2 is the larger of the two observed values.

Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results maybe 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, LCS, and LCSD. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Accuracy of inorganic analyses 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, calibration blanks, EBs, and FBs.

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.

Initial and continuing calibration blanks (ICB/CCBs) 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. Equipment blanks were collected and analyzed for all target analytes.

Field blanks consist of analyte-free source water stored at the sample collection site. The water is collected from each source water used during each sampling event. Field blanks were collected and analyzed for all target analytes.

For inorganic analyses, contaminants found in both the environmental sample and the blank sample are assumed to be laboratory artifacts if both values are less than the PQL or if a sample result and blank contaminant value

were greater than the PQL and the sample result is less than 10 times the blank contaminant value. The blanks and associated samples were evaluated according to the NDEP *BMI Plant Sites and Common Areas Projects, Henderson, Nevada, Revised Guidance on Qualifying Data due to Blank Contamination for the BMI Complex and Common Areas*, January 5 2012.

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. In accordance with EPA guidance (EPA 2004), sample results for analyses that were performed after the method holding time but less than two times the method holding time (if any) would be qualified as estimated (J- or UJ) and nondetect sample results for analyses that were performed after two times the method holding time would be qualified as rejected (R). Detected results are not to be rejected.

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 MDL for this project. The laboratory uses a formatter that reports estimated values down to the MDL. 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 following sections present a review of QC data for metals analysis (dissolved chromium) and wet chemistry analyses (hexavalent chromium, bromide, chloride, chlorate, perchlorate, and TDS).

2.0 Metals Analysis

A total of 65 water samples and 14 QC samples were analyzed for dissolved chromium by EPA Method 200.8. None of the 79 total results were rejected based on holding time and/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 all initial calibrations were within the acceptance criteria of ≥ 0.995 and the %Rs in the continuing calibration verifications met the acceptance criteria of 90-110%.

2.1.2 Internal Standards

All internal standard relative intensities were within acceptance criteria.

2.1.3 MS/MSD Samples

MS/MSD %Rs were within acceptance criteria as stated in the QAPP therefore, no chromium results were qualified based on this criterion. The details are presented in Attachment A, Section VI.

2.1.4 LCS/LCSD Samples

All LCS/LCSD %Rs and RPDs met acceptance criteria as stated in the QAPP.

2.1.5 ICP/MS Interference Check Sample

All validated ICP/MS interference check %Rs met acceptance criteria as stated in the QAPP.

2.1.6 FD Samples

The field duplicate samples were evaluated for acceptable precision with RPDs. When the sample or field duplicate concentration is <PQL, the PQL is used for calculation purposes. All field duplicate RPDs were within the acceptance criteria. The field duplicate RPDs are presented in detail in Attachment A, Section X.

2.1.7 Analyte Quantitation and Target Identification

Raw data were evaluated for the Stage 4 samples. All analyte quantitation and target identifications were acceptable.

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 180-day analysis holding time criteria for dissolved chromium.

2.2.2 Blanks

Method blanks, ICB/CCBs, EBs, and FBs were 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, flags were assigned for the chemical analytical data during data validation 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 non-detect (U) at the PQL because contaminants found in both the environmental sample and the blank sample are assumed to be laboratory artifacts if both values are less than the PQL.

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

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 amended.

2.2.2.1 Method and Calibration Blanks

No contaminants were detected in the method or calibration blanks for this analysis.

2.2.2.2 EBs and FBs

Chromium was detected in equipment blank WMW5.5S-20150422-EB (0.80 J μg/L) and in field blank MW-25-20160421-FB (0.86 μg/L). Consequently, low-level chromium results for four samples were qualified as non-detect (“U”) due to equipment blank contamination in accordance with national functional guidelines. The details regarding analytes detected in field generated blanks are presented in Attachment A, Section V.

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. Data validation review indicates that 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. No results were rejected.

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 Analysis

A total of 65 primary water samples and 14 QCs were analyzed for hexavalent chromium by EPA Method 218.7; chloride and bromide by EPA Method 300.0; chlorate by EPA Method 300.1B; perchlorate by EPA Method 314.0; and TDS by Standard Method 2540C. All wet chemistry data were assessed to be valid. 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

As previously discussed in Section 2.1.1, initial and continuing calibration results provide a means of evaluating accuracy.

Instrument calibrations were evaluated for all wet chemistry methods. The correlation coefficients in the initial calibrations were within the acceptance criteria of ≥0.995 and the %Rs in the continuing calibration verifications met the acceptance criteria.

3.1.2 Surrogate

Surrogate (dichloroacetic acid) recoveries were evaluated for chlorate analysis by EPA Method 300.1B. All surrogate %Rs met the acceptance criteria as stated in the QAPP.

3.1.3 MS/MSD Samples

Due to MS/MSD %Rs outside of acceptance criteria as stated in the QAPP, the following samples had one or more results qualified AA-20-20160419, DBMW-1-20160419, MCF-06C-20160419, WMW4.9S-20160422, DBMW-22-20160422, MCF-05-20160425, MCF-20A-20160425, PMW-7-20160422, PMW-8-20160422, RIT-10-20160422, RIT-6-20160422, WMW6.15S-20160422, HM-2-20160428, LNDMW2-20160427, MCF-20A-20160427, MW-02-20160428, MCF-06A-R-20160428, MCF-31A-20160428, MCF-31B-20160428, MW-10-20160428, MW-10-20160428-FD, and MW-06-20160428. The details regarding the qualification of results are presented in Attachment B, Section VII.

3.1.4 DUP Samples

DUP samples were evaluated for TDS analysis by SM 2540c. All DUP RPDs met the acceptance criteria as stated in the QAPP.

3.1.5 LCS Samples

LCS samples were evaluated for all wet chemistry methods. All LCS %Rs met the acceptance criteria as stated in the QAPP.

3.1.6 FD Samples

The field duplicate samples were evaluated for acceptable precision with RPDs. Results for hexavalent chromium and bromide were qualified in the following samples: PC-74-20160429 and PC-74-20160429-FD. The details regarding the qualification of results are presented in Attachment B, Section X.

3.1.7 Analyte Quantitation and Target Identification

Raw data were evaluated for the Stage 4 samples. All analyte quantitation and target identifications were acceptable. In instances where data exceeded the calibration range and was subsequently diluted, the data was qualified as not reportable by the laboratory in order to yield only one complete set of data for a given sample. The details regarding the qualification of results are presented in Attachment B, Section XII.

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 water samples met the 7-day analysis holding time criteria for TDS and hexavalent chromium and the 28-day analysis holding time criteria for chlorate, chloride, bromide, and perchlorate.

The details regarding sample preservation and holding times are presented in Attachment B, Section I.

3.2.2 Blanks

As previously discussed in Section 2.2.2, method blanks, ICB/CCBs, EBs, and FBs were analyzed to evaluate representativeness.

3.2.2.1 Method and Calibration Blanks

No data were qualified due to contaminants detected in the method or calibration blanks for this analysis.

3.2.2.2 EBs and FBs

One equipment blank (PC-76-20160429-EB) and two field blanks (RIT-10-20160422-FB and PC-74-20160429-FB) had detectable chloride contamination at concentrations below the PQL. No samples were qualified on the basis of EB or FB contamination. The details regarding these results are presented in Attachment B, Section V.

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 wet chemistry 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.

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, surrogates, MS/MSD, DUP, LCS/LCSD, and field duplicates. The precision and accuracy of the data set were considered acceptable after incorporation of validation-qualified results.

All calibrations were performed as required and met the acceptance criteria. All surrogate, MS/MSD, DUP, LCS, and field duplicate percent recoveries, RPDs, and difference met acceptance criteria with the exceptions noted in Sections 2.2.2.2, 3.1.3, and 3.1.6. All ICP interference check sample %Rs met acceptance criteria.

5.2 Representativeness

All samples for each method and matrix were evaluated for holding time compliance. All samples were associated with a method blank in each individual SDG. The representativeness of the project data is considered acceptable after incorporation of validation-qualified results.

5.3 Comparability

Sampling frequency requirements were met in obtaining necessary equipment blanks, field blanks and field duplicates. 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. The overall comparability is considered acceptable after incorporation of validation-qualified results.

5.4 Completeness

Of the 448 total analytes reported from primary samples, 0 sample results were rejected. The completeness for the SDGs is as follows:

Parameter	Total Analytes	No. of Rejects	% Completeness
Metals	64	0	100
Wet Chemistry	384	0	100
Total	**448**	**0**	**100**

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 blanks, calibration blanks, equipment blanks, and field blanks did not affect sensitivity.

6.0 Conclusions and Recommendations

The analytical data quality assessment for the water sample laboratory analytical results generated during the May 2016 Groundwater Sampling in the Downgradient Study Area of the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada established that the overall project requirements and completeness levels were met. No results were rejected. Sample results that were found to be estimated (J, J-, J+, UJ) are usable for limited purposes only. Based upon the Stage 2B and Stage 4 data validation all other results are considered valid and usable for all purposes.

7.0 References

AECOM, 2017. Groundwater Sampling Technical Memorandum, NERT Remedial Investigation – Downgradient Study Area, Nevada Environmental Response Trust Site, Henderson Nevada. July 2017 (Rev 1).

EPA 2014. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. August 2014.

NDEP 2009. Data Verification and Validation Requirements - Supplement established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada. April 13.

NDEP 2012. Revised Guidance on Qualifying Data due to Blank Contamination for the BMI Complex and Common Areas. January 5.

Quality Assurance Project Plan, Downgradient Study Area, Henderson, Nevada (QAPP), Revision. April 17, 2016.

_____.1983. EPA Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Cincinnati, Ohio. March.

_____.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.

(Eaton et al., 1998) Standard Method for the Examination of Water and Wastewater (20th ed.).Washington, DC: American Public Health Association.

Tables

Table 1
Sample Cross Reference
NERT Downgradient Study Area
Henderson, Nevada

SDG	Client Sample ID	Lab Sample ID	Matrix	Sample Date	QC Type	Validation Level	Bromide (E300)	Chlorate (E300.1)	Chloride (E300)	Chromium (E200.8)	Chromium, Hexavalent (E218.7)	Perchlorate (E314.0)	Total Dissolved Solids (SM2540C)
16-2741	AA-23R-20160418	16-2741-1A	W	04/18/16		Stage 2B					X		
16-2741	DBMW-7-20160418	16-2741-2A	W	04/18/16		Stage 2B					X		
16-2741	DBMW-7-20160418-FD	16-2741-3A	W	04/18/16	DUP	Stage 2B					X		
16-2741	DBMW-8-20160418	16-2741-4A	W	04/18/16		Stage 2B					X		
16-2774	AA-20-20160419	16-2774-02A	W	04/19/16		Stage 2B					X		
16-2774	DBMW-1-20160419	16-2774-03A	W	04/19/16		Stage 2B					X		
16-2774	MCF-06C-20160419	16-2774-01A	W	04/19/16		Stage 2B					X		
16-2775	DBMW-4-20160419	16-2775-03A	W	04/19/16		Stage 2B					X		
16-2775	DBMW-4-20160419-EB	16-2775-02A	W	04/19/16	EB	Stage 2B					X		
16-2775	DBMW-5-20160419	16-2775-01A	W	04/19/16		Stage 2B					X		
16-2825	AA-22-20160420	16-2825-01A	W	04/20/16		Stage 2B					X		
16-2825	WMW6.15N-20160420	16-2825-05A	W	04/20/16		Stage 2B					X		
16-2825	WMW6.9N-20160420	16-2825-03A	W	04/20/16		Stage 2B					X		
16-2825	WMW6.9N-20160420-FD	16-2825-04A	W	04/20/16	DUP	Stage 2B					X		
16-2825	WMW7.8N-20160420	16-2825-02A	W	04/20/16		Stage 2B					X		
16-2837	MW-04-20160420	16-2837-04A	W	04/20/16		Stage 2B					X		
16-2837	MW-05-20160420	16-2837-02A	W	04/20/16		Stage 2B					X		
16-2837	MW-11-20160420	16-2837-01A	W	04/20/16		Stage 2B					X		
16-2837	MW-18-20160420	16-2837-03A	W	04/20/16		Stage 2B					X		
16-2878	COH2B1-20160421	16-2878-01A	W	04/21/16		Stage 2B					X		
16-2878	PC-77-20160421	16-2878-05A	W	04/21/16		Stage 2B					X		
16-2878	PC-78-20160421	16-2878-04A	W	04/21/16		Stage 2B					X		
16-2878	WMW6.55S-20160421	16-2878-02A	W	04/21/16		Stage 2B					X		
16-2878	WMW6.9S-20160421	16-2878-03A	W	04/21/16		Stage 2B					X		
16-2886	MCF-06B-20160421	16-2886-01A	W	04/21/16		Stage 2B					X		
16-2886	MW-12-20160421	16-2886-05A	W	04/21/16		Stage 2B					X		
16-2886	MW-13-20160421	16-2886-04A	W	04/21/16		Stage 2B					X		
16-2886	MW-25-20160421	16-2886-02A	W	04/21/16		Stage 2B					X		
16-2886	MW-25-20160421-FB	16-2886-03A	W	04/21/16	FB	Stage 2B					X		
16-2907	PMW-7-20160422	16-2907-02A	W	04/22/16		Stage 2B					X		
16-2907	PMW-8-20160422	16-2907-03A	W	04/22/16		Stage 2B					X		
16-2907	RIT-06-20160422	16-2907-04A	W	04/22/16		Stage 2B					X		
16-2907	RIT-10-20160422	16-2907-05A	W	04/22/16		Stage 2B					X		
16-2907	RIT-10-20160422-FB	16-2907-06A	W	04/22/16	FB	Stage 2B					X		
16-2907	WMW6.15S-20160422	16-2907-01A	W	04/22/16		Stage 2B					X		
16-2908	AA-30-20160422	16-2908-01A	W	04/22/16		Stage 2B					X		
16-2908	DBMW-22-20160422	16-2908-07A	W	04/22/16		Stage 2B					X		
16-2908	LNDMW1-20160422	16-2908-06A	W	04/22/16		Stage 2B					X		
16-2908	MW-20-20160422	16-2908-05A	W	04/22/16		Stage 2B					X		
16-2908	WMW4.9S-20160422	16-2908-04A	W	04/22/16		Stage 2B					X		
16-2908	WMW5.5S-20160422	16-2908-02A	W	04/22/16		Stage 2B					X		
16-2908	WMW5.5S-20160422-EB	16-2908-03A	W	04/22/16	EB	Stage 2B					X		
16-2948	MCF-05-20160425	16-2948-02A	W	04/25/16		Stage 2B					X		

Table 1
Sample Cross Reference
NERT Downgradient Study Area
Henderson, Nevada

SDG	Client Sample ID	Lab Sample ID	Matrix	Sample Date	QC Type	Validation Level	Bromide (E300)	Chlorate (E300.1)	Chloride (E300)	Chromium (E200.8)	Chromium, Hexavalent (E218.7)	Perchlorate (E314.0)	Total Dissolved Solids (SM2540C)
16-2948	MCF-20A-20160425	16-2948-01A	W	04/25/16		Stage 2B					X		
16-2987	MCF-05-20160426	16-2987-02A	W	04/26/16		Stage 2B					X		
16-2987	MCF-18A-20160426-0800	16-2987-01A	W	04/26/16		Stage 2B					X		
16-2988	MW-1-20160426	16-2988-01A	W	04/26/16		Stage 2B					X		
16-2988	MW-2-20160426	16-2988-02A	W	04/26/16		Stage 2B					X		
16-2988	MW-3-20160426	16-2988-03A	W	04/26/16		Stage 2B					X		
16-2988	MW-4-20160426	16-2988-04A	W	04/26/16		Stage 2B					X		
16-3021	LNDMW2-20160427	16-3021-03A	W	04/27/16		Stage 2B					X		
16-3021	LNDMW2-20160427-FB	16-3021-04A	W	04/27/16	FB	Stage 2B					X		
16-3021	WMW3.5N-20160427	16-3021-01A	W	04/27/16		Stage 2B					X		
16-3021	WMW3.5N-20160427-FD	16-3021-02A	W	04/27/16	DUP	Stage 2B					X		
16-3021	WMW4.9N-20160427	16-3021-05A	W	04/27/16		Stage 2B					X		
16-3021	WMW4.9N-20160427-EB	16-3021-06A	W	04/27/16	EB	Stage 2B					X		
16-3022	MCF-08A-20160427	16-3022-02A	W	04/27/16		Stage 2B					X		
16-3022	MCF-08B-R-20160427	16-3022-03A	W	04/27/16		Stage 2B					X		
16-3022	MCF-08B-R-20160427-FD	16-3022-04A	W	04/27/16	DUP	Stage 2B					X		
16-3022	MCF-18A-20160427	16-3022-01A	W	04/27/16		Stage 2B					X		
16-3022	MCF-20A-20160427	16-3022-05A	W	04/27/16		Stage 2B					X		
16-3074	HM-2-20160428	16-3074-01A	W	04/28/16		Stage 2B					X		
16-3074	MW-02-20160428	16-3074-02A	W	04/28/16		Stage 2B					X		
16-3074	MW-06-20160428	16-3074-03A	W	04/28/16		Stage 2B					X		
16-3075	MCF-06A-R-20160428	16-3075-01A	W	04/28/16		Stage 2B					X		
16-3075	MCF-31A-20160428	16-3075-03A	W	04/28/16		Stage 2B					X		
16-3075	MCF-31B-20160428	16-3075-02A	W	04/28/16		Stage 2B					X		
16-3075	MW-10-20160428	16-3075-04A	W	04/28/16		Stage 2B					X		
16-3075	MW-10-20160428FD	16-3075-05A	W	04/28/16		Stage 2B					X		
16-3075	WMW5.7N-20160428	16-3075-06A	W	04/28/16		Stage 2B					X		
16-3096	PC-74-20160429	16-3096-03A	W	04/29/16		Stage 2B					X		
16-3096	PC-74-20160429-FB	16-3096-07A	W	04/29/16	FB	Stage 2B					X		
16-3096	PC-74-20160429-FD	16-3096-04A	W	04/29/16	DUP	Stage 2B					X		
16-3096	PC-76-20160429	16-3096-05A	W	04/29/16		Stage 2B					X		
16-3096	PC-76-20160429-EB	16-3096-08A	W	04/29/16	EB	Stage 2B					X		
16-3096	PC-76-20160429-FD	16-3096-06A	W	04/29/16	DUP	Stage 2B					X		
16-3096	UZO-17-20160429	16-3096-02A	W	04/29/16		Stage 2B					X		
16-3096	WMW3-5S-20160429	16-3096-01A	W	04/29/16		Stage 2B					X		
16-3280	WMW5.58S-20160505	16-3280-01A	W	05/05/16		Stage 2B					X		
440-144933	AA-23R-20160418	440-144933-1	W	04/18/16		Stage 2B	X	X	X	X		X	X
440-144933	DBMW-7-20160418	440-144933-3	W	04/18/16		Stage 2B	X	X	X	X		X	X
440-144933	DBMW-7-20160418-FD	440-144933-4	W	04/18/16	DUP	Stage 2B	X	X	X	X		X	X
440-144933	DBMW-8-20160418	440-144933-2	W	04/18/16		Stage 2B	X	X	X	X		X	X
440-144937	AA-20-20160419	440-144937-2	W	04/19/16		Stage 2B	X	X	X	X		X	X
440-144937	DBMW-1-20160419	440-144937-3	W	04/19/16		Stage 2B	X	X	X	X		X	X
440-144937	MCF-06C-20160419	440-144937-1	W	04/19/16		Stage 2B	X	X	X	X		X	X

Table 1
Sample Cross Reference
NERT Downgradient Study Area
Henderson, Nevada

SDG	Client Sample ID	Lab Sample ID	Matrix	Sample Date	QC Type	Validation Level	Bromide (E300)	Chlorate (E300.1)	Chloride (E300)	Chromium (E200.8)	Chromium, Hexavalent (E218.7)	Perchlorate (E314.0)	Total Dissolved Solids (SM2540C)
440-144940	DBMW-4-20160419	440-144940-3	W	04/19/16		Stage 2B	X	X	X			X	X
440-144940	DBMW-4-20160419-EB	440-144940-2	W	04/19/16	EB	Stage 2B	X	X	X	X		X	X
440-144940	DBMW-5-20160419	440-144940-1	W	04/19/16		Stage 2B	X	X	X	X		X	X
440-145066	DBMW-4-20160419	440-145066-1	W	04/19/16		Stage 2B				X			
440-145066	MW-04-20160420	440-145066-5	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145066	MW-05-20160420	440-145066-3	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145066	MW-11-20160420	440-145066-2	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145066	MW-18-20160420	440-145066-4	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145213	AA-22-20160420	440-145213-1	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145213	WMW6.15N-20160420	440-145213-5	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145213	WMW6.9N-20160420	440-145213-3	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145213	WMW6.9N-20160420-FD	440-145213-4	W	04/20/16	DUP	Stage 2B	X	X	X	X		X	X
440-145213	WMW7.8N-20160420	440-145213-2	W	04/20/16		Stage 2B	X	X	X	X		X	X
440-145220	MCF-06B-20160421	440-145220-1	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145220	MW-12-20160421	440-145220-5	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145220	MW-13-20160421	440-145220-4	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145220	MW-25-20160421	440-145220-2	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145220	MW-25-20160421-FB	440-145220-3	W	04/21/16	FB	Stage 2B	X	X	X	X		X	X
440-145222	AA-30-20160422	440-145222-1	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145222	LNDMW1-20160422	440-145222-6	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145222	MW-20-20160422	440-145222-5	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145222	WMW4.9S-20160422	440-145222-4	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145222	WMW5.5S-20160422	440-145222-2	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145222	WMW5.5S-20160422-EB	440-145222-3	W	04/22/16	EB	Stage 2B	X	X	X	X		X	X
440-145224	COH2B1-20160421	440-145224-1	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145224	PC-77-20160421	440-145224-5	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145224	PC-78-20160421	440-145224-4	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145224	WMW6.55S-20160421	440-145224-2	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145224	WMW6.9S-20160421	440-145224-3	W	04/21/16		Stage 2B	X	X	X	X		X	X
440-145369	DBMW-22-20160422	440-145369-7	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145369	MCF-05-20160425	440-145369-9	W	04/25/16		Stage 2B	X	X	X	X		X	X
440-145369	MCF-20A-20160425	440-145369-8	W	04/25/16		Stage 2B	X	X	X	X		X	X
440-145369	PMW-7-20160422	440-145369-2	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145369	PMW-8-20160422	440-145369-3	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145369	RIT-10-20160422	440-145369-5	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145369	RIT-10-20160422-FB	440-145369-6	W	04/22/16	FB	Stage 2B	X	X	X	X		X	X
440-145369	RIT-6-20160422	440-145369-4	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145369	WMW6.15S-20160422	440-145369-1	W	04/22/16		Stage 2B	X	X	X	X		X	X
440-145599	MCF-05-20160426	440-145599-2	W	04/26/16		Stage 2B	X	X	X	X		X	X
440-145599	MCF-18A-20160426-0800	440-145599-1	W	04/26/16		Stage 2B	X	X	X	X		X	X
440-145701	MCF-08A-20160427	440-145701-6	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145701	MCF-08BR-20160427	440-145701-7	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145701	MCF-08BR-20160427-FD	440-145701-8	W	04/27/16	DUP	Stage 2B	X	X	X	X		X	X

Table 1
Sample Cross Reference
NERT Downgradient Study Area
Henderson, Nevada

SDG	Client Sample ID	Lab Sample ID	Matrix	Sample Date	QC Type	Validation Level	Bromide (E300)	Chlorate (E300.1)	Chloride (E300)	Chromium (E200.8)	Chromium, Hexavalent (E218.7)	Perchlorate (E314.0)	Total Dissolved Solids (SM2540C)
440-145701	MCF-18A-20160427	440-145701-5	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145701	MW-1-20160426	440-145701-1	W	04/26/16		Stage 2B	X	X	X	X		X	X
440-145701	MW-2-20160426	440-145701-2	W	04/26/16		Stage 2B	X	X	X	X		X	X
440-145701	MW-3-20160426	440-145701-3	W	04/26/16		Stage 2B	X	X	X	X		X	X
440-145701	MW-4-20160426	440-145701-4	W	04/26/16		Stage 2B	X	X	X	X		X	X
440-145790	HM-2-20160428	440-145790-8	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145790	LNDMW2-20160427	440-145790-3	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145790	LNDMW2-20160427-FB	440-145790-4	W	04/27/16	FB	Stage 2B	X	X	X	X		X	X
440-145790	MCF-20A-20160427	440-145790-7	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145790	MW-02-20160428	440-145790-9	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145790	WMW3.5-N-20160427	440-145790-1	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145790	WMW3.5N-20160427-FD	440-145790-2	W	04/27/16	DUP	Stage 2B	X	X	X	X		X	X
440-145790	WMW4.9N-20160427	440-145790-5	W	04/27/16		Stage 2B	X	X	X	X		X	X
440-145790	WMW4.9N-20160427-EB	440-145790-6	W	04/27/16	EB	Stage 2B	X	X	X	X		X	X
440-145793	MCF-06A-R-20160428	440-145793-1	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145793	MCF-31A-20160428	440-145793-3	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145793	MCF-31B-20160428	440-145793-2	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145793	MW-10-20160428	440-145793-4	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145793	MW-10-20160428-FD	440-145793-5	W	04/28/16	DUP	Stage 2B	X	X	X	X		X	X
440-145860	MW-06-20160428	440-145860-1	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-145860	PC-74-20160429	440-145860-5	W	04/29/16		Stage 2B	X	X	X	X		X	X
440-145860	PC-74-20160429-FB	440-145860-9	W	04/29/16	FB	Stage 2B	X	X	X	X		X	X
440-145860	PC-74-20160429-FD	440-145860-6	W	04/29/16	DUP	Stage 2B	X	X	X	X		X	X
440-145860	PC-76-20160429	440-145860-8	W	04/29/16		Stage 2B	X	X	X	X		X	X
440-145860	PC-76-20160429-EB	440-145860-10	W	04/29/16	EB	Stage 2B	X	X	X	X		X	X
440-145860	PC-76-20160429-FD	440-145860-7	W	04/29/16	DUP	Stage 2B	X	X	X	X		X	X
440-145860	UZO-17-20160429	440-145860-4	W	04/29/16		Stage 2B	X	X	X	X		X	X
440-145860	WMW3.5S-20160428	440-145860-3	W	04/29/16		Stage 2B	X	X	X	X		X	X
440-145860	WMW5.7N-20160428	440-145860-2	W	04/28/16		Stage 2B	X	X	X	X		X	X
440-146623	WMW5.58S-20160505	440-146623-1	W	05/05/16		Stage 2B	X	X	X	X		X	X

Table 2
Validation Elements

Stage 2B	Metals	Wet Chemistry
Sample Receipt & Technical Holding Time	√	√
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	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
Field Duplicate	√	√
Project Quantitation Limits (QL)	√	√
Multiple Results for One Sample	√	√
Sample Result Verification - -	- -	- -
Overall Data Usability Assessment	√	√

Stage 4	Metals	Wet Chemistry
Sample Receipt & Technical Holding Time	√	√
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	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
Field Duplicate	√	√
Project Quantitation Limits (QL)	√	√
Multiple Results for One Sample	√	√
Sample Result Verification	√	√
Overall Data Usability Assessment	√	√

Notes:
√ = Reviewed
N/A = Not applicable to method or not performed during this sampling event
-- = Not applicable for Stage 2B review

Table 3
Qualification Codes and Definitions

Reason Code	Explanation
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	duel column confirmation %D 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
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 4
Analytical Results of Groundwater Sampling with Data Validation Qualifiers
NERT Downgradient Study Area
Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding	
16-3096	PC-74-20160429	4/29/2016	E218.7	18540-29-9	Chromium, Hexavalent	1.8		0.090	1.0	ug/l	J	fd	FD RPD >30%	40	%
16-3096	PC-74-20160429-FD	4/29/2016	E218.7	18540-29-9	Chromium, Hexavalent	2.7		0.090	1.0	ug/l	J	fd	FD RPD >30%	40	%
440-144937	AA-20-20160419	4/19/2016	E300	16887-00-6	Chloride	1000	B	2.5	250	mg/l		bl	Method Blank	0.284	mg/L
440-144937	AA-20-20160419	4/19/2016	E300	24959-67-9	Bromide	0.25	U	2.5	5.0	mg/l	UJ	m	matrix spike %R	54/58	%
440-144937	DBMW-1-20160419	4/19/2016	E300	16887-00-6	Chloride	1100	B	5.0	250	mg/l		bl	Method Blank	0.284	mg/L
440-144937	DBMW-1-20160419	4/19/2016	E300	24959-67-9	Bromide	0.25	UF1	5.0	10	mg/l	UJ	m	matrix spike %R	54/58	%
440-144937	DBMW-1-20160419	4/19/2016	E314.0	14797-73-0	Perchlorate	9000	F1	950	4000	ug/l		m	matrix spike %R	nc/nc	%
440-144937	MCF-06C-20160419	4/19/2016	E300	16887-00-6	Chloride	1700	B	5.0	250	mg/l		bl	Method Blank	0.284	mg/L
440-144937	MCF-06C-20160419	4/19/2016	E300	24959-67-9	Bromide	0.25	U	5.0	10	mg/l	UJ	m	matrix spike %R	54/58	%
440-144940	DBMW-4-20160419	4/19/2016	E300	16887-00-6	Chloride	1100	B	5.0	250	mg/l		bl	Method Blank	0.284	mg/L
440-144940	DBMW-5-20160419	4/19/2016	E300	16887-00-6	Chloride	1200	B	2.5	250	mg/l		bl	Method Blank	0.284	mg/L
440-144940	DBMW-5-20160419	4/19/2016	E300	24959-67-9	Bromide	2.9	J	2.5	5.0	mg/l	J	sp	Detect <PQL	-	-
440-145066	MW-11-20160420	4/20/2016	E300.1	14866-68-3	Chlorate	93	J	50	100	ug/l	J	sp	Detect <PQL	-	-
440-145066	MW-18-20160420	4/20/2016	E314.0	14797-73-0	Perchlorate	3.4	J	0.95	4.0	ug/l	J	sp	Detect <PQL	-	-
440-145213	WMW6.15N-20160420	4/20/2016	E200.8	7440-47-3	Chromium	3.6	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145213	WMW6.9N-20160420	4/20/2016	E200.8	7440-47-3	Chromium	3.5	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145213	WMW6.9N-20160420	4/20/2016	E300	24959-67-9	Bromide	0.67	J	0.50	1.0	mg/l	J	sp	Detect <PQL	-	-
440-145213	WMW6.9N-20160420-FD	4/20/2016	E200.8	7440-47-3	Chromium	3.9	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145213	WMW6.9N-20160420-FD	4/20/2016	E300	24959-67-9	Bromide	0.72	J	0.50	1.0	mg/l	J	sp	Detect <PQL	-	-
440-145213	WMW7.8N-20160420	4/20/2016	E200.8	7440-47-3	Chromium	2.9	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145213	WMW7.8N-20160420	4/20/2016	E300	24959-67-9	Bromide	0.28	J	0.25	0.50	mg/l	J	sp	Detect <PQL	-	-
440-145220	MW-12-20160421	4/21/2016	E200.8	7440-47-3	Chromium	18	J	5.0	20	ug/l	U	bf	Field Blank	0.80	ug/l
440-145220	MW-25-20160421-FB	4/21/2016	E200.8	7440-47-3	Chromium	0.80	J	0.50	2.0	ug/l	J	sp	Detect <PQL	-	-
440-145222	MW-20-20160422	4/22/2016	E200.8	7440-47-3	Chromium	1.1	J	1.0	4.0	ug/l	U	be	Equipment Blank	0.86	ug/l
440-145222	WMW4.9S-20160422	4/22/2016	E200.8	7440-47-3	Chromium	2.7	J	1.0	4.0	ug/l	U	be	Equipment Blank	0.86	ug/l
440-145222	WMW4.9S-20160422	4/22/2016	E300	16887-00-6	Chloride	290	F1	0.50	50	mg/l	J-	m	matrix spike %R	51/47	%
440-145222	WMW5.5S-20160422	4/22/2016	E200.8	7440-47-3	Chromium	2.6	J	1.0	4.0	ug/l	U	be	Equipment Blank	0.86	ug/l
440-145222	WMW5.5S-20160422	4/22/2016	E300	24959-67-9	Bromide	2.2	J	1.3	2.5	mg/l	J	sp	Detect <PQL	-	-
440-145222	WMW5.5S-20160422-EB	4/22/2016	E200.8	7440-47-3	Chromium	0.86	J	0.50	2.0	ug/l	J	sp	Detect <PQL	-	-
440-145224	PC-78-20160421	4/21/2016	E200.8	7440-47-3	Chromium	1.1	J	1.0	4.0	ug/l	J	sp	Detect <PQL	-	-
440-145224	PC-78-20160421	4/21/2016	E300	24959-67-9	Bromide	2.6	J	2.5	5.0	mg/l	J	sp	Detect <PQL	-	-
440-145224	WMW6.55S-20160421	4/21/2016	E300	24959-67-9	Bromide	2.2	J	1.3	2.5	mg/l	J	sp	Detect <PQL	-	-
440-145224	WMW6.9S-20160421	4/21/2016	E200.8	7440-47-3	Chromium	1.4	J	1.0	4.0	ug/l	J	sp	Detect <PQL	-	-
440-145369	DBMW-22-20160422	4/22/2016	E200.8	7440-47-3	Chromium	5.7	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145369	DBMW-22-20160422	4/22/2016	E300.1	14866-68-3	Chlorate	10	U	50	100	ug/l	UJ	m	matrix spike %R	nc/nc	%
440-145369	MCF-05-20160425	4/25/2016	E200.8	7440-47-3	Chromium	110	F1	2.5	10	ug/l					
440-145369	MCF-05-20160425	4/25/2016	E300.1	14866-68-3	Chlorate	10	U	500	1000	ug/l	UJ	m	matrix spike %R	nc/nc	%
440-145369	MCF-20A-20160425	4/25/2016	E300.1	14866-68-3	Chlorate	10	U	2000	4000	ug/l	UJ	m	matrix spike %R	nc/nc	%
440-145369	PMW-7-20160422	4/22/2016	E200.8	7440-47-3	Chromium	4.6	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145369	PMW-7-20160422	4/22/2016	E300.1	14866-68-3	Chlorate	10	U	500	1000	ug/l	UJ	m	matrix spike %R	nc/nc	%
440-145369	PMW-8-20160422	4/22/2016	E200.8	7440-47-3	Chromium	4.6	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145369	PMW-8-20160422	4/22/2016	E300	24959-67-9	Bromide	3.8	J	2.5	5.0	mg/l	J+	m	matrix spike %R	376/319	%
440-145369	PMW-8-20160422	4/22/2016	E300.1	14866-68-3	Chlorate	180		50	100	ug/l	J-	m	matrix spike %R	nc/nc	%
440-145369	RIT-10-20160422	4/22/2016	E200.8	7440-47-3	Chromium	3.0	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145369	RIT-10-20160422	4/22/2016	E300	24959-67-9	Bromide	2.0	J	1.3	2.5	mg/l	J+	m	matrix spike %R	376/319	%
440-145369	RIT-10-20160422-FB	4/22/2016	E300	16887-00-6	Chloride	0.30	J	0.25	0.50	mg/l	J	sp	Detect <PQL	-	-
440-145369	RIT-6-20160422	4/22/2016	E200.8	7440-47-3	Chromium	4.2	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145369	RIT-6-20160422	4/22/2016	E300	24959-67-9	Bromide	4.9		1.3	2.5	mg/l	J+	m	matrix spike %R	376/319	%
440-145369	WMW6.15S-20160422	4/22/2016	E300	24959-67-9	Bromide	2.0		0.50	1.0	mg/l	J+	m	matrix spike %R	376/319	%
440-145701	MW-3-20160426	4/26/2016	E200.8	7440-47-3	Chromium	16	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-

Table 4
Analytical Results of Groundwater Sampling with Data Validation Qualifiers
NERT Downgradient Study Area
Henderson, Nevada

SDG	Client Sample ID	Sample Date	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	SQL	PQL	Units	Validator Qualifier	Reason Code	Reason Code Definition	Qualification Finding	
440-145701	MW-4-20160426	4/26/2016	E200.8	7440-47-3	Chromium	17	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-
440-145790	HM-2-20160428	4/28/2016	E300	16887-00-6	Chloride	1000		2.5	250	mg/l	J-	m	matrix spike %R	50/48	%
440-145790	HM-2-20160428	4/28/2016	E300	24959-67-9	Bromide	2.5	J	2.5	5.0	mg/l	J	sp	Detect <PQL	-	-
440-145790	LNDMW2-20160427	4/27/2016	E200.8	7440-47-3	Chromium	5.1	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-
440-145790	LNDMW2-20160427	4/27/2016	E300	24959-67-9	Bromide	3.5	F1	1.3	2.5	mg/l	J-	m	matrix spike %R	48/57	%
440-145790	MCF-20A-20160427	4/27/2016	E300	16887-00-6	Chloride	50000		25	5000	mg/l	J-	m	matrix spike %R	50/48	%
440-145790	MW-02-20160428	4/28/2016	E200.8	7440-47-3	Chromium	8.6	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-
440-145790	MW-02-20160428	4/28/2016	E300	16887-00-6	Chloride	380	F1	1.3	100	mg/l	J-	m	matrix spike %R	50/48	%
440-145793	MCF-06A-R-20160428	4/28/2016	E300	16887-00-6	Chloride	56000		25	5000	mg/l	J-	m	matrix spike %R	46/51	%
440-145793	MCF-31A-20160428	4/28/2016	E300	16887-00-6	Chloride	81000		25	5000	mg/l	J-	m	matrix spike %R	46/51	%
440-145793	MCF-31B-20160428	4/28/2016	E300	16887-00-6	Chloride	54000		25	5000	mg/l	J-	m	matrix spike %R	46/51	%
440-145793	MW-10-20160428	4/28/2016	E200.8	7440-47-3	Chromium	9.4	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145793	MW-10-20160428	4/28/2016	E300	16887-00-6	Chloride	300	F1	0.25	50	mg/l	J-	m	matrix spike %R	46/51	%
440-145793	MW-10-20160428	4/28/2016	E300.1	14866-68-3	Chlorate	100	J	100	200	ug/l	J	sp	Detect <PQL	-	-
440-145793	MW-10-20160428-FD	4/28/2016	E200.8	7440-47-3	Chromium	9.5	J	2.5	10	ug/l	J	sp	Detect <PQL	-	-
440-145793	MW-10-20160428-FD	4/28/2016	E300	16887-00-6	Chloride	280		0.25	50	mg/l	J-	m	matrix spike %R	46/51	%
440-145793	MW-10-20160428-FD	4/28/2016	E300.1	14866-68-3	Chlorate	110	J	100	200	ug/l	J	sp	Detect <PQL	-	-
440-145860	MW-06-20160428	4/28/2016	E200.8	7440-47-3	Chromium	8.9	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-
440-145860	MW-06-20160428	4/28/2016	E300	16887-00-6	Chloride	180	F1	0.25	25	mg/l	J-	m	matrix spike %R	74/72	%
440-145860	PC-74-20160429	4/29/2016	E300	24959-67-9	Bromide	4.9		1.3	2.5	mg/l	J	fd	FD RPD >30%	61.3	%
440-145860	PC-74-20160429-FB	4/29/2016	E300	16887-00-6	Chloride	0.30	J	0.25	0.50	mg/l	J	sp	Detect <PQL	-	-
440-145860	PC-74-20160429-FD	4/29/2016	E300	24959-67-9	Bromide	2.6		1.3	2.5	mg/l	J	fd	FD RPD >30%	61.3	%
440-145860	PC-76-20160429-EB	4/29/2016	E300	16887-00-6	Chloride	0.30	J	0.25	0.50	mg/l	J	sp	Detect <PQL	-	-
440-145860	UZO-17-20160429	4/29/2016	E200.8	7440-47-3	Chromium	5.1	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-
440-145860	WMW3.5S-20160428	4/29/2016	E200.8	7440-47-3	Chromium	9.9	J	5.0	20	ug/l	J	sp	Detect <PQL	-	-

Notes:

ID	Identification
B	Compound was found in the blank and in the sample
J	Estimated - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample. 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.
U	Nondetected - Analyses were performed for the compound or analyte, but it was not detected.
UJ	Estimated/Nondetected - The analyte was analyzed for, but not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
F1	Matrix spike or matrix spike duplicate was outside acceptable limits
SQL	sample quantitation limits
PQL	practical quantitation limit
ug/l	micrograms per liter
mg/l	milligrams per liter
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 with a negative bias. The analyte was detected but the reported value may not be accurate or precise.
FD RPD	field duplicate relative percent difference
%	percent
%R	percent recovery
<	less than
>	greater than

Appendix A

Dissolved Chromium by EPA Method 200.8

I. Sample Receipt and Technical Holding Times

All samples were collected and preserved appropriately, and all analyses were performed within the method-specified holding times were met. All analyses were performed as requested on the chain of custodies. The laboratory reported all requested analyses and the deliverable data reports were complete.

II. Instrument Calibration

Appropriate Inductivity Coupled Plasma (ICP)/Mass Spectrometry tune, initial calibration (IC), initial calibration verification (ICV), and continuing calibration verification (CCV) were performed as required by the method. All results were within QC limits and compliance requirements were met.

III. Interference Check Sample (ICS) Analysis

ICS A and ICS AB solutions were analyzed at the proper frequency. All ICS results were within acceptance criteria.

IV. Laboratory Blanks

Laboratory instrument blanks, calibration blanks and method blanks were analyzed at the proper frequency as required by the method. No contaminants were found in the laboratory blanks.

V. Field Blanks

Samples DBMW-4-20160419-EB, WMW5.5S-20160422-EB, WMW4.9N-20160427-EB, and PC-76-20160429-EB were identified as equipment blanks. No contaminants were found with the following exception:

SDG	Blank ID	Collection Date	Analyte	Concentration	Associated Samples
145222-2	WMW5.5S-20160422-EB	4/21/2106	Dissolved Chromium	0.80 J µg/L	WMW5.5S-20160422 WMW4.9S-20160422 MW-20-20160422

Samples MW-25-20160421-FB, RIT-10-201604220-FB, LNDMW2-20160427-FB, PC-74-20160429-FB, and PC-76-20160429-FB were identified as field blanks. No contaminants were found with the following exception:

SDG	Blank ID	Collection Date	Analyte	Concentration	Associated Samples
145220-2	MW-25-20160421-FB	4/21/2106	Dissolved Chromium	0.86 J µg/L	MW-12-20160421

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

SDG	Sample	Analyte	Reported Concentration	Modified Final Concentration
145220-2	MW12-20160421	Dissolved Chromium	18 J µg/L	U (ND < 20 µg/L)
145222-2	WMW5.5S-20160422	Dissolved Chromium	2.6 J µg/L	U (ND < 4 µg/L)
145222-2	WMW4.9S-20160422	Dissolved Chromium	2.7 J µg/L	U (ND < 4 µg/L)
145222-2	MW-20-20160422	Dissolved Chromium	1.1 J µg/L	U (ND < 4 µg/L)

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on associated project samples. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Laboratory Duplicate Sample Analysis

Laboratory duplicate (DUP) analyses are not required by EPA Method 200.8 and therefore laboratory duplicate analyses were not performed for these SDGs.

VIII. ICP Serial Dilution

ICP serial dilution is not applicable to EPA Method 200.8 and therefore serial dilutions of client samples were not performed for these SDGs.

IX. Laboratory Control Samples

Laboratory control samples (LCS and LCSD) were prepared and analyzed the proper frequency as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples DBMW-7-20160418-FD, WMW6.9N-20160420-FD, MCF-08B-R-20160427-FD, WMW3.5N-20160427-FD, MW-10-20160428-FD, PC-74-20160429-FD, and PC-76-20160429-FD were identified as field duplicates. Acceptable field and analytical precision was demonstrated for all field duplicate pairs. When the sample or field duplicate concentration is <RL, the RL is used for calculation purposes.

SDG	Sample ID	Primary Conc.	Duplicate Conc.	RPD	RPD Limit	Flags	A or P
144933-2	DBMW-7-20160418	66 µg/L	63 µg/L	4.65	<30		
145213-2	WMW6.9N-20160420	3.5 J µg/L	3.9 J µg/L	10.81	<30		
145701-2	MCF-08BR-20160427	40 (RL) µg/L	40 (RL) µg/L	NC	<30		
145790-2	WMW3.5N-20160427	20 (RL) µg/L	20 (RL) µg/L	NC	<30		
145793-2	MW-10-20160428	9.4 J µg/L	9.5 J µg/L	1.06	<30		
145860-2	PC-74-20160429	20 (RL) µg/L	20 (RL) µg/L	NC	<30		
145860-2	PC-76-20160429	20 (RL) µg/L	20 (RL) µg/L	NC	<30		

XI. Sample Result Verification

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

XII. Overall Assessment of Data

All samples were analyzed as requested and all holding times were met. Due to field and/or equipment blank contamination, low-level detections for four samples were qualified as non-detected (“U”). No other data were qualified. Overall, based on this data validation, the data as qualified are useable for meeting project objectives. All results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is

100%. Additionally, because all samples in each data set were collected and analyzed under similar prescribed conditions, the data are considered to be comparable.

May 2016 Groundwater Monitoring
Dissolved Chromium - 440-144933, 440-144937, 440-144940, 440-145066, 440-145213, 440-145220, 440-145222, 440-145224, 440-145369, 440-145599, 440-145701, 440-145790, 440-145793, 440-145860, 440-146623

SDG	Client Sample ID	Analyte	Lab Result	Lab Qualifier	Units	Validator Qualifier	Reason Code Definition
440-145213	WMW6.15N-20160420	Chromium	3.6	J	µg/L	J	Detect <PQL
440-145213	WMW6.9N-20160420	Chromium	3.5	J	µg/L	J	Detect <PQL
440-145213	WMW6.9N-20160420-FD	Chromium	3.9	J	µg/L	J	Detect <PQL
440-145213	WMW7.8N-20160420	Chromium	2.9	J	µg/L	J	Detect <PQL
440-145220	MW-12-20160421	Chromium	18	J	µg/L	U	Field Blank
440-145220	MW-25-20160421-FB	Chromium	0.80	J	µg/L	J	Detect <PQL
440-145222	MW-20-20160422	Chromium	1.1	J	µg/L	U	Equipment Blank
440-145222	WMW4.9S-20160422	Chromium	2.7	J	µg/L	U	Equipment Blank
440-145222	WMW5.5S-20160422	Chromium	2.6	J	µg/L	U	Equipment Blank
440-145222	WMW5.5S-20160422-EB	Chromium	0.86	J	µg/L	J	Detect <PQL
440-145224	PC-78-20160421	Chromium	1.1	J	µg/L	J	Detect <PQL
440-145224	WMW6.9S-20160421	Chromium	1.4	J	µg/L	J	Detect <PQL
440-145369	DBMW-22-20160422	Chromium	5.7	J	µg/L	J	Detect <PQL
440-145369	MCF-05-20160425	Chromium	110	F1	µg/L	None	Ave MS/MSD and RPD within criteria
440-145369	PMW-7-20160422	Chromium	4.6	J	µg/L	J	Detect <PQL
440-145369	PMW-8-20160422	Chromium	4.6	J	µg/L	J	Detect <PQL
440-145369	RIT-10-20160422	Chromium	3.0	J	µg/L	J	Detect <PQL
440-145369	RIT-6-20160422	Chromium	4.2	J	µg/L	J	Detect <PQL
440-145701	MW-3-20160426	Chromium	16	J	µg/L	J	Detect <PQL
440-145701	MW-4-20160426	Chromium	17	J	µg/L	J	Detect <PQL
440-145790	LNDMW2-20160427	Chromium	5.1	J	µg/L	J	Detect <PQL
440-145790	MW-02-20160428	Chromium	8.6	J	µg/L	J	Detect <PQL
440-145793	MW-10-20160428	Chromium	9.4	J	µg/L	J	Detect <PQL
440-145793	MW-10-20160428-FD	Chromium	9.5	J	µg/L	J	Detect <PQL
440-145860	MW-06-20160428	Chromium	8.9	J	µg/L	J	Detect <PQL
440-145860	UZO-17-20160429	Chromium	5.1	J	µg/L	J	Detect <PQL
440-145860	WMW3.5S-20160428	Chromium	9.9	J	µg/L	J	Detect <PQL

No Sample Data Qualified in the following SDGs

May 2016 Groundwater Monitoring
Dissolved Chromium - 440-144933, 440-144937, 440-144940, 440-145066, 440-146623

Appendix B

Hexavalent Chromium by EPA Method 218.6
Chloride and Bromide by EPA Method 300.0
Chlorate by EPA Method 300.1B
Perchlorate by EPA Method 314.0
Total Dissolved Solids by Standard Method 2540C

I. Sample Receipt and Technical Holding Times

All samples were collected and preserved appropriately, and all analyses were performed within the method-specified holding times. All analyses were performed as requested on the chain of custodies. The laboratory reported all requested analyses and the deliverable data reports were complete.

II. Instrument Calibration

Initial and continuing calibrations were performed as required by the analytical method. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

III. ICP Interference Check Sample (ICS) Analysis

ICS analysis is not applicable for these methods.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions. Chloride was detected above the method detection limit (MDL) but below the practical quantitation limit (PQL) in continuing calibration blank 440-327103 from analysis group 145701-1. Data qualification was not considered necessary, since the results for applicable project samples were either ND or >10 times the contamination. In addition, chloride was detected in MB-440-352445/51 at 0.3 J mg/L. Data qualification was not considered necessary, since the results for applicable project samples were either ND or >10 times the contamination

V. Field Blanks

Samples DBMW-4-20160419-EB, WMW5.5S-20160422-EB, WMW4.9N-20160427-EB, and PC-76-20160429-EB were identified as equipment blanks. No contaminants were found with the following exceptions:

SDG	Blank ID	Collection Date	Analyte	Concentration	Associated Samples
145860-1	PC-76-20160429-EB	4/29/16	Chloride	0.3J mg/L	MW-06-20160428 WMW5.7N-20160428 WMW3.5S-20160428 UZO-17-20160429 PC-74-20160429 PC-74-20160429-FD PC-76-20160429 PC-74-20160429-FB PC-76-20160429-EB

Samples MW-25-20160421-FB, RIT-10-201604220-FB, LNDMW2-20160427-FB, PC-74-20160429-FB, and PC-76-20160429-FB were identified as field blanks. No contaminants were found with the following exceptions.

SDG	Blank ID	Collection Date	Analyte	Concentration	Associated Samples
145369-1	RIT-10-20160422-FB	4/22/16	Chloride	0.3J mg/L	WMW6.15S-20160422 PMW-7-20160422 PMW-8-20160422 RIT-6-20160422 RIT-10-20160422 RIT-10-20160422-FB MCF-20A-20160425 MCF-05-20160425
145860-1	PC-74-20160429-FB	4/29/16	Chloride	0.3J mg/L	MW-06-20160428 WMW5.7N-20160428 WMW3.5S-20160428 UZO-17-20160429 PC-74-20160429 PC-74-20160429-FD PC-76-20160429-FD PC-76-20160429 PC-74-20160429-FB PC-76-20160429-EB

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified based on these results because the results in these SDGs were either ND or >10 times the contamination level.

VI. Surrogates

Surrogates were added to all samples analyzed for Chlorate by EPA Method 300.1B. All surrogate recoveries (%R) were within QC limits and no results were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

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

SDG	Spike ID (Associated Samples)	Analyte	MS or MSD (%R)	Associated Samples	Qualifier	A or P
144937-1	DBMW-1-20160419	Bromide	54 MS/ 58 MSD	MCF-06C-20160419 AA-20-20160419 DBMW-1-20160419	UJ	A
145222-1	WMW4.9S-20160422	Chloride	51 MS/ 47 MSD	WMW4.9S-20160422	J-	A
145369-1	MCF-20A-20160425	Bromide	149 MS/ 165 MSD	WMW6.15S-20160422 PMW-8-20160422 RIT-6-20160422 RIT-10-20160422	J+	A
145369-1	MCF-05-20160425	Bromide	376 MS/ 319 MSD	WMW6.15S-20160422 PMW-8-20160422 RIT-6-20160422 RIT-10-20160422	J+	A
145369-1	MCF-05-20160425	Chlorate	NC	PMW-7-20160422 PMW-8-20160422 DBMW-22-20160422 MCF-20A-20160425 MCF-05-20160425	J-/ UJ	A
145701-1	MCF-18A-20160427	Bromide	732 MS/741 MSD	MCF-18A-20160427	UJ	A

145790-1	LNDMW2-20160427	Bromide	48 MS/ 57 MSD	LNDMW2-20160427	J-	A
145790-1	MW-02-20160428	Chloride	50 MS/ 48 MSD	MCF-20A-20160427 HM-2-20160428 MW-02-20160428	J-	A
145793-1	MW-10-20160428	Chloride	46 MS/ 51 MSD	MCF-06A-R-20160428 MCF-31B-20160428 MCF-31A-20160428 MW-10-20160428 MW-10-20160428-FD	J-	A
145860-1	MW-06-20160428	Chloride	74 MS / 72 MSD	MW-06-20160428 WMW5.7N-20160428 WMW3.5S-20160428 UZO-17-20160429 PC-74-20160429 PC-74-20160429-FD PC-76-20160429 PC-74-20160429-FB PC-76-20160429-EB	J-	A

Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

Duplicate (DUP) analyses were performed for Total Dissolved Solids by Standard Method 2540C. All duplicate analyses met criteria and therefore no samples were qualified based on duplicate analysis results.

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 DBMW-7-20160418-FD, WMW6.9N-20160420-FD, MCF-08B-R-20160427-FD, WMW3.5N-20160427-FD, MW-10-20160428-FD, PC-74-20160429-FD, and PC-76-20160429-FD were identified as field duplicates. Acceptable field and analytical precision was demonstrated for all field duplicate pairs with the exceptions listed in the following table. When the sample or field duplicate concentration is <RL, the RL is used for calculation purposes as follows:

SDG	Analyte	DBMW-7-20160418	FD	RPD	RPD Limit	Flags	A or P
144933-1	Chloride	1500 mg/L	1400 mg/L	6.9%	<30%		
144933-1	Chlorate	8000 µg/L	7600 µg/L	5.1%	<30%		
144933-1	Perchlorate	4400 µg/L	4600 µg/L	4.4%	<30%		
144933-1	Hexavalent Chromium	81 µg/L	79 µg/L	2.5%	<30%		
144933-1	TDS	6300 mg/L	6300 mg/L	0%	<30%		

SDG	Analyte	WMW6.9N-20160420	FD	RPD	RPD Limit	Flags	A or P
145213-1	Bromide	0.67 J mg/L	0.72 J mg/L	7.2%	<30%		

145213-1	Chloride	310 mg/L	300 mg/L	3.3%	<30%		
145213-1	TDS	2400 mg/L	2400 mg/L	0%	<30%		

SDG	Analyte	MCF-08BR-20160427	FD	RPD	RPD Limit	Flags	A or P
145701-1	Chloride	7300 mg/L	7200 mg/L	1.4%	<30%		
145701-1	TDS	29000 mg/L	28000 mg/L	3.5%	<30%		

SDG	Analyte	WMW3.5-N-20160427	FD	RPD	RPD Limit	Flags	A or P
145790-1	Chloride	1000 mg/L	1000 mg/L	0.0%	<30%		
145790-1	Chlorate	480 mg/L	480 mg/L	0.0%	<30%		
145790-1	Perchlorate	340 µg/L	360 µg/L	5.7%	<30%		
145790-1	TDS	5200 mg/L	5100 mg/L	1.9%	<30%		

SDG	Analyte	MW-10-20160428	FD	RPD	RPD Limit	Flags	A or P
145793-1	Bromide	0.63 mg/L	0.67 mg/L	6.2%	<30%		
145793-1	Chloride	300 mg/L	280 mg/L	6.9%	<30%		
145793-1	Perchlorate	9.8 µg/L	8.2 µg/L	17.8%	<30%		
145793-1	TDS	3100 mg/L	3200 mg/L	3.2%	<30%		

SDG	Analyte	PC-74-20160429	FD	RPD	RPD Limit	Flags	A or P
145860-1	Bromide	4.9 mg/L	2.6 mg/L	**61.3%**	<30%	J	A
145860-1	Chloride	590 mg/L	580 mg/L	1.7%	<30%		
145860-1	Chlorate	460 µg/L	400 µg/L	14.0%	<30%		
145860-1	Perchlorate	1700 µg/L	2100 mg/L	21.1%	<30%		
145860-1	TDS	4200 mg/L	4100 mg/L	2.4%	<30%		
16-3096	Hexavalent Chromium	0.002 µg/L	0.003 µg/L	**40.0%**	<30%	J	A

SDG	Analyte	PC-76-20160429	FD	RPD	RPD Limit	Flags	A or P
145860-1	Bromide	3.5 mg/L	3.1 mg/L	12.1%	<30%		
145860-1	Chloride	630 mg/L	640 mg/L	1.6%	<30%		
145860-1	Perchlorate	800 µg/L	950 µg/L	17.1%	<30%		
145860-1	TDS	4400 mg/L	4500 mg/L	2.2%	<30%		

XI. Sample Result Verification

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

XII. Overall Assessment of Data

All samples were analyzed as requested and all holding times were met. Due to MS/MSD recoveries that were outside of control criteria, less than 1% of the data were qualified as estimated ("UJ/J"). Due to Field Duplicate RPD results, only two results were qualified as estimated ("J"). No other data were qualified. Overall, based on this data validation, the data as qualified are useable for meeting project objectives. All

results are considered to be valid; the analytical completeness defined as the ratio of the number of valid analytical results (valid analytical results include values qualified as estimated) to the total number of analytical results requested on samples submitted for analysis, for the project is 100%. Additionally, because all samples in each data set were collected and analyzed under similar prescribed conditions, the data are considered to be comparable.

May 2016 Groundwater Monitoring
Wet Chemistry – 16-2741, 16-2774, 16-2775, 16-2825, 16-2878, 16-2886, 16-2907, 16-2908, 16-2948, 16-2987, 16-2988, 16-3021, 16-3074, 16-3075, 16-3096, 16-3280, 440-144933, 440-144937, 440-144940, 440-145066, 440-145213, 440-145220, 440-145222, 440-145224, 440-145369, 440-145599, 440-145701, 440-145790, 440-145793, 440-145860, 440-146623

SDG	Client Sample ID	Analyte	Lab Result	Lab Qualifier	Units	Validator Qualifier	Reason Code Definition
16-3096	PC-74-20160429	Chromium, Hexavalent	1.8		ug/l	J	FD RPD >30%
16-3096	PC-74-20160429-FD	Chromium, Hexavalent	2.7		ug/l	J	FD RPD >30%
440-144937	AA-20-20160419	Chloride	1000	B	mg/l		Method Blank
440-144937	AA-20-20160419	Bromide	0.25	U	mg/l	UJ	matrix spike %R
440-144937	DBMW-1-20160419	Chloride	1100	B	mg/l		Method Blank
440-144937	DBMW-1-20160419	Bromide	0.25	UF1	mg/l	UJ	matrix spike %R
440-144937	DBMW-1-20160419	Perchlorate	9000	F1	ug/l		matrix spike %R
440-144937	MCF-06C-20160419	Chloride	1700	B	mg/l		Method Blank
440-144937	MCF-06C-20160419	Bromide	0.25	U	mg/l	UJ	matrix spike %R
440-144940	DBMW-4-20160419	Chloride	1100	B	mg/l		Method Blank
440-144940	DBMW-5-20160419	Chloride	1200	B	mg/l		Method Blank
440-144940	DBMW-5-20160419	Bromide	2.9	J	mg/l	J	Detect <PQL
440-145066	MW-11-20160420	Chlorate	93	J	ug/l	J	Detect <PQL
440-145066	MW-18-20160420	Perchlorate	3.4	J	ug/l	J	Detect <PQL
440-145213	WMW6.9N-20160420	Bromide	0.67	J	mg/l	J	Detect <PQL
440-145213	WMW6.9N-20160420-FD	Bromide	0.72	J	mg/l	J	Detect <PQL
440-145213	WMW7.8N-20160420	Bromide	0.28	J	mg/l	J	Detect <PQL
440-145222	WMW4.9S-20160422	Chloride	290	F1	mg/l	J-	matrix spike %R
440-145222	WMW5.5S-20160422	Bromide	2.2	J	mg/l	J	Detect <PQL
440-145224	PC-78-20160421	Bromide	2.6	J	mg/l	J	Detect <PQL
440-145224	WMW6.55S-20160421	Bromide	2.2	J	mg/l	J	Detect <PQL
440-145369	DBMW-22-20160422	Chlorate	10	U	ug/l	UJ	matrix spike %R
440-145369	MCF-05-20160425	Chlorate	10	U	ug/l	UJ	matrix spike %R
440-145369	MCF-20A-20160425	Chlorate	10	U	ug/l	UJ	matrix spike %R
440-145369	PMW-7-20160422	Chlorate	10	U	ug/l	UJ	matrix spike %R
440-145369	PMW-8-20160422	Bromide	3.8	J	mg/l	J+	matrix spike %R
440-145369	PMW-8-20160422	Chlorate	180		ug/l	J-	matrix spike %R
440-145369	RIT-10-20160422	Bromide	2.0	J	mg/l	UJ	matrix spike %R
440-145369	RIT-10-20160422-FB	Chloride	0.30	J	mg/l	J	Detect <PQL
440-145369	RIT-6-20160422	Bromide	4.9		mg/l	J+	matrix spike %R
440-145369	WMW6.15S-20160422	Bromide	2.0		mg/l	J+	matrix spike %R
440-145790	HM-2-20160428	Chloride	1000		mg/l	J-	matrix spike %R
440-145790	HM-2-20160428	Bromide	2.5	J	mg/l	J	Detect <PQL

440-145790	LNDMW2-20160427	Bromide	3.5	F1	mg/l	J-	matrix spike %R
440-145790	MCF-20A-20160427	Chloride	50000		mg/l	J-	matrix spike %R
440-145790	MW-02-20160428	Chloride	380	F1	mg/l	J-	matrix spike %R
440-145793	MCF-06A-R-20160428	Chloride	56000		mg/l	J-	matrix spike %R
440-145793	MCF-31A-20160428	Chloride	81000		mg/l	J-	matrix spike %R
440-145793	MCF-31B-20160428	Chloride	54000		mg/l	J-	matrix spike %R
440-145793	MW-10-20160428	Chloride	300	F1	mg/l	J-	matrix spike %R
440-145793	MW-10-20160428	Chlorate	100	J	ug/l	J	Detect <PQL
440-145793	MW-10-20160428-FD	Chloride	280		mg/l	J-	matrix spike %R
440-145793	MW-10-20160428-FD	Chlorate	110	J	ug/l	J	Detect <PQL
SDG	**Client Sample ID**	**Analyte**	**Lab Result**	**Lab Qualifier**	**Units**	**Validator Qualifier**	**Reason Code Definition**
440-145860	MW-06-20160428	Chloride	180	F1	mg/l	J-	matrix spike %R
440-145860	PC-74-20160429	Bromide	4.9		mg/l	J	FD RPD >30%
440-145860	PC-74-20160429-FB	Chloride	0.30	J	mg/l	J	Detect <PQL
440-145860	PC-76-20160429	Bromide	3.5	J	mg/l	J	Detect <PQL
440-145860	PC-74-20160429-FD	Bromide	2.6		mg/l	J	FD RPD >30%
440-145860	PC-76-20160429-EB	Chloride	0.30	J	mg/l	J	Detect <PQL

No Sample Data Qualified in these SDGs

May 2016 Groundwater Monitoring
Wet Chemistry - 16-2741, 16-2774, 16-2775, 16-2825, 16-2878, 16-2886, 16-2907, 16-2908, 16-2948, 16-2987, 16-2988, 16-3021, 16-3074, 16-3075, 16-3280, 440-144933, 440-145222, 440-145599, 440-145701, and 440-146623.