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Prepared by
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Emeryville, California

Date
November 7, 2023

DATA VALIDATION SUMMARY REPORT FOR HEXAVALENT CHROMIUM DATA FROM THE SCREENING-LEVEL HEALTH RISK ASSESSMENT FOR 8TH STREET

NEVADA ENVIRONMENTAL RESPONSE TRUST SITE HENDERSON, NEVADA

RAMBOLL

Hexavalent Chromium Data from Screening-Level Health Risk Assessment for 8th Street DVSR and EDD October 2023

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

Le Petomane XXVII, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Not Individually, but Solely as President of the Trustee

Signature: Jay A Steinberg, President

Name: Jay A. Steinberg, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

Title: Solely as President and not individually

Company: Le Petomane XXVII, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Date: 11/7/23

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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.

November 7, 2023

Kimberly Kuwabara, MS
Senior Managing Consultant

Date

Certified Environmental Manager
Ramboll US Corporation, Inc.
CEM Certificate Number: 2353
CEM Expiration Date: March 20, 2025

CONTENTS

LIST OF TABLES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

CCB	Continuing Calibration Blank
DL	Detection Limit
DQO	Data Quality Objectives
DUP	Laboratory Duplicate
DVSR	Data Validation Summary Report
EPA	Environmental Protection Agency
FD	Field Duplicate
ICB	Initial Calibration Blank
LCS/LCSD	Laboratory Control Sample / Laboratory Control Sample Duplicate
MDL	Method Detection Limit
MS/MSD	Matrix Spike / Matrix Spike Duplicate
NDEP	Nevada Department of Environmental Protection
NERT	Nevada Environmental Response Trust
NFG	National Functional Guidelines
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance / Quality Control
QAPP	Quality Assurance Project Plan
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RPD	Relative Percent Difference
SDG	Sample Delivery Group
SQL	Sample Quantitation Limit
USEPA	United States Environmental Protection Agency
%R	Percent Recovery

1. INTRODUCTION

Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this data validation summary report (DVSR) to assess the validity and usability of laboratory analytical data for samples collected on October 16, 2023 associated with the Screening-Level Health Risk Assessment for 8th Street sampling efforts, at the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada. Data collection was performed in accordance with the Quality Assurance Project Plan, Revision 6, Nevada Environmental Response Trust Site, Henderson, Nevada dated February 2021, and included the collection and analyses of six soil samples and one field duplicate sample. The samples were analyzed for hexavalent chromium by Environmental Protection Agency (EPA) SW-846 Method 7199.

Laboratory analytical services were provided by Pace Analytical National located in Mt. Juliet, Tennessee and reported in sample delivery group (SDG) L1667057. Table I is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, matrix, and validation level. Table II is a reference table that identifies the QC elements reviewed for each validation level per Method 7199.

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 and Quality Assurance Project Plan (QAPP) requirements for soil samples, approximately ninety percent of the analytical data were validated according to Stage 2B data validation procedures and ten percent of the analytical data were validated according to Stage 4 data validation procedures. For this data set, one of the seven samples was validated at level Stage 4 for a percentage of 14%. The remining six samples were validated at level Stage 2B.

The analytical data were evaluated for quality assurance/quality control (QA/QC) based on the following documents: QAPP Revision 6 (February 2021), United States Environmental Protection Agency (USEPA) National Functional Guidelines (NFG) for Inorganic Superfund Methods Data Review (November 2020); and 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; and 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. Section 4.0 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.

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: field duplicates (FDs), method blanks, calibration blanks, laboratory blanks, laboratory control samples/laboratory control sample duplicates (LCS/LCSDs), matrix spike/matrix spike duplicates (MS/MSDs), and laboratory duplicates (DUPs).

Before conducting the PARCCS evaluation, the analytical data were validated according to the QAPP (February 2021), NFG (USEPA 2020), 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 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).

No data included in this data set were qualified as a result of the data validation.

Once the data are reviewed and qualified according to the QAPP, NFG, 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 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, LCS, and samples containing surrogate spikes. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Surrogate spikes are either isotopically labeled compounds or compounds that are not typically detected in the samples. Surrogate spikes are added to every blank, environmental sample, LCS, MS/MSD, and standard, for all applicable organic analyses. 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, LCS/LCSD, and surrogate compounds added to environmental samples 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 laboratory blanks and calibration blanks.

A laboratory 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 laboratory blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample preparation steps. Laboratory 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.

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 laboratory blank and field blank results to identify potential effects of laboratory background and field procedures on sensitivity.

All QA/QC criteria for all evaluation parameters were met as noted in the following sections.

2. HEXAVALENT CHROMIUM

All wet chemistry data were assessed to be valid since none of the seven total results were rejected based on holding time and 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

The %Rs in the initial and continuing calibration verifications were within the acceptance criteria.

2.1.2 MS/MSD Samples

Project-specific MS/MSD Samples were not analyzed as part of this data set.

2.1.3 LCS/LCSD Samples

All LCS/LCSD %Rs and RPDs were within the laboratory acceptance criteria.

2.1.4 Target Analyte Quantitation

Raw data were evaluated for sample ETH-SB-1A-0-2-20231016. The hexavalent chromium quantitation was acceptable.

2.2 Representativeness

2.2.1 Sample Preservation and Holding Times

The soil samples were analyzed within the 30-day analysis holding time criteria for hexavalent chromium.

2.2.2 Blanks

Method blanks and ICB/CCBs were analyzed to evaluate representativeness. Hexavalent chromium was not detected in any of the blanks.

2.2.2.1 Method and Calibration Blanks

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

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.

2.4 Completeness

The completeness level was 100 percent, with no results rejected. 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. 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.

4. SUMMARY OF PARCCS CRITERIA

The PARCCS criteria are discussed in detail in the following sections.

4.1 Precision and Accuracy

Precision and accuracy were evaluated using data quality indicators such as calibration, DUP, LCS/LCSD, and field duplicates. The precision and accuracy of the data set were considered acceptable.

Calibrations were performed as required and met the acceptance criteria.

LCS/LCSD %Rs and RPDs met acceptance criteria.

4.2 Representativeness

All samples were evaluated for holding time compliance. All holding times were met. All samples were associated with a laboratory blank. The representativeness of the project data is considered acceptable.

4.3 Comparability

Sampling frequency requirements were met in obtaining necessary 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.

4.4 Completeness

None of the seven results reported were rejected. The completeness for the data set is 100%; which meets the completeness percentage goal of 90 percent.

4.5 Sensitivity

Sensitivity was achieved by the laboratory to support the DQOs. Calibration concentrations and PQLs met the project requirements.

5. CONCLUSIONS AND RECOMMENDATIONS

The analytical data quality assessment for the soil sample laboratory analytical results generated during the October 16, 2023 sampling for the Screening-Level Health Risk Assessment for 8th Street at the NERT site in Henderson, Nevada established that the overall project requirements and completeness levels were met.

6. REFERENCES

NDEP 2018. NDEP Data Validation Guidance. July.

Ramboll 2021. Quality Assurance Project Plan, Nevada Environmental Response Trust Site, Henderson, Nevada. February 24. NDEP approved March 11, 2021.

USEPA 2020. USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review. November.

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.

TABLES

TABLE I. Sample Cross-Reference
Nevada Environmental Trust Site
Henderson, Nevada

SDG	Client Sample ID	Lab ID	Sample Date	Validation Level	Matrix	QC Type	Hexavalent Chromium (7199)
L1667057	ETH-SB-1A-0-2-20231016	L1667057-01	10/16/2023	Stage 4	Soil		X
L1667057	ETH-SB-1A-8-10-20231016	L1667057-02	10/16/2023	Stage 2B	Soil		X
L1667057	ETH-SB-2A-0-2-20231016	L1667057-03	10/16/2023	Stage 2B	Soil		X
L1667057	ETH-SB-2A-8-10-20231016	L1667057-04	10/16/2023	Stage 2B	Soil		X
L1667057	ETH-SB-2A-8-10-20231016-FD	L1667057-05	10/16/2023	Stage 2B	Soil	FD	X
L1667057	ETH-SB-3A-0-2-20231016	L1667057-06	10/16/2023	Stage 2B	Soil		X
L1667057	ETH-SB-3A-8-10-20231016	L1667057-07	10/16/2023	Stage 2B	Soil		X

Notes:

FD = Field Duplicate
QC = Quality Control

TABLE II. Stage 2B & Stage 4 Validation Elements
Nevada Environmental Trust Site
Henderson, Nevada

Quality Control Elements	Stage 2B	Stage 4
	Hexavalent Chromium	Hexavalent Chromium
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	**N/A**	**N/A**
Matrix Spike (MS)/ Matrix Spike Duplicate (MSD)	**N/A**	**N/A**
Laboratory Duplicate (DUP)	√	√
Laboratory Control Sample (LCS)/ Laboratory Control Sample Duplicate (LCSD)	√	√
Field Duplicate	√	√
Project Quantitation Limits (QL)	√	√
Multiple Results for One Sample	√	√
Target Analyte Quantitation	**-**	√
Target Analyte Identification	**-**	√
Overall Data Usability Assessment	√	√

Notes:

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

ATTACHMENT A
HEXAVALENT CHROMIUM DATA VALIDATION REPORT

Hexavalent Chromium by SW 846 Method 7199

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

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

III. Continuing Calibration

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

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was not performed on an associated project sample.

VII. Duplicate Sample Analysis

A laboratory duplicate (DUP) analysis was performed on associated project sample ETH-SB-1A-8-10-20231016. Hexavalent chromium was not detected in the sample or laboratory duplicate.

VIII. 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.

IX. Field Duplicates

ETH-SB-2A-8-10-20231016-FD is a field duplicate of ETH-SB-2A-8-10-20231016. Hexavalent chromium was not detected in the sample or field duplicate.

X. Target Analyte Quantitation

The target analyte quantitation was acceptable for sample ETH-SB-1A-0-2-20231016 which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XI. Overall Assessment of Data

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

Data Qualification Summary - SDG L1667057

No Sample Data Qualified in this SDG

Laboratory Blank Data Qualification Summary - SDG L1667057

No Sample Data Qualified in this SDG

Field Blank Data Qualification Summary - SDG L1667057

No Sample Data Qualified in this SDG