Data Validation Summary Report for Asbestos Data from Parcel E and Associated with the Remedial Investigation at the Nevada Environmental Response Trust (NERT) Site

Prepared for:

Ramboll
Emeryville, CA

March 3, 2020

Prepared by:

Neptune and Company, Inc.
1435 Garrison St., Suite 201
Lakewood, CO 80215

DVSR and EDD of Asbestos Data Associated with the Remedial Investigation

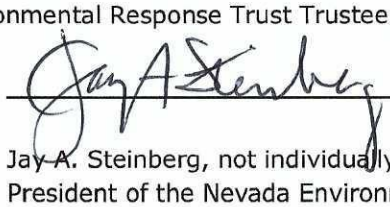
Nevada Environmental Response Trust
Site (Former Tronox LLC Site)
Henderson, Nevada

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

Signature:  Not Individually, but Solely as President of the Trustee

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

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Date: 3/3/2020

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Henderson, Nevada

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.

_____ March 3, 2020

John M. Pekala, PG
Principal

Date

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

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Table of Contents

List of Acronyms and Abbreviations

BMI	Basic Management, Inc.
NERT	Nevada Environmental Response Trust
DVSR	data validation summary report
ED	electron diffraction
EDD	electronic data deliverable
EDXA	energy dispersive X-ray analysis
EMSL	Environmental Molecular Sciences Laboratory
EPA	Environmental Protection Agency (U.S.)
NDEP	Nevada Division of Environmental Protection
PARCCS	precision, accuracy, representativeness, completeness, comparability and sensitivity
%C	percent completeness
g PM10	grams of particulate matter 10 microns or less in diameter
QA	quality assurance
QC	quality control
RPD	relative percent difference
S	analytical sensitivity
SOP	standard operating procedure
TEM	transmission electron microscope

1. Introduction

This data validation summary report (DVSR) has been prepared by Neptune and Company, Inc. (Neptune) to assess the validity and usability of asbestos results reported by EMSL Analytical, Inc. (EMSL) for samples collected from Parcel E on the Nevada Environmental Response Trust (NERT) Site in September 2019 as part of the NERT Phase 2 Remedial Investigation, Modification 12. This asbestos-only DVSR includes a single sample delivery group reported in one electronic data deliverable (EDD) containing all analytical results and any qualifiers applied during this validation.

The laboratory report from EMSL contained results for seven soil samples and one field duplicate sample. The samples were prepared and collected via U.S. Environmental Protection Agency (EPA) Method 540-R-97-028 (with Berman and Kolk Modifications, 2000) for the determination of releasable asbestos via dust generation. Asbestos structure counting utilized transmission electron microscopy (TEM).

Table 1-1 below identifies the samples collected and subsequently validated by Neptune. All sample-related information was received from Ramboll US Corporation (Ramboll).

Table 1-1. NERT RI Samples

Sample ID	Laboratory ID	Date Collected
RISB-ER-02-1.0-20190911	041927219-0001	2019-09-11
RISB-EJ-02-1.0-20190911	041927219-0002	2019-09-11
RISB-EJ-04-1.0-20190911	041927219-0003	2019-09-11
RISB-EJ-03-1.0-20190911	041927219-0004	2019-09-11
RISB-EJ-03-1.0-20190911-FD	041927219-0005	2019-09-11
RISB-ER-03-1.0-20190911	041927219-0006	2019-09-11
RISB-ER-01-1.0-20190911	041927219-0007	2019-09-11
RISB-EJ-01-1.0-20190911	041927219-0008	2019-09-11

The laboratory report included a summary report and a bench data sheet for each asbestos sample. Information included elutriator data, structure counts, classification, sketches and TEM images, electron diffraction (ED) and energy dispersive X-ray analysis (EDXA) results. The chain-of-custody was properly completed and identified all samples reported. One field duplicate was analyzed for precision and was included in the report. EMSL maintains data for blank samples and TEM calibration, which are typically not included in the lab reports because, due to the nature of elutriator sampling, it could take months before enough samples are analyzed to warrant a blank (i.e., filter lot, method, etc.). If EMSL were to notice issues with the blank samples or calibration, this would be reported.

It should be noted that one minor reporting issue was identified. The IST Filter Information

sheet for RISB-ER-03-1.0-20190911 did not identify which filters were sent for additional analyses. R. Ray, the project manager for EMSL, provided this information in an email dated 1/6/2020. Filter 2 was sent.

The laboratory reports were validated following 2012 Nevada Division of Environmental Protection (NDEP) guidance for validating asbestos data in soils (NDEP, 2012). Acceptance criteria for the quality control (QC) samples were based upon the associated analytical method (540-R-97-028) and the modified elutriator method (Berman and Kolk, 2000). In cases where the analytical method did not fully describe the quality assurance (QA) criteria or corrective action, the U.S. Department of Defense's *Quality Systems Manual for Environmental Laboratories*, Version 5.3, was used as a guide for acceptance criteria. Professional judgment was also used in some cases to qualify the results.

This DVSR summarizes the QA evaluation of the data according to precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) criteria. It also provides an assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

Data qualifiers and their definitions are provided below.

Qualifiers	
J-	Estimated: The associated numerical value is an estimated quantity with a potentially negative 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.
J+	Estimated: The associated numerical value is an estimated quantity with a potentially positive 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.
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.
UJ	Estimated/nondetected: Analyses were performed for the compound or analyte, but it was not detected. This qualification is used to flag possible false negative results in the case where low bias is indicated by a detect in the field duplicate.
R	Rejected: The datum 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.

Qualifier Reason Codes	
b	The analyte was detected in the associated laboratory blank
fd	Field duplicates did not meet the project control limits
as	The required analytical sensitivity was not met

1.1. PARCCS Criteria

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

$$RPD = \frac{|D1 - D2|}{D1 + D2} \times 100$$

where D1 and D2 are, respectively, the reported structure counts for the sample and duplicate analyses.

An RPD exceeding the 50% criterion from Berman and Kolk (2000) indicates imprecision but cannot judge accuracy or bias (e.g., J+ or J-). Due to the inherent heterogeneity of soil samples, RPD exceedances may be observed; however, it is important for field duplicates to be evaluated to assess site (and possibly sampling) variability. For this report, only duplicate field samples were provided (i.e., no laboratory duplicates were analyzed).

Accuracy is a measure of the agreement of an experimental determination and the true value of the parameter being measured. Due to the nature of asbestos analysis, accuracy cannot easily be assessed. There are no standards or reference materials that mimic the type of samples collected at field sites. The key component for accuracy is the analyst, who is well-trained in the identification and analysis of asbestos structures, including proficiency tests generated by accrediting agencies (e.g., National Voluntary Laboratory Accreditation Program). The analyst uses tools such as ED and EDXA to accurately assess morphology and identify asbestos structures and visually determines size using scale bars. Analytical equipment (e.g. TEM, ED and EDXA) have manufacturer requirements for maintenance and calibration; these records are maintained by the laboratory and not part of a standard data package, although they can be provided upon request. For this DVSR, the instrument calibration (e.g., camera, magnification, K-factors, detector resolution, resolvable Mg-Si and Na peaks, spot size measurement) will not be discussed as this information was not provided. EMSL does maintain these records and would report issues if any were observed.

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated herein by reviewing the blank results, sample results and holding times. Detects in the blank samples identify structures that may have been introduced into the samples during sample collection, transport, preparation, or analysis. QC blanks collected and analyzed can include filter lot, field, laboratory, method, equipment and conditioning filter blanks. The laboratory's client (Ramboll) determines if field blanks are collected/analyzed as per the NDEP approved work plan, whereas analysis of other blanks is

dependent on batch size and if contamination is detected (e.g., conditioning filters). Holding times and preservation are not established in the EPA Method (540-R-97-028) or Berman and Kolk (2000) modifications; however, the EMSL Elutriator Standard Operating Procedure (SOP) (rev. 2.1, June 2010) recommends samples be shipped on ice and stored at ice temperature if samples are not immediately analyzed to avoid bacterial growth in the samples.

Comparability is a qualitative expression of the confidence with which one data set may be compared with another. In the data validation context, it provides an assessment of the equivalence of the analytical results to data obtained from other analyses. Comparability is also dependent upon other PARCCS criteria because only when precision, accuracy, and representativeness are known can data sets be compared with confidence. The comparability of asbestos is somewhat limited because the accuracy of analysis cannot be easily assessed.

Completeness is defined as the percentage of acceptable sample results compared with the total number of sample results. 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. Percent completeness (%C) is calculated using the following equation:

$$\%C = \frac{T - R}{T} \times 100$$

where T is the total number of sample results and R is the number of rejected sample results.

Sensitivity relates to the ability of an analytical method to identify positive results. For asbestos analysis, sensitivity is measured using a construct called "analytical sensitivity." This is the calculated concentration of airborne asbestos structures that is equivalent to counting one asbestos structure in the analysis (Chatfield, 1995). Analytical sensitivity (S) is a function of the volume of air sampled, the active area of the collection filter and the area of the TEM grid (as defined below by Chatfield, 1995):

$$S = \frac{A_f}{k \times A_g \times V}$$

where A_f is the active area of the sample collection filter, A_g is the mean area of grid openings examined, k is the number of grid openings examined and V is the volume of air sampled.

The purpose of analytical sensitivity is to try to encompass the range of asbestos concentrations that are of concern for asbestos related risk assessment. Berman and Kolk (2000) suggest that an analytical sensitivity of 3 x 10^6 S/grams of particulate matter 10 microns or less in diameter (g $_{PM10}$) will encompass most of these concentrations and is adequate for most studies where protocol amphibole structures are suspected; however, due to the lower potency of chrysotile, they also suggested that a sensitivity of 5 × 10^7 S/g $_{PM10}$ may be sufficient in cases where only chrysotile structures are suspected.

1.2. Basis for Qualifying Data

Field Duplicates: Duplicate and parent sample results were qualified (J or UJ) if the RPD between the sample and its duplicate was above 50%.

Blanks: Per the EMSL Elutriator SOP (rev. 2.1, June 2010), the following blanks are analyzed:

- Filter lot blanks: 2 per lot of 50 filters, analyzed prior to sampling; lot rejected if background contamination is > 0.2 fiber/mm^2;
- Field blanks: not required per the Quality Assurance Project Plan (QAPP);
- Lab blanks: 1) filter to evaluate elutriator prep room air; 2) filter near elutriator sampling ports (always collected, only analyzed if there is a question of contamination); 3) not analyzed unless there is a question of contamination; 4) blanks considered contaminated if >10 structures/mm^2;
- Method blank: analyzed 1 in every 20 samples (this can take months before 20 samples are analyzed due to the time-intensive elutriator method), washed play sand used to assess tumbler and elutriator, should not exceed 0.2 structures/mm^2;
- Equipment blanks: similar to the method blank, except sand is not used (only air); interchangeable with method blank;
- Conditioning filters: collected at the beginning of every run; not required unless there is case of contamination since these filters can help with troubleshooting.

2. Asbestos via EPA Method 540-R-97-028 with Berman and Kolk (2000) Modifications (soils)

No quality control issues were found for the samples listed in Table 1-1. Further information regarding the quality control checks are detailed below.

2.1. Quality Control Results

2.1.1. Blank Samples

The following blank information was obtained from EMSL via email or confirmed via phone with Robyn Ray, EMSL Special Projects Manager:

- Filter lot blanks: running average from 12/4/2008 to 9/27/2019 have no detects;
- Field blanks: no field blank was included with this data set;
- Lab blanks: no issues have been reported;
- Method blank: no issues have been reported;
- Conditioning filters: only used for troubleshooting.

No blank issues were reported; therefore, no data was qualified.

2.1.2. Duplicate Sample Results

There were no detects in the field duplicate samples. The results were within the control limit of 50% RPD established by Berman and Kolk (2000) and no qualifications were required.

2.1.3. Analytical Sensitivities

The required analytical sensitivity (3×10^6 S/g $_{PM10}$) was met for all samples; no qualifications were required.

2.2. Unaddressed Issues

There are no unaddressed issues in the laboratory reports or EDD.

2.3. Summary

As described above, no samples were qualified due to QC issues. The data are considered acceptable as no data are rejected. The EDD reports the correct structure counts and qualifiers (as applicable) and should be used to report asbestos results for these samples.

3. PARCCS

Precision: Assessments were discussed above and the data are considered acceptable with the included data qualifiers (where applied).

Accuracy: As discussed above, accuracy is not easily assessed; however, EMSL records indicate the data should be accurate within their limitations.

Representativeness: No significant blank contamination has been found in laboratory samples and the representativeness of the project data is considered acceptable.

Comparability: The laboratory used standard analytical methods for the analyses. No information was provided that would conflict with the comparability of the results; therefore, the overall comparability is considered acceptable.

Completeness: No results were rejected based on this data validation. The completeness level attained for the samples was 100%.

Sensitivity: The analytical sensitivity for all samples was around 3×10^6 S/g $_{PM10}$, which is acceptable for risk assessment.

References

Berman DW and Kolk A, (2000). *Draft Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Material, Revision 1*. Submitted to the U.S. Environmental Protection Agency, Region 8, May 23, 2000, 84 pp.

Chatfield EJ, (1995). *Ambient Air: Determination of Asbestos Fibers, Direct Transfer Transmission Electron Microscopy Procedure.* Submitted to the International Standards Organization: ISO 10312:1995(E).

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NDEP, 2012. *Data Validation Guidance for Asbestos Data in Soils for the Basic Management Incorporated (BMI) Complex and Common Areas*, June.