

Prepared for
Nevada Environmental Response Trust
Henderson, Nevada

Prepared by
Ramboll US Corporation
Emeryville, California

Project Number
1690011200-022

Date
December 30, 2019
Amended March 10, 2020

QUALITY ASSURANCE PROJECT PLAN, REVISION 4 NEVADA ENVIRONMENTAL RESPONSE TRUST SITE HENDERSON, NEVADA

Quality Assurance Project Plan, Revision 4

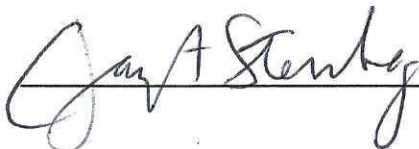
**Nevada Environmental Response Trust
(Former Tronox LLC Site)
Henderson, Nevada**

Nevada Environmental Response Trust (Trust) 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 the Trust. 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

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: 3/10/2020

Quality Assurance Project Plan, Revision 4

**Nevada Environmental Response Trust
(Former Tronox LLC Site)
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 10, 2020

**John M. Pekala, PG
Principal**

Date

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

The following individuals provided input to this document:

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Quality Assurance Project Plan, Revision 4
Nevada Environmental Response Trust Site
Henderson, Nevada

Project Title	Quality Assurance Project Plan (QAPP)
Site Name	Nevada Environmental Response Trust Site
Site Location	Henderson, Nevada
Company	Ramboll US Corporation
Telephone	(510) 655-7400

QAPP Reviewed and Approved:



John M. Pekala, PG
Ramboll Project Manager

Date: March 10, 2020



Christopher M. Stubbs, PhD, PE
Ramboll Project Quality Assurance/Quality Control Officer

Date: March 10, 2020

the primary contact for direction of field personnel. The Task Leaders will also be responsible for overseeing review of the QA/QC programs related to the compilation of data.

Field Task Leader

The Field Task Leader is responsible for overall implementation of the approved work plan, including work conducted by the Site contractor and is responsible for general oversight of field activities.

Health Risk Assessment (HRA) Task Leader

The HRA Task Leader will work with the other Task Leaders and QA Officer to ensure that work is conducted in compliance with health risk assessment objectives and applicable QA procedures.

Analytical Task Leader

The Analytical Task Leader is responsible for coordination with the analytical laboratories, review of analytical data, and tracking data through the data validation and reporting processes and will work with the other Task Leaders to ensure that work is conducted in compliance with project-specific objectives and applicable QA/QC procedures.

Database Administrator

The Database Administrator is responsible for working with the Analytical Task Leader to assist with review of analytical data, and tracking data through the data validation and reporting processes. The Database Administrator is responsible for preparing the data for electronic submission to the database and submitting finalized, validated data to NERT databases.

1.4.4 Analytical Laboratories

Laboratory PMs

Each Laboratory PM is the primary point-of-contact at the analytical laboratory for the project, and is responsible for ensuring project data meet the QA/QC objectives established herein. The Laboratory PM is also responsible for tracking the progress of testing in the laboratory and ensuring the timely delivery of data or other laboratory deliverables to the project team. The laboratories used for chemical and radiochemical soil and groundwater testing will be certified by the State of Nevada for the analysis of interest. In the absence of Nevada certification for a particular analysis, as is the case for soil gas, National Environmental Laboratory Accreditation Conference (NELAC) certification will be considered an acceptable substitute. Table 1 lists the analytical laboratories and the current certification status for the methods that are addressed as part of this QAPP.

- **Laboratory Project Manager at Eurofins TestAmerica, Inc. (Eurofins TestAmerica)**

The primary subcontracted laboratory for soil, surface water, and groundwater analysis (with the exception of asbestos and organic acid analysis) for this project is Eurofins TestAmerica's Irvine, California location. Because of the variety of specialized analyses required for this project, several additional Nevada-certified Eurofins TestAmerica laboratories will be used during this project including the following laboratories: Sacramento, California; Denver, Colorado; Buffalo, New York; and St. Louis, Missouri. Eurofins TestAmerica will also subcontract with ALS Environmental (Kelso, Washington) for arsenic speciation analysis, Eurofins Air Toxics (Folsom, California) for soil vapor analysis, and Eurofins Lancaster Laboratories Environmental, LLC (Lancaster,

Pennsylvania). The Laboratory PM will coordinate with individual laboratory managers for this project. The primary laboratory may also subcontract analyses to other certified laboratories that can meet the requirements of this QAPP upon written approval of the PM or appropriate Analytical Task Leader and following consultation with NDEP.

- **Laboratory Project Manager at EMSL Analytical, Inc. (EMSL)**
The primary subcontracted laboratory for asbestos analysis for this project is EMSL. EMSL is certified by the State of Nevada for the analysis of asbestos in soil (elutriator method). Analysis for asbestos will take place at EMSL's laboratory in Cinnaminson, New Jersey.
- **Laboratory Project Manager at Silver State Analytical Laboratories, Inc. (Silver State)**
Silver State will be subcontracted to analyze water samples for hexavalent chromium. The samples will be analyzed at Silver State's laboratory in Las Vegas, Nevada.
- **Laboratory Project Manager at Geotechnical & Environmental Services, Inc. (GES)**
GES will be subcontracted for geotechnical analyses. The analyses will be performed at the GES laboratory located in Las Vegas, Nevada.
- **Laboratory Project Manager at PTS Laboratories, Inc. (PTS)**
PTS will be subcontracted for geotechnical analyses. The analyses will be performed at the PTS laboratory located in Houston, Texas.
- **Laboratory Project Manager at Microbial Insights, Inc. (Microbial Insights)**
Microbial Insights will be subcontracted for the analysis of phospholipid fatty acid analysis and perchlorate reductase by quantitative polymerase chain reaction. The analyses will be performed by the Microbial Insights laboratory in Knoxville, Tennessee.
- **Laboratory Project Manager at Pace Analytical Energy Services, LLC (Pace)**
Pace will be subcontracted to analyze groundwater samples for dissolved hydrogen.

1.4.5 Data Validation Subcontractors

Data Validation Project Managers

A Data Validation PM is responsible for validating and managing the data, including review of data from the laboratory at the appropriate level, adding any qualifiers to call-out differences between guidelines and the reported data, and preparing the data for electronic submission to the database. Consultants or their designee perform data validation. The following data validation subcontractors may perform data validation for the projects included in this QAPP:

- **Laboratory Data Consultants, Inc. (LDC), Data Validation Project Manager**
LDC of Carlsbad, California will be providing data validation for soil, groundwater and soil gas samples collected for this project, with the exception of samples analyzed for asbestos.
- **Neptune and Company, Inc. (Neptune), Data Validation Project Manager**
Neptune of Lakewood, Colorado will provide data validation for all samples analyzed for asbestos during this project.

1.5 Problem Definition and Background

The problem definition and Site background are presented in the RI/FS Work Plans (ENVIRON 2014a, Ramboll Environ 2016a, and Ramboll Environ 2017a) and the Unit 4 and 5

**TABLE 1. ANALYTICAL METHODS AND LABORATORIES AMENDED
QUALITY ASSURANCE PROJECT PLAN
Nevada Environmental Response Trust Site; Henderson, Nevada**

ANALYTES	MATRIX	ANALYTICAL METHOD	Certification Status	ANALYTICAL LABORATORY	SOP DATE ⁽¹⁾
Volatile Organic Compounds (VOCs) ⁽²⁾	Water	EPA Method 8260B	NV	Eurofins TestAmerica (Irvine, CA)	March 2, 2015
	Soil	EPA Method 8260B	NV		
	Water	EPA Method 8260B SIM	NELAC	Eurofins TestAmerica (Irvine, CA)	May 29, 2018
	Soil	EPA Method 8260B SIM	NELAC		
	Soil Gas	EPA Method TO-15	NELAC	Eurofins TestAmerica (Sacramento, CA)	November 21, 2017
	Soil Gas	EPA Method TO-15	NELAC	Eurofins Air Toxics (Folsom, CA)	June 28, 2018
	Soil Gas	EPA Method TO-15 SIM	NELAC	Eurofins Air Toxics (Folsom, CA)	July 18, 2018
Semivolatile Organic Compounds (SVOCs)	Water	EPA Method 8270C	NELAC	Eurofins TestAmerica (Irvine, CA)	March 7, 2016
	Soil	EPA Method 8270C	NELAC		
Phthalic Acid	Water	EPA Method 8270C	NELAC	Eurofins TestAmerica (Denver, CO)	January 18, 2019
	Soil	EPA Method 8270C	NELAC		
Polycyclic Aromatic Hydrocarbons (PAHs)	Water	EPA Method 8270B SIM	NELAC	Eurofins TestAmerica (Irvine, CA)	February 7, 2019
	Soil	EPA Method 8270B SIM	NELAC		
4-chlorobenzenesulfonic acid (p-CBSA)	Water	Lab SOP by Liquid Chromatography/ Electrospray/Mass Spectrometry SOP No. WS-LC-0013, Rev 3.1	Not Applicable	Eurofins TestAmerica (Sacramento, CA)	October 5, 2012
Volatile Fatty Acids	Water	Lab SOP by Ion Chromatography SOP No. BF-MB-009, Rev 3	Not Applicable	Eurofins TestAmerica (Buffalo, NY)	March 21, 2018
Organochlorine Pesticides	Water	EPA Method 8081A	NELAC	Eurofins TestAmerica (Irvine, CA)	October 7, 2016
	Soil	EPA Method 8081A	NELAC		
Organophosphorus Pesticides	Water	EPA Method 8141A	NV	Eurofins TestAmerica (Denver, CO)	January 18, 2019
	Soil	EPA Method 8141A	NV		
PCBs as Aroclors	Water	EPA Method 8082	NV	Eurofins TestAmerica (Irvine, CA)	November 4, 2016
	Soil	EPA Method 8082	NV		
PCBs as Congeners	Water	EPA Method 1668A	NELAC	Eurofins TestAmerica (Sacramento, CA)	September 2, 2016
	Soil	EPA Method 1668A	NELAC		
Dioxins/Furans	Water	EPA Method 8290 or 8280 ⁽⁷⁾	NV (EPA 8290) NELAC (EPA 8280)	Eurofins TestAmerica (Sacramento, CA)	8290: November 4, 2016 8280: April 30, 2017
	Soil	EPA Method 8290 or 8280 ⁽⁷⁾	NV (EPA 8290) NELAC (EPA 8280)		

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Gasoline Range Organics(GRO)	Water	EPA Method 8015B	NELAC	Eurofins TestAmerica (Irvine, CA)	November 6, 2015
	Soil	EPA Method 8015B	NELAC		
Diesel/Oil Range Organics (DROs/OROs)	Water	EPA Method 8015B	NELAC	Eurofins TestAmerica (Irvine, CA)	November 11, 2016
	Soil	EPA Method 8015B	NELAC		
Methane	Water	Method RSK 175	NV	Eurofins TestAmerica (Irvine, CA)	October 18, 2016
Metals ⁽³⁾	Water	EPA Method 200.7 / 6010B	NV (EPA 200.7) NELAC (EPA 6010B)	Eurofins TestAmerica (Irvine, CA)	October 26, 2017
	Soil	EPA Method 6010B	NELAC (EPA 6010B)		
Metals ⁽⁴⁾	Water	EPA Method 200.8 / 6020	NV	Eurofins TestAmerica (Irvine, CA)	July 13, 2018
	Soil	EPA Method 6020	NV		
Rare Earth Metals ⁽⁵⁾	Water	EPA Method 6020A	NELAC	Eurofins TestAmerica (St. Louis, MO)	February 1, 2019
	Soil	EPA Method 6020A	NELAC		
Arsenic III/V	Water	EPA Method 1632	NELAC	ALS (Kelso, Washington)	March 31, 2017
Mercury	Water	EPA Method 7470A	NV	Eurofins TestAmerica (Irvine, CA)	November 11, 2016
	Soil	EPA Method 7471A	NV		
Hexavalent Chromium	Water	EPA Method 218.6	NV	Eurofins TestAmerica (Irvine, CA)	February 15, 2019
	Soil	EPA Method 7199	NV		
Alkalinity and Carbonate	Water	SM 2320B	NV	Eurofins TestAmerica (Irvine, CA)	December 6, 2018
	Soil	SM 2320B	Not Applicable		
Hardness	Water	SM 2340C	NV	Eurofins TestAmerica (Irvine, CA)	February 5, 2018
Ammonia	Water	SM 4500-NH ₃ D	NV	Eurofins TestAmerica (Irvine, CA)	December 1, 2016
	Soil	SM 4500-NH ₃ D	Not Applicable		
Total Kjeldahl Nitrogen (TKN)	Water	EPA Method 351.2	NV	Eurofins TestAmerica (Irvine, CA)	March 12, 2018
Inorganic Anions ⁽⁶⁾	Water	EPA Method 300.0	NV	Eurofins TestAmerica (Irvine, CA)	June 30, 2017
	Soil	EPA Method 300.0	Not Applicable		
Chlorate	Water	EPA Method 300.1	NV	Eurofins TestAmerica (Irvine, CA)	August 1, 2016
	Soil	EPA Method 300.1	Not Applicable		
Cyanide	Water	EPA Method 9014	NV	Eurofins TestAmerica (Irvine, CA)	October 5, 2015
	Soil	EPA Method 9014	NV		

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Formaldehyde	Water	EPA Method 8315A	NV	Eurofins TestAmerica (Irvine, CA)	March 1, 2017
	Soil	EPA Method 8315A	NV		
Phosphorus	Water	EPA Method 365.3	NV	Eurofins TestAmerica (Irvine, CA)	October 5, 2015
Sulfide	Water	SM 4500-S ²⁻ D	NV	Eurofins TestAmerica (Irvine, CA)	December 19, 2016
Perchlorate	Water	EPA Method 314.0	NV	Eurofins TestAmerica (Irvine, CA)	December 21, 2018
	Soil	EPA Method 314.0	NV		
Perchlorate	Water	EPA Method 6860	NV	Eurofins TestAmerica (Denver, CO)	December 11, 2018
	Soil	EPA Method 6860	NV		
pH	Soil	EPA Method 9045C	NELAC	Eurofins TestAmerica (Irvine, CA)	April 20, 2018
Specific Conductance	Water	EPA Method 120.1 / SM 2510B	NV	Eurofins TestAmerica (Irvine, CA)	November 12, 2018
	Soil	EPA Method 120.1 / SM 2510B	Not Applicable		
Total Dissolved Solids (TDS)	Water	SM 2540C	NV	Eurofins TestAmerica (Irvine, CA)	February 7, 2019
Total and/or Dissolved Organic Carbon	Water	SM 5310B	NV	Eurofins TestAmerica (Irvine, CA)	February 1, 2019
	Soil	Lloyd Kahn	NELAC	Eurofins (Lancaster, PA)	July 9, 2019
Surfactants	Soil	SM 5540C	Not Applicable	Eurofins TestAmerica (Irvine, CA)	February 5, 2018
Radium 226	Water	EPA Method 903.0	NV	Eurofins TestAmerica (St. Louis, MO)	January 16, 2019
	Soil	EPA Method 903.0	NELAC		
Radium 228	Water	EPA Method 904.0	NV	Eurofins TestAmerica (St. Louis, MO)	January 16, 2019
	Soil	EPA Method 904.0	NELAC		
Thorium 228, 230, 232 and Uranium 234, 235, and 238	Water	DOE EML HASL 300 A-01-R (alpha spectroscopy)	Not Applicable	Eurofins TestAmerica (St. Louis, MO)	March 9, 2018
	Soil	DOE EML HASL 300 A-01-R (alpha spectroscopy)	Not Applicable		
Asbestos	Soil	EPA Method 540-R-97-028 modified per Berman & Kolk (2000)	NV	EMSL Analytical (Cinnaminson, NJ)	June 18, 2010
Helium	Soil Gas	ASTM D1946	NELAC	Eurofins TestAmerica (Sacramento, CA)	November 18, 2016

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ANALYTES	MATRIX	ANALYTICAL METHOD	Certification Status	ANALYTICAL LABORATORY	SOP DATE ⁽¹⁾
Dissolved Hydrogen	Water	AM20GAx	Not Applicable	Pace (Pittsburgh, PA)	April 30, 2019

Notes:

ASTM = American Society for Testing and Materials

DOE = Department of Energy

EML = Environmental Measurements Laboratory

EPA = United States Environmental Protection Agency

HASL = Health and Safety Laboratory

NELAC = Laboratory is certified to perform the method listed by an accrediting body of the National Environmental Laboratory Accreditation Conference (NELAC)

Not Applicable = Accreditation for the method is not available through the State of Nevada or NELAC

NV = Laboratory is certified to perform the method list by the State of Nevada

SIM = Selective Ion Monitoring

SM = Standard Method

(1) The Standard Operating Procedures (SOP) Date is the most current review or effective date listed on the laboratory's approved SOPs that will be implemented for this project. Laboratories are responsible for notifying Ramboll of any revisions to the SOPs referenced above. The use of revised SOPs are subject to approval.

(2) 1,4 dioxane and 1,2,3-Trichloropropane will be run by EPA Method 8260B SIM.

(3) Silicon and phosphorus can also analyzed by this method.

(4) Certain metals will be analyzed by EPA Method 200.8 / 6020 to overcome matrix interference from saline groundwater and/or to achieve lower PQLs and SQLs.

(5) Niobium, palladium, sulfur and/or uranium

(6) Fluoride, chloride, bromide, sulfate, ortho-phosphate, nitrate, and/or nitrate.

(7) EPA Method 8280 may be used to analyze dioxin samples with concentrations that are too high to be accurately measured by EPA Method 8290. An initial screening will be performed by the laboratory to determine which dioxin analysis method should be used.

Sources:

Berman, Q.W. and Kolk, A.J. 2000. Modified Elutriator Method for the Determination of Asbestos in Soil and Bulk Materials, Revision 1. Submitted to the U.S. Environmental Protection Agency, Region 8, May 23.

Appendix A. QAPP Project Organization/Roles and Responsibilities

Organization	Name	Project Role/Title
Nevada Division of Environmental Protection	Weiyan Dong, PhD	NDEP Remedial Project Manager
Nevada Environmental Response Trust	Steve Clough, PG, CEM	NERT Remediation Director
Ramboll	John M. Pekala, PG, CEM	Project Manager
Ramboll	Christopher M. Stubbs, PhD, PE	Project Quality Assurance/Quality Control Officer
Ramboll	Greg Kinsall, PG	Field Task Leader
Ramboll	Elizabeth Miesner, MPH	Health Risk Assessment Task Leader
Ramboll	Craig Knox	Analytical Task Leader\Database Administrator
Ramboll	Kristin Drucquer	Data Validation Coordinator
Tetra Tech	Dan Pastor, PE	Project Manager
Tetra Tech	Gina Heaton	Project Quality Assurance/Quality Control Officer
Tetra Tech	Kyle Hansen, CEM	Field Task Leader
Tetra Tech	Valerie Bogle	Database Administrator
Tetra Tech	Maureen McMyler	Data Validation Coordinator
Eurofins TestAmerica	Danielle Roberts	Laboratory Project Manager
EMSL Analytical Inc.	Daniel Kocher	Laboratory Project Manager
Silver State	Daniel Frohnen	Laboratory Project Manager
GES	Robert Thomsen	Laboratory Project Manager
PTS	Rick Schweizer	Laboratory Project Manager
Microbial Insights	Jennifer Amos	Laboratory Project Manager
Pace	Ruth Welsh	Laboratory Project Manager
Laboratory Data Consultants	Stella Cuenco	Data Validation Project Manager
Neptune and Company	Patti Meeks	Data Validation Project Manager