

December 16, 2022

## **TECHNICAL MEMORANDUM**

Re:	NDEP Directed One-Time VOC Sampling Plan
From:	Kimberly Kuwabara, CEM#2353, Expires 3/20/2023, Ramboll Jessica Donovan and Jon Hunt, Ramboll
To:	Steve Clough Nevada Environmental Response Trust

#### Re: NDEP Directed One-Time VOC Sampling Plan Nevada Environmental Response Trust Site Henderson, Nevada Ramboll Project No. 1690025038-013

This Technical Memorandum presents the proposed approach for the one-time volatile organic compound (VOC) sampling event planned to be performed in the Spring of 2023 at the Nevada Environmental Response Trust (NERT) Site (the "Site") located in Henderson, Nevada.

The NERT Sampling and Analysis Plan (SAP), Revision 2, was submitted to the Nevada Division of Environmental Protection (NDEP) on December 10, 2021, and an initial round of NDEP comments was received on February 16, 2022. An annotated response to comments (RTC) document was submitted to NDEP on May 6, 2022, and NDEP provided additional comments on the RTC document in a letter dated August 31, 2022 (the "Comment Letter"). In the Comment Letter, NDEP required NERT and other Black Mountain Industrial (BMI) companies to analyze for VOCs in the list of locations attached to the letter. The NDEP stated goal of additional VOC sampling is "to build a sound foundation to determine the chemicals migrating through the east and west NERT property boundaries". In response to this NDEP requirement, NERT has prepared this NDEP Directed One-Time VOC Sampling Plan (the "Sampling Plan").

In this Sampling Plan, Ramboll evaluated NDEP's list of suggested wells to sample to determine if they still exist and if they are appropriate for inclusion in the required one-time VOC sampling event. As shown in Table 1, of the 75 locations NDEP suggested be sampled, 13 have been previously abandoned, 7 are soil borings at which no well was installed in the past, 2 represent wells not owned by NERT (and NERT does not have access to them), and 53 are already included in the SAP, Revision 3.

Consistent with NERT's response to NDEP Comment #2a in the Comment Letter, NERT acknowledges that the use of saturated soil samples from deep soil borings to define the extent of contamination within Operable Unit 1 (OU-1) during the Remedial Investigation (RI) resulted in data that is now approximately four to five years old. To address the NDEP requirement for a current data set and the corresponding requirement for data collection to be accomplished by all applicable BMI Complex entities at approximately the same time, NERT proposes the installation of seven new wells as further discussed herein. To determine the location of these new wells, and as requested by NDEP, the spatial

distribution of existing wells to characterize trespass chemicals and the distribution of VOCs at the Site was further evaluated. The proposed locations of the seven new wells are shown in Figures 1a and 1b with blue well symbols. Table 2 provides details regarding the proposed drilling scope of work as summarized below.

It is the intent of the Trust to perform this NDEP directed one-time VOC sampling event in May 2023 concurrent with the planned five-year monitoring event specified in the SAP, Revision 3. All of the wells identified in Figures 1a through 1e representing OU-1, 2a through 2c representing OU-2, and 3a through 3c representing OU-3, will be sampled as part of the combined one-time VOC sampling event and five-year monitoring event. Of the 404 wells identified for this combined event, seven are solely related to this NDEP directed one-time VOC sampling requirement.

The groundwater samples collected will be analyzed for the VOCs specified in Table 3 with additional analysis to be performed in accordance with the SAP, Revision 3. If the SAP, Revision 3 is not approved by February 17, 2023, there may be insufficient time available to plan and coordinate the one-time VOC sampling with the Spring 2023 annual and five-year sampling event, such that the one-time VOC sample collection may need to be postponed until a later date agreed upon with NDEP.

## **Monitoring Wells Proposed for Installation**

Seven wells are proposed to be installed within OU-1 (M-272 through M-278). The proposed wells are presented below along with the rationale for their installation:

- M-272 (30-50 feet below ground surface [ft bgs]) to be installed between existing wells M-206 (30-50 ft bgs) and M-207 (25-45 ft bgs), and M-278 (60-70 ft bgs) to be installed between existing wells M-125D (60-70 ft bgs) and M-5D (60-70 ft bgs). The location of these wells are shown in Figures 1a and 1b. These wells will improve delineation of chemicals migrating from the Olin, Stauffer, Syngenta, and Montrose (OSSM) site through OU-1 (OSSM's trespassing plume) and will support NERT's Conceptual Site Model (CSM) as presented in the RI Report for OU-1 and OU-2 (RI Report) and allow NERT to respond more directly to OSSM's incorrect hypothesis that its plume within OU-1 is captured by its extraction wells before migrating across Warm Springs Road.
- M-273 (55-65 ft bgs) and M-274 (70-85 ft bgs) will be installed east of existing wells M-21 (18-38 ft bgs) and M-21D (40-55 ft bgs). The locations of these wells are shown in Figure 1b. These wells are co-located with soil boring location RI-15, which was evaluated as part of the RI Report. The wells are intended to provide current groundwater data as several years have elapsed since the deep soil boring samples were collected.
- M-275 (60-80 ft bgs), M-276 (60-80 ft bgs) and M-277 (60-80 ft bgs) will be installed east of proposed wells M-273 and M-274 and west of the OU-1 eastern boundary. The locations of these wells are shown in Figure 1b. These wells will improve delineation of chloroform migrating from the Unit 4 and 5 Buildings area across OU-1 and will support NERT's CSM as presented in the RI Report with respect to the configuration of the NERT and TIMET chloroform plumes.

The drilling methods to be used will follow those provided in the RI Field Sampling Plan, Revision 1 (ENVIRON 2014).<sup>1</sup> Groundwater sampling methods will follow the procedures specified in the SAP, Revision 3. The newly installed wells will be sampled for the VOC suite of analytes presented in Table 3. Field parameters will be measured during sampling in addition to the VOC analytical suite, including temperature, pH, dissolved oxygen (DO), oxygen reduction potential (ORP), turbidity, and electrical conductivity (EC).

## Monitoring Wells to be Sampled for VOCs

A total of 404 wells will be sampled for VOCs across the NERT RI Study Area as part of the 2023 sampling event. This event will involve the collection of groundwater samples from the seven proposed wells described in the previous subsection of this work plan and from the 397 wells specified in the SAP, Revision 3 for the five-year monitoring event (assuming approval from NDEP without additional comments impacting the proposed program). These groundwater monitoring wells are shown in Figures 1a through 1e, 2a through 2c, and 3a through 3c. The most recent available chloroform isoconcentration contours are also presented on these figures to help evaluate the overall spatial distribution of the proposed VOC sampling. VOC sampling is only to be performed by NERT at wells west of Pabco Road.

## **VOC Sampling Methodologies**

The 2023 VOC sampling event will be performed in accordance with the procedures specified in the SAP, Revision 3. Eurofins Environment Testing America, Inc. is currently under contract to analyze the groundwater samples for VOCs. In accordance with the SAP, Revision 3, all analytical data will be validated to Stage 2A and submitted to NDEP in a Data Validation Summary Report (DVSR) and Electronic Data Deliverable (EDD).

#### Reporting

The results of the 2023 one-time VOC sampling event from all 404 wells will be reported in the forthcoming 2022-2023 Annual Groundwater Monitoring and GWETS Performance Report. Data from the seven wells proposed herein will be incorporated into the overall discussion of VOC contamination in the 2022-2023 Annual Groundwater Monitoring and GWETS Performance Report and included in the corresponding DVSR/EDD submittal.

#### Attachments

- Table 1Locations Suggested by NDEP and Considered for VOC Sampling
- Table 2Summary of Proposed Monitoring Wells in OU-1
- Table 3Monitoring Program VOCs List
- Figure 1a Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (0-55 ft bgs), OU-1

<sup>&</sup>lt;sup>1</sup> ENVIRON (ENVIRON International Corporation). 2014. Field Sampling Plan, Revision 1, Nevada Environmental Response Trust Site, Henderson, Nevada. July 18.

- Figure 1b Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (55-90 ft bgs), OU-1
- Figure 1c Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (90-130 ft bgs), OU-1
- Figure 1d Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (130-175 ft bgs), OU-1
- Figure 1e Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (175-300 ft bgs), OU-1
- Figure 2a Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (0-55 ft bgs), OU-2
- Figure 2b Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (55-90 ft bgs), OU-2
- Figure 2c Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (90-300 ft bgs), OU-2
- Figure 3a Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (0-55 ft bgs), OU-3
- Figure 3b Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (55-90 ft bgs), OU-3
- Figure 3c Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (90-300 ft bgs), OU-3

# NDEP Directed One-Time VOC Sampling Plan

## 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:	Day A Sterber Not Individually, but Solely as President of the Trustee
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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:	12/18/22



# NDEP Directed One-Time VOC Sampling Plan

#### Nevada Environmental Response Trust Site (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.

Krubely Kuwabara

Kimberly Kuwabara, M.S. Senior Managing Consultant

Certified Environmental Manager Ramboll US Consulting, Inc. CEM Certificate Number: 2353 CEM Expiration Date: March 20, 2023 December 15, 2022

Date

# TABLE 1: LOCATIONS SUGGESTED BY NDEP AND CONSIDERED FOR VOC SAMPLING

## Nevada Environmental Response Trust Site

## Henderson, Nevada

Well	Status	Note	
LG032	P&A	Replacement location "LG032R" is also P&A	
M-057A	Active	Included in the SAP for annual VOC sampling as M-57A	
M-1	P&A		
M-123	Active	Included in the SAP for annual VOC sampling	
M-124	Active	Included in the SAP for annual VOC sampling	
M-125	Active	Included in the SAP for annual VOC sampling	
M-125D	Active	Included in the SAP for annual VOC sampling	
M-126	Active	Included in the SAP for annual VOC sampling	
M-127	P&A		
M-131	Active	Included in the SAP for VOC sampling every five years, starting in 2023	
M-134	Active	Included in the SAP for annual VOC sampling	
M-135	Active	Included in the SAP for annual VOC sampling	
M-142	Active	Included in the SAP for annual VOC sampling	
M-14A	Active	Included in the SAP for annual VOC sampling	
M-14D	Active	Included in the SAP for VOC sampling every five years, starting in 2023	
M-159	Active	Included in the SAP for annual VOC sampling	
M-160	Active	Included in the SAP for annual VOC sampling	
M-186	Active	Included in the SAP for annual VOC sampling	
M-19	Active	Included in the SAP for annual VOC sampling	
M-191	Active	Included in the SAP for annual VOC sampling	
M-195	Active	Included in the SAP for annual VOC sampling	
M-196	Active	Included in the SAP for annual VOC sampling	
M-197	Active	Included in the SAP for annual VOC sampling	
M-199	Active	Included in the SAP for annual VOC sampling	
M-200	Active	Included in the SAP for annual VOC sampling	
M-201	Active	Included in the SAP for annual VOC sampling	
M-202	Active	Included in the SAP for annual VOC sampling	
M-206	Active	Included in the SAP for annual VOC sampling	
M-223	Active	Included in the SAP for annual VOC sampling	
M-224	P&A	Replaced by M-224R	
M-224R	Active	Included in the SAP for annual VOC sampling	
M-225R	Active	Included in the SAP for annual VOC sampling	
M-226	Active	Included in the SAP for annual VOC sampling	
M-227	P&A	Replaced by M-227R	
M-227R	Active	Included in the SAP for annual VOC sampling	
M-228	P&A	Replaced by M-228R	
M-228R	Active	Included in the SAP for annual VOC sampling	
M-229	Active	Included in the SAP for annual VOC sampling	
M-22A	Active	Included in the SAP for annual VOC sampling	
M-230	Active	Included in the SAP for VOC sampling every five years, starting in 2023	
M-234	Active	Included in the SAP for annual VOC sampling	
M-240	Active	Included in the SAP for annual VOC sampling	
M-245	Active	Included in the SAP for VOC sampling every five years, starting in 2023	
M-249-100	Active	Included in the SAP for annual VOC sampling	
M-251-100	Active	Included in the SAP for annual VOC sampling	
M-263	Active	Included in the SAP for annual VOC sampling	

# TABLE 1: LOCATIONS SUGGESTED BY NDEP AND CONSIDERED FOR VOC SAMPLING

## Nevada Environmental Response Trust Site

#### Henderson, Nevada

Well	Status	Note
M-31A	Active	Included in the SAP for annual VOC sampling
M-35	Active	Included in the SAP for annual VOC sampling
M-50	P&A	
M-52	Active	Included in the SAP for annual VOC sampling
M-57A	Active	Included in the SAP for annual VOC sampling (NDEP also listed this location as M-057A)
M-66	Active	Included in the SAP for annual VOC sampling
M-67	Active	Included in the SAP for annual VOC sampling
M-68	Active	Included in the SAP for annual VOC sampling
M-72	Active	Included in the SAP for annual VOC sampling
M-73	Active	Included in the SAP for annual VOC sampling
M-74	Active	Included in the SAP for annual VOC sampling
M-81A	Active	Included in the SAP for annual VOC sampling
M-98	Active	Included in the SAP for annual VOC sampling
MC-MW-17	Active	Well is not owned by NERT
MC-MW-18	Active	Well is not owned by NERT
PG107	P&A	
RISB-31	Soil Boring	This is a soil boring location only (a well was never installed)
RISB-32	Soil Boring	This is a soil boring location only (a well was never installed)
RISB-33	Soil Boring	This is a soil boring location only (a well was never installed)
RISB-34	Soil Boring	This is a soil boring location only (a well was never installed)
RISB-35	Soil Boring	This is a soil boring location only (a well was never installed)
RISB-36	Soil Boring	This is a soil boring location only (a well was never installed)
RISB-37	Soil Boring	This is a soil boring location only (a well was never installed)
TR-6	Active	Included in the SAP for annual VOC sampling
U4U5-16	P&A	This was a temporary well that was immediately abandoned after sampling occurred
U4U5-2	P&A	This was a temporary well that was immediately abandoned after sampling occurred
U4U5-31	P&A	This was a temporary well that was immediately abandoned after sampling occurred
U4U5-74	P&A	This was a temporary well that was immediately abandoned after sampling occurred
U4U5-76	P&A	This was a temporary well that was immediately abandoned after sampling occurred

#### Notes:

NDEP = Nevada Division of Environmental Protection

NERT = Nevada Environmental Response Trust

P&A = plugged/abandoned well

SAP = Groundwater Sampling and Analysis Plan, Revision 3 (pending NDEP review/approval).

VOC = volatile organic compound

# TABLE 2. SUMMARY OF PROPOSED MONITORING WELLS IN OU-1Nevada Environmental Response Trust; Henderson, Nevada

Well	Minor Water Bearing	Coordinates		Screened (ft b	d Interval ogs)
Name	Zone	Easting	Northing	Тор	Bottom
M-272	Water Table Interval	827112.95	26720912.06	30	50
M-273	Lower Shallow	828136.17	26718417.68	55	65
M-274	Lower Shallow	828136.17	26718417.68	70	85
M-275	Lower Shallow	828670.72	26718447.48	60	80
M-276	Lower Shallow	828949.26	26718402.38	60	80
M-277	Lower Shallow	828941.31	26718776.43	60	80
M-278	Lower Shallow	826306.21	26719650.54	60	70

#### Notes:

ft bgs = feet below ground surface

## TABLE 3: MONITORING PROGRAM VOCs LIST

Nevada Environmental Response Trust Site Henderson, Nevada

Method	Analyte	CAS Number	Practical Quantitation Limit (ug/L)	Method Detection Limit (ug/L)
EPA Method	1,2,3-Trichloropropane	96-18-4	0.005	0.0035
8260B SIM	1,4-Dioxane	123-91-1	2	0.5
	1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.25
	1,1,1-Trichloroethane	71-55-6	0.5	0.25
	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.25
	1,1,2-Trichloroethane	79-00-5	0.5	0.25
	1,1-Dichloroethane	75-34-3	0.5	0.25
	1,1-Dichloroethene	75-35-4	0.5	0.25
	1,1-Dichloropropene	563-58-6	0.5	0.25
	1,2,3-Trichlorobenzene	87-61-6	1.0	0.4
	1,2,3-Trichloropropane	96-18-4	0.5	0.25
	1,2,4-Trichlorobenzene	120-82-1	1.0	0.4
	1,2,4-Trimethylbenzene	95-63-6	0.5	0.25
	1,2-Dibromo-3-Chloropropane	96-12-8	1.0	0.5
	1,2-Dibromoethane (EDB)	106-93-4	0.5	0.25
	1,2-Dichlorobenzene	95-50-1	0.5	0.5
	1,2-Dichloroethane	107-06-2	0.5	0.25
	1,2-Dichloropropane	78-87-5	0.5	0.25
	1,3,5-Trimethylbenzene	108-67-8	0.5	0.25
	1,3-Dichlorobenzene	541-73-1	0.5	0.25
	1,3-Dichloropropane	142-28-9	0.5	0.25
	1,4-Dichlorobenzene	106-46-7	0.5	0.25
	2,2-Dichloropropane	594-20-7	1.0	0.25
EPA Method	2-Butanone	78-93-3	5.0	2.5
8260B	2-Chlorotoluene	95-49-8	0.5	0.25
	4-Chlorotoluene	106-43-4	0.5	0.25
	Benzene	71-43-2	0.5	0.25
	Bromobenzene	108-86-1	0.5	0.25
	Bromochloromethane	74-97-5	0.5	0.25
	Bromodichloromethane	75-27-4	0.5	0.25
	Bromoform	75-25-2	1.0	0.25
	Bromomethane	74-83-9	0.5	0.25
	Carbon tetrachloride	56-23-5	0.5	0.25
	Chlorobenzene	108-90-7	0.5	0.25
	Chloroethane	75-00-3	0.5	0.25
	Chloroform	67-66-3	0.5	0.25
	Chloromethane	74-87-3	0.5	0.25
	cis-1,2-Dichloroethene	156-59-2	0.5	0.25
	cis-1,3-Dichloropropene	10061-01-5	0.5	0.25
	Dibromochloromethane	124-48-1	0.5	0.25
	Dibromomethane	74-95-3	0.5	0.25
	Dichlorodifluoromethane	75-71-8	0.5	0.25
	Ethylbenzene	100-41-4	0.5	0.25
	Ethyl ter-butyl ether (ETBE)	637-92-3	0.5	0.25
	Hexachlorobutadiene	87-68-3	0.5	0.25
	Isopropyl benzene	98-82-8	0.5	0.25

## TABLE 3: MONITORING PROGRAM VOCs LIST

# Nevada Environmental Response Trust Site Henderson, Nevada

Method	Analyte	CAS Number	Practical Quantitation Limit (ug/L)	Method Detection Limit (ug/L)
	m,p-Xylene	179601-23-1	1.0	0.5
	Methylene Chloride	75-09-2	2.0	0.88
	Naphthalene	91-20-3	1.0	0.4
	n-Butylbenzene	104-51-8	1.0	0.4
	n-Propylbenzene	103-65-1	0.5	0.25
	o-Xylene	95-47-6	0.5	0.25
	p-Isopropyltoluene	99-87-6	0.5	0.25
EPA Method	sec-Butylbenzene	135-98-8	0.5	0.25
	Styrene	100-42-5	0.5	0.25
02000	tert-Butylbenzene	98-06-6	0.5	0.25
	Tetrachloroethene	127-18-4	0.5	0.25
	Toluene	108-88-3	0.5	0.25
	trans-1,2-Dichloroethene	156-60-5	0.5	0.25
	trans-1,3-Dichloropropene	10061-02-6	0.5	0.25
	Trichloroethene	79-01-6	0.5	0.25
	Trichlorofluoromethane	75-69-4	0.5	0.25
	Vinyl chloride	75-01-4	0.5	0.25

#### Notes:

CAS = Chemical Abstracts Service

EPA = United States Environmental Protection Agency

SIM = Selective Ion Monitoring

ug/L = micrograms per liter

VOCs = Volatile Organic Compounds





RAMBO		
DRAFTED BY: MS/JC DATE: 2022-11-16		

# Annual and Five-Year VOC Sampling Event Locations in the Shallow Water-Bearing Zone (55-90 ft bgs), OU-1

Nevada Environmental Response Trust Site Henderson, Nevada

FIGURE 1b



RAMBO	
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# Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (90-130 ft bgs), OU-1

Nevada Environmental Response Trust Site Henderson, Nevada

FIGURE **1c** 



RAMBO	
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## Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (130-175 ft bgs), OU-1 Nevada Environmental Response Trust Site

Henderson, Nevada

FIGURE 1d



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Annual and Five-Year VOC Sampling Event Locations in the Middle Water-Bearing Zone (175-300 ft bgs), OU-1

Nevada Environmental Response Trust Site Henderson, Nevada

FIGURE 1e

















