

MEMO

Date **September 29, 2022**
To **Nevada Environmental Response Trust**
From **Daniel Petersen, Chris Ritchie, and Mia Sosa**
Copy to **Nevada Division of Environmental Protection**
United States Environmental Protection
Subject **Greener Cleanup Best Management Practices: Short-Term BMPs**

TASK PROGRESS UPDATE

Ramboll US Consulting, Inc. (Ramboll) has prepared this technical memorandum on behalf of the Nevada Environmental Response Trust (NERT or the "Trust") which summarizes the Trust's implementation of the Greener Cleanup Best Management Practices (BMP) Work Plan, Revision 2, dated February 10, 2020, prepared at the direction of the U.S. Environmental Protection Agency (USEPA) and approved by the Nevada Division of Environmental Protection (NDEP) on August 4, 2020 (the "Work Plan"). This memorandum focuses specifically on summarizing the evaluation and implementation of the short-term BMPs identified in the Work Plan. Consistent with the Work Plan, this evaluation follows the American Society for Testing Materials (ASTM) Standard Guide for Greener Cleanups and is limited to the operation of the NERT Groundwater Extraction and Treatment System (GWETS) and the associated groundwater monitoring program.

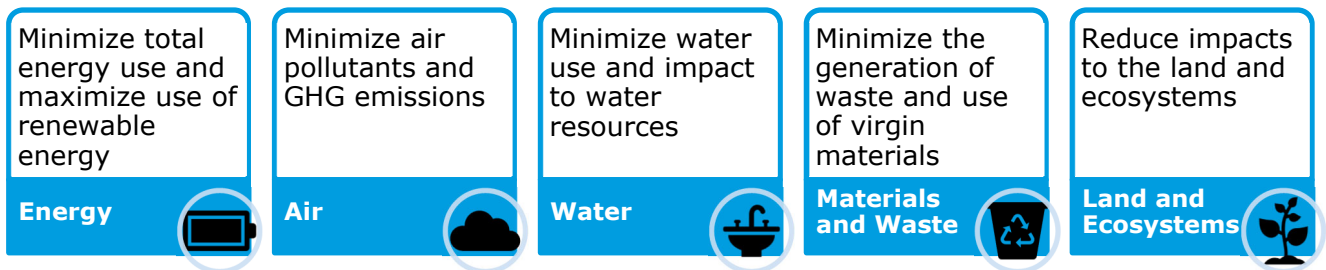
A separate memorandum has been prepared to summarize the evaluation of the long-term BMPs identified in the Work Plan. A Renewable Energy Assessment (REA) was submitted to NDEP on February 27, 2020, as one of the BMPs selected for evaluation. Greener Cleanup BMPs related to the implementation and operation of the NERT final remedy will be evaluated and implemented as appropriate in the future.

BACKGROUND

The NERT GWETS has been in operation since 1987 with the initial installation of the Interceptor Well Field (IFW) and the Groundwater Treatment Plan (GWTP) in 1987 resulting from a 1986 Consent Order between NDEP and Kerr-McGee Chemical. The GWETS was expanded between 2001 and 2004 in accordance with a 2001 Administrative Order on Consent resulting in the installation of the OU-1 barrier wall, the Athens Road Well Field (AWF), the Seep Well Field (SWF), and the design and installation of a treatment process to remove chromium and perchlorate from extracted groundwater prior to discharge under a NPDES permit. Upon inception of the Trust in 2011, NERT assumed operation of the GWETS and it has been continuously operating since that time. The GWETS operates as a CERCLA removal action and it is anticipated that it will be materially modified or replaced in connection with implementation of NERT's final remedy. Since 2013, data has been compiled on the

overall environmental footprint of the GWETS and associated groundwater monitoring program. At the direction of NDEP and USEPA, environmental footprint data have been reported in the Annual Groundwater Monitoring and GWETS Performance Report and Semi-Annual Groundwater Monitoring and GWETS Performance Memorandums since 2014. Consistent with the Work Plan, the environmental footprint of operation and the GWETS and the associated groundwater monitoring program was to be quantified using USEPA's Spreadsheets for Environmental Footprint Analysis (SEFA) Excel workbooks and an evaluation of alternatives was to be conducted to reduce the overall environmental footprint in accordance with the ASTM Standard Guide for Greener Cleanups (E2893-16).¹

ASTM E2893-16 (the "ASTM standard") defines five core elements to be considered in the BMP process to reduce the environmental footprint of a cleanup phase, as described in the diagram below. These core elements generally align with the environmental contributions quantified as part of the environmental footprint analyses performed for the NERT GWETS and the associated groundwater monitoring program. The recent environmental footprint results are therefore used to identify major environmental footprint contributors as they relate to the core elements and to prioritize BMPs accordingly.



The ASTM standard further establishes a BMP process which includes five steps: (1) BMP Opportunity Assessment; (2) BMP Prioritization; (3) BMP Selection; (4) BMP Implementation; and (5) BMP Documentation. With regard to the short-term BMPs that have been prioritized, the Work Plan has addressed the third step in the process (selection) and this evaluation describes the fourth step (implementation) of the short-term BMPs recommended in the Work Plan. BMPs evaluated and described herein will also be considered with respect to the timeline of the project, as the ongoing Remedial Investigation and Feasibility Study (RI/FS) progresses and the selection of the final remedy is anticipated.

SHORT-TERM BMP IMPLEMENTATION AND FEASIBILITY ANALYSES

In an effort to reduce the environmental footprint of the NERT GWETS and the associated groundwater monitoring program, the Trust selected one short-term BMP for implementation and has identified three short-term BMP Feasibility Analyses to be performed. Evaluation of these short-term BMPs is summarized below.

¹ ASTM, 2016. ASTM E2893-16e1, Standard Guide for Greener Cleanups, ASTM International, West Conshohocken, PA, www.astm.org.

REUSE OF SAMPLING EQUIPMENT, BMP #37

The short-term BMP to reuse sampling equipment was implemented by the Trust in 2018. Through this program, the Trust began to use dedicated tubing in all monitoring wells and other complimentary waste reduction activities were implemented. As of May 2022, dedicated tubing was deployed in each of the 276 monitoring wells sampled during the annual monitoring event. As a result of using dedicated tubing for all wells available for sampling, there has been a significant reduction of tubing being discarded during each annual groundwater sampling event since 2018. The Trust will continue to use and deploy dedicated tubing in any new wells added to the groundwater monitoring program in the future.

LOCAL PRODUCT VENDORS, BMP #25

The short-term BMP to evaluate local product vendors has been implemented. Potential options for purchasing materials from alternative suppliers to minimize fuel consumption were evaluated in consultation with Envirogen Technologies Inc. (ETI) to identify major consumables source locations and transportation methods. A summary of materials usage and transportation for the performance period from July through December 2019 is included in the attached Table 1. Potential alternative suppliers were assessed; however, according to ETI, sourcing of consumables have largely already been optimized with respect to transport distance. The reason for this is that the cost of transportation largely dictates the price of consumables and ETI routinely reviews supplier pricing to reduce costs. Therefore, the current suppliers already represent the best options to minimize transportation distances and thereby reduce environmental footprint. Moreover, ETI reports that while suppliers may have local distribution centers, the source locations of the GWETS consumables are typically the same irrespective of supplier. ETI will continue to periodically review local-sourcing of GWETS consumables in their capacity as the GWETS operator. Transportation of materials will continue to be compiled and assessed as part of the environmental footprint analysis.

GREENER LABORATORY PRACTICES, BMP #26

The short-term BMP to identify and establish greener laboratory practices has been implemented. Ramboll worked in coordination with Eurofins TestAmerica, the contracted analytical laboratory for the NERT groundwater monitoring program, to identify greener laboratory practices that Eurofins TestAmerica can commit to for their work on the NERT project. Eurofins TestAmerica has prepared a *Corporate Social Responsibility (CSR) and Sustainability Framework* (Attachment A). In an email dated August 12, 2020, Eurofins TestAmerica re-committed to the sustainability framework even though it has not yet been re-branded following the merger of Eurofins and TestAmerica.

While the practices listed in the sustainability framework provided by Eurofins TestAmerica satisfies the requirements of the BMP, there may not be measurable impacts to the environmental footprint from instituting them simply because of how the analytical services are considered in the environmental footprint analysis. As requested by the United States Environmental Protection Agency (USEPA) in April 2017, a quantitative analysis of the environmental footprint of the GWETS and associated groundwater monitoring program is conducted using the USEPA's SEFA

workbooks. The SEFA workbooks only consider the number of analyses, not how analyses are performed nor what protocols are followed. Nonetheless, the greener laboratory practices identified in Attachment A should have an overall environmental benefit and satisfy this BMP.

Ramboll, on behalf of the Trust, has completed a competitive procurement of laboratory services to support the RI. As part of this procurement, Ramboll requested that potential laboratories provide their own standards for greener laboratory practices. Evaluation of potential green practices was part of the Trust's decision-making process as the Trust expands its analytical laboratory network to ensure timely, high quality, and cost competitive laboratory services. As part of this procurement, laboratories with greener laboratory practices along with cost, qualifications and experience, and service capabilities were evaluated. Laboratories with greener laboratory practices were awarded extra points in their overall ranking. The results of this procurement were incorporated into the Quality Assurance Project Plan, Revision 6 submitted in February 2021.

GREENER CONTRACT LANGUAGE, BMP #28

The short-term BMP to establish greener contract preferences in new contracts/subcontracts associated with the GWETS and the associated groundwater monitoring program has been implemented, to-date, between the Trust and their contractors. The greener contract preferences specifies that the contractor shall make commercially reasonable efforts to implement the following Green and Sustainable Remediation (GSR) practices with respect to operating the GWETS or the associated groundwater monitoring program:

- Solar-powered groundwater extraction well pumps;
- Passive/no-flow sampling techniques;
- Use of clean diesel or biofuels for on-site equipment and transport;
- Remote data collection;
- Carbon offsets;
- Renewable energy; and
- Waste minimization.

The relevant contracts may be reconsidered upon the selection, design, and/or implementation of the final remedy as part of the NERT FS.

CONCLUSIONS

This technical memorandum provides a summary of the four short-term BMPs selected by NDEP and USEPA and evaluated by the Trust. While the selected BMPs have been implemented, these BMPs are unlikely to have measurable effects on the environmental footprint due to the nature of the BMPs and the limitations of the methodology used for the environmental footprint analysis. Nonetheless, the implementation of these short-term BMPs will have real environmental benefits now and continuing into the future.

The NERT RI Study Area is currently the subject of an ongoing RI/FS, the results of which will be used to develop and implement a final remedy. As such, the Trust anticipates conducting the BMP process for short-term and long-term BMPs subsequent

Greener Cleanup Best Management Practices: Short-Term BMPs
Nevada Environmental Response Trust Site
Henderson, Nevada

to applicable cleanup phases in the future as the final remedy is developed and implemented.

ATTACHMENTS

Table 1: Materials Usage and Transportation, July-December 2019
Attachment A: Eurofins TestAmerica Corporate Social Responsibility (CSR) and Sustainability Framework

**Greener Cleanup Best Management Practices:
Short-Term BMPs**

**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: Jay A Steinberg 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

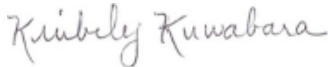
Date: 9/29/22

Greener Cleanup Best Management Practices Update: Short-Term BMPs

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.



September 29, 2022

Kimberly Kuwabara
Senior Managing Consultant

Date

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

TABLE 1: MATERIALS USAGE AND TRANSPORTATION, JULY - DECEMBER 2019**Nevada Environmental Response Trust Site
Henderson, Nevada**

Material Type	Quantity	Units	Location of Manufacture	One-way Distance to Site (miles)	Mode of Transportation	Specific Gravity	Density (lbs/gal)
Ferrous sulfate (FeSO ₄)	6,400	gal	South Gate, CA	250	Truck	1.203	10.02
Defoamer XFO-10S FG	50	gal	Santa Fe Springs, CA	250	Truck	1.00	8.35
DAF polymer BF CP 2661	2,000	gal	Greensboro, South Carolina	2,250	Truck	1.03	8.60
Polymer Superfloc 4818 RS GWTP	200	lbs	Madison, Alabama	1,750	Truck	1.072	8.95
Lime (hydrated lime)	3,600	lbs	Sainte Genevieve, MO	1,600	Truck	2.2	-
Ethanol (190 proof)	53,000	gal	Peoria, IL	1,950	Train	0.817	-
				250	Truck		
Phosphoric acid (H ₃ PO ₄)	2,900	gal	Pocatello, ID	600	Truck	1.20-1.26	10.0-10.5
pH adjustment (NaOH)	12,000	gal	Plaquemine, LA	1,650	Train/Truck	1.33	11.1
Micronutrients (VWNA micronutrient)	6,000	gal	South Gate, CA	250	Truck	1.1075	9.24
Hydrogen peroxide (H ₂ O ₂)	8,100	gal	Longview, WA	1,050	Truck	1.1327	9.44
			Woodstock, TN	1,600			
Aluminum Chlorohydrate (ACH)	2,000	gal	Phoenix, AZ	300	Truck	-	11.1 - 11.3
Ion exchange (IX) resin	200	cubic feet	India	10,400	Boat	1.0-1.15	-
				2,550	Truck		
Granular activated carbon (GAC)	20,000	lbs	Pittsburg, PA	2,200	Truck	0.4-0.7	3.3-5.8

Notes

gal = gallons

lbs = pounds

A) Materials usage information is provided by Envirogen personnel based on electronic outputs from their process control systems and inventory ordering information. Envirogen reported all materials are refined and none of the materials are from recycled sources.

B) Information regarding location of manufacture and mode of transportation is provided by Envirogen personnel. Approximate one-way distance to the Site is estimated using Google Maps rounded to the nearest 50 miles.

C) Specific gravity and density information for each material is obtained from Safety Data Sheets maintained at the Site.

D) According to Envirogen personnel, the GAC is tested annually for potential contaminant breakthrough and is replaced only if breakthrough is observed. Approximately one hundred percent of the GAC is regenerated and reused.

TestAmerica's Corporate Social Responsibility (CSR) and Sustainability Framework

TestAmerica is proud to be the industry leader for environmental testing and data deliverables in the United States, knowing that our services enable clients to make decisions that positively impact the environment.

Our implementation of Corporate Social Responsibility (CSR) and Sustainability protocols includes taking into account the social, ethical, and environmental effects of the company's activities on our staff, our local communities, and the global community we serve.

The foundation blocks of our CSR and Sustainability Framework include:

- ◆ *Governance, Ethics and Compliance:* Operating in a responsible and ethical manner, complying with our ethics policy and the law, promoting ethical sales and purchasing practices;
- ◆ *Employees:* Providing a rewarding, diverse, and inclusive workplace for employees;
- ◆ *Environment, Health and Safety:* Capitalizing on the inherent social and financial benefits from sound environmental practices and a safe and healthy workplace;
- ◆ *Supply Chain:* Working with suppliers to improve their social and environmental performance and cooperatively seeking opportunities to reduce the carbon footprint relative to the delivery of services to TestAmerica laboratories and clients.
- ◆ *Charitable & Community Support:* Encouraging the support of local and national charitable organizations and other initiatives that support local communities connected to our business and employees. Our employees frequently participate in environmental sustainability community programs to promote Greener Living and environmental awareness in their communities. As a company, TestAmerica Laboratories has supported fund raising for WaterAid, an internal charity that transforms lives by improving access to safe water.
- ◆ *Economic Impacts:* Using financial resources wisely to benefit company stakeholders and to address key sustainability issues;
- ◆ *Public Policy:* Working with governments, regulators and policymakers to improve the quality of analytical methods ensuring the consistent delivery of legally defensible data.
- ◆ *Operational Practice:* Our employees work to integrate responsible and sustainable solutions within every business division, every service category and every department of our operations.

TestAmerica's Contribution

Process Optimization

TestAmerica measures solvent use and air emissions on a by lab basis across the entire company every month. As part of this review best practices have been defined across the business to minimize solvent usage, reduce waste and reduce air emission based on the potential impacts to the environment. These solutions have included the following:

- ◆ Recycling of select solvent waste streams to be used for fuel blending rather than disposal.
- ◆ Minimizing solvent usage by reducing volumes required during analysis and recycling.
- ◆ Using more efficient hi tech instrumentation such as microwave, solid phase extraction and Soxhlet that enable up to 75% reduction in solvent use vs. traditional technologies.
- ◆ Sample Volume minimization: Through method enhancements, sample sizes needed for analysis have been reduced to minimum volumes, reducing the number and weight of bottles and coolers required for each sampling event.
 - Minimization creates a smaller shipping volume, thereby reducing CO2 emissions and creating less laboratory waste due to the smaller containers.
 - Downsizing the volume of sample required for analyses reduces the consumption of chemical reagents and generation of waste proportionally. Significant reductions over the past decade, as a result of both technology and process improvements, include:
 - Cyanide digestions – down by 90%
 - Metals digestions – down by 50%
 - LVI, Microwave and other Lower Volume prep/extraction procedures have reduced the volume of sample required for organic extractions by factors of 2-8 relative to historical laboratory practices

Waste Reduction

- ◆ Select solvent waste streams are recycled and used for fuel blending rather than disposal.
- ◆ Wastes are neutralized, as appropriate, to minimize waste disposal impact of acidic or basic waste streams.
- ◆ Waste generation is measured by all facilities, monthly. Waste minimization (of chemicals, soil, water etc.) programs are reviewed annually as part of TestAmerica's internal EH&S audit review.
- ◆ Waste to Energy – several facilities send their trash to be burned in a waste-to-energy program.

Travel Efficiency

TestAmerica measures vehicle mileage on a by lab basis across the entire business every month. As part of this review, best practices have been defined across the business to reduce air emissions based on the potential impacts to the environment. These solutions have included:

- ◆ The addition of service center locations that extend TestAmerica's footprint in geographies, maximizing logistics efficiencies that reduce road and air transportation impacts to move samples from the client to laboratories for analysis.
- ◆ Courier vehicles are replaced with more fuel efficient vehicles.
- ◆ Focus on logistics management of courier vehicles to minimize travel time.
- ◆ Increased dependency on Web-based meetings to support both internal and external conference calls and presentations, mitigating air and car travel.
- ◆ New: TestAmerica is currently working on implementation of strategically located shipping hubs. These hubs will centralize the prep and delivery of sampling kits within 2 days of any client in the continental US, further optimizing transport and reducing CO2 emissions.

Resource Reduction

Laboratory design/modifications in recent laboratory build-outs include but are not limited to:

- ◆ Recirculation chillers in our laboratory operations conserve water resources.
- ◆ High efficiency hoods reduce the volume make-up air by about 30%. This design change reduces the energy required to condition (heat/cool) a significant volume of the air handled in the HVAC.
- ◆ Bulk solvent distribution systems reduce consumption of glass bottles, cardboard and associated shipping and waste.
- ◆ Bulk Argon systems fully consume liquid argon, eliminating the return of partially utilized dewars, which are vented as waste.
- ◆ Wheat-board counters have replaced Woodstock.
- ◆ High efficiency lighting ballasts are used to reduce electricity usage.
- ◆ Recycling programs for paper, cardboard, aluminum cans, and glass reduce waste. Most TestAmerica facilities maintain an internal recycling program in the office to reduce waste of paper.
- ◆ Many facilities have eliminated disposable plates and plastic ware in lunch rooms and break areas. TestAmerica encourages all employees to bring their own reusable cups and/or plates. The lunch room areas include a dishwasher and sink, in which to wash dishes.
- ◆ Central cold rooms for sample storage reduce electric demand of multiple refrigeration units.
- ◆ Motion-sensor light switches in unoccupied rooms.

Reduction in the use of paper

The environmental testing business has traditionally been a very high user of paper both in the analytical process and in the final data reports. TestAmerica has been and is focusing on internal systems and external deliverables to achieve a paperless environment.

Since 2005, TestAmerica has reduced its paper usage by over 95%. This paper reduction has been achieved through the following technology solutions:

- ◆ Laboratory Information Management Systems (LIMS) improvements enable us to capture and manage data electronically. In most cases, data is transferred directly from the analytical instrument to LIMS, improving accuracy and eliminating the need for manual transcription or scanning of printed documents to final reports.
- ◆ High quality, automated, text searchable pdf analytical reports are delivered to our clients primarily through email, web portal or TotalAccess. This reduces paper usage as well as packing material and mailing.
- ◆ TestAmerica's online secure data service, TotalAccess, makes data reports and invoices available electronically. Data is searchable by most variables and can be compared to the applicable regulatory or action limits. It is only necessary to print what is needed.
- ◆ Our E-Procurement Team supports electronic invoices to those clients with E-Procurement capability. These include Exostar, ARIBA, XING, OB10, Catalyst, CAS, ENFOS, Oil-Dex, ARIBA Supplier Network, WEBEDI, Bottomline Business, Web-Commerce, Online Filing Cabinet, and others.

Working with Clients to support their CSR programs

As the largest environmental testing company in the US, TestAmerica is uniquely positioned to support a broad range of testing needs.

We work with our clients to minimize transportation and logistics, both to and from the site, in support of samples which cannot be analyzed locally.

And we are supporting E-Procurement Solutions by partnering with our clients to implement a wide variety of electronic platforms for business registration, procurement and electronic invoicing.