RAMBOLL

ENVIRONMENT
& HEALTH

MEMO

Date	**July 31, 2018**
To	**Nevada Environmental Response Trust**
From	**John Pekala, Scott Warner, and Chris Ritchie**
Copy to	**Nevada Division of Environmental Protection** **United States Environmental Protection Agency**
Subject	**In-Situ Bioelectrochemical Laboratory-Scale Treatability Study Monthly Progress Report**

TASK PROGRESS UPDATE: JUNE 2018

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Ramboll US Corporation (Ramboll) has prepared this memorandum which summarizes Ramboll's progress during June 2018 toward successfully implementing the In-Situ Bioelectrochemical Laboratory-Scale Treatability Study.

TASK M24 – IN-SITU BIOELECTROCHEMICAL LABORATORY-SCALE TREATABILITY STUDY

- Task Leader – Scott Warner / Chris Ritchie
- Current Status
  - Baseline groundwater quality characterization has been completed at Colorado State University (CSU). Some minor analytical interference has been observed due to high salt content of the samples supplied to CSU and alternative procedures are geing evaluated. Preliminary data are summarized in the attached in Table 1.
  - A method for quantifying dissolved hydrogen generation has been developed. Electrochemical batch tests have been performed on groundwater to assess hydrogen generation and total organic carbon (TOC), total inorganic carbon (TIC) and pH changes. Preliminary data will be provided as they become available.
  - Experimental design for column testing is underway, including column construction and methods for characterizing microbial community dynamics.
  - Membrane testing has been completed, and a combination of thin-layer Naflion membrane with a titanium electrode was selected for future tests.
- Schedule and Progress Updates
  - This task remains on schedule.
  - Allowing time for experimental design and column set-up, column testing is currently anticipated to begin mid July.
- Health and Safety

– There were no safety incidents during June 2018.

ATTACHMENTS

Table 1 – Baseline Water Quality Summary (Preliminary Information)

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In-Situ Bioelectrochemical Laboratory-Scale Treatability Study Progress Update

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 systems(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, not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Signature: Jay A Steinberg, not individually, but solely as Pres. Sent, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust 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: 7/31/18

In-Situ Bioelectrochemical Laboratory-Scale Treatability Study Progress Update

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 prepared 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. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

Description of Services Provided: Prepared In-Situ Bioelectrochemical Laboratory-Scale Treatability Study Progress Update, Nevada Environmental Response Trust Site, Henderson, Nevada

July 31, 2018

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John M. Pekala, PG
Principal
Certified Environmental Manager
Ramboll Environ US Corporation
CEM Certificate Number: 2347
CEM Expiration Date: September 20, 2018

Date

TABLE 1: BASELINE WATER QUALITY SUMMARY (Preliminary Information)
In-Situ Bioelectrochemical Laboratory-Scale Treatability Study
Nevada Environmental Response Trust Site
Henderson, Nevada

Analyte	IC (mg/L)	ICP-MS (mg/L)
Dissolved anions		
Perchlorate*	4	--
Chlorate*	61	--
Chloride*	3577	--
Nitrate*	17	--
Nitrite*	20	--
Sulfate*	39	--
Flouride	4	--
Dissolved cations		
Sodium	1335	1310
Potassium	212	251
Calcium	829	632
Magnesium	565	515
Ammonium*	16	--
Dissolved metals		
Iron	--	0.149
Manganese	--	0.005
Chromium	--	0.052
Arsenic	--	0.231

Other Parameters		
Analyte	**Result**	**Units**
pH	6.3	
Total Dissolved Solids	12.0	g/L
Dissolved Organic Carbon*	48	mg C/L
Dissolved Inorganic Carbon*	36	mg C/L

Notes:

Data are considered preliminary and are subject to change.

Analyses performed at Colorado State University.

IC - Ion chromatography

ICP-MS - Inductively coupled plasma mass spectroscopy

* Analysis potentially affected by high salt concentration