

TECHNICAL MEMORANDUM

To: Nevada Environmental Response Trust

Cc: Nevada Division of Environmental Protection
United States Environmental Protection Agency

From: Arul Ayyaswami and Dan Pastor

Date: December 20, 2018

Subject: Vacuum Enhanced Recovery Treatability Study Monthly Progress Report

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memorandum that summarizes Tetra Tech's progress made through October 2018 toward successfully implementing the Vacuum Enhanced Recovery (VER) Treatability Study as outlined in the VER Treatability Study Work Plan (Work Plan).

Task Progress Update: October 2018

Task M16 – Vacuum Enhanced Recovery Treatability Study

- Task Leader – Arul Ayyaswami
- Current Status
 - The Trust received a letter from NDEP, dated September 6, 2018, approving the VER Treatability Study Results report with comments noted for the administrative record. NERT agreed to collect additional groundwater samples from the VER extraction wells, and wells VER-01I and VER-01D (Figure 1) were re-sampled on October 15, 2018. The analytical results are summarized in Table 1 and discussed below.
 - Concentrations of perchlorate, chlorate, hexavalent chromium and chloroform in groundwater collected from VER-01I were 300 mg/L, 740 mg/L, 2.3 mg/L, and 0.12 mg/L, respectively. These concentrations were very similar to the baseline concentrations but less than the concentrations observed in the groundwater sample collected at the start of the constant-rate pumping test for VER-01I. Higher concentrations were observed at the time of testing, but those concentrations were consistent with the range of concentrations observed in the nearby IWF extraction wells.
 - Concentrations of perchlorate, chlorate, hexavalent chromium and chloroform in groundwater collected from VER-01D were 3.6 mg/L, 9.1 mg/L, 0.0043 mg/L, and 0.0023 mg/L, respectively. These concentrations were in the same general range of

concentrations observed in the groundwater sample collected at the start of the constant-rate pumping test for VER-01D (time = 0 hours), except for the hexavalent chromium concentration. Concentrations of perchlorate, chlorate, hexavalent chromium and chloroform in groundwater from the time = 0-hours sample collected at the start of the constant-rate pumping test from VER-01D were 4.6 mg/L, 21.0 mg/L, 0.024 mg/L, and 0.0047 mg/L, respectively.

- The Data Validation Summary Report (DVSR) for the Vacuum Enhanced Recovery Treatability Study Results Report was revised to address the NDEP comments provided in a letter dated September 4, 2018. A response to comments and the revised DVSR was submitted to NDEP on October 17, 2018.
- Schedule and Progress Updates
 - The DVSR for the supplemental VER data will be submitted in Fourth Quarter 2018.
- Health and Safety
 - There were no health and safety incidents related to Task M16 through October 2018.

CERTIFICATION

Vacuum Enhanced Recovery Treatability Study Monthly Progress Report

**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: J. A. Steinberg *not individually, but solely as Pres*, 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: 12/2/18

CERTIFICATION

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 Vacuum Enhanced Recovery Treatability Study Monthly Progress Report, Nevada Environmental Response Trust Site, Henderson, Nevada.



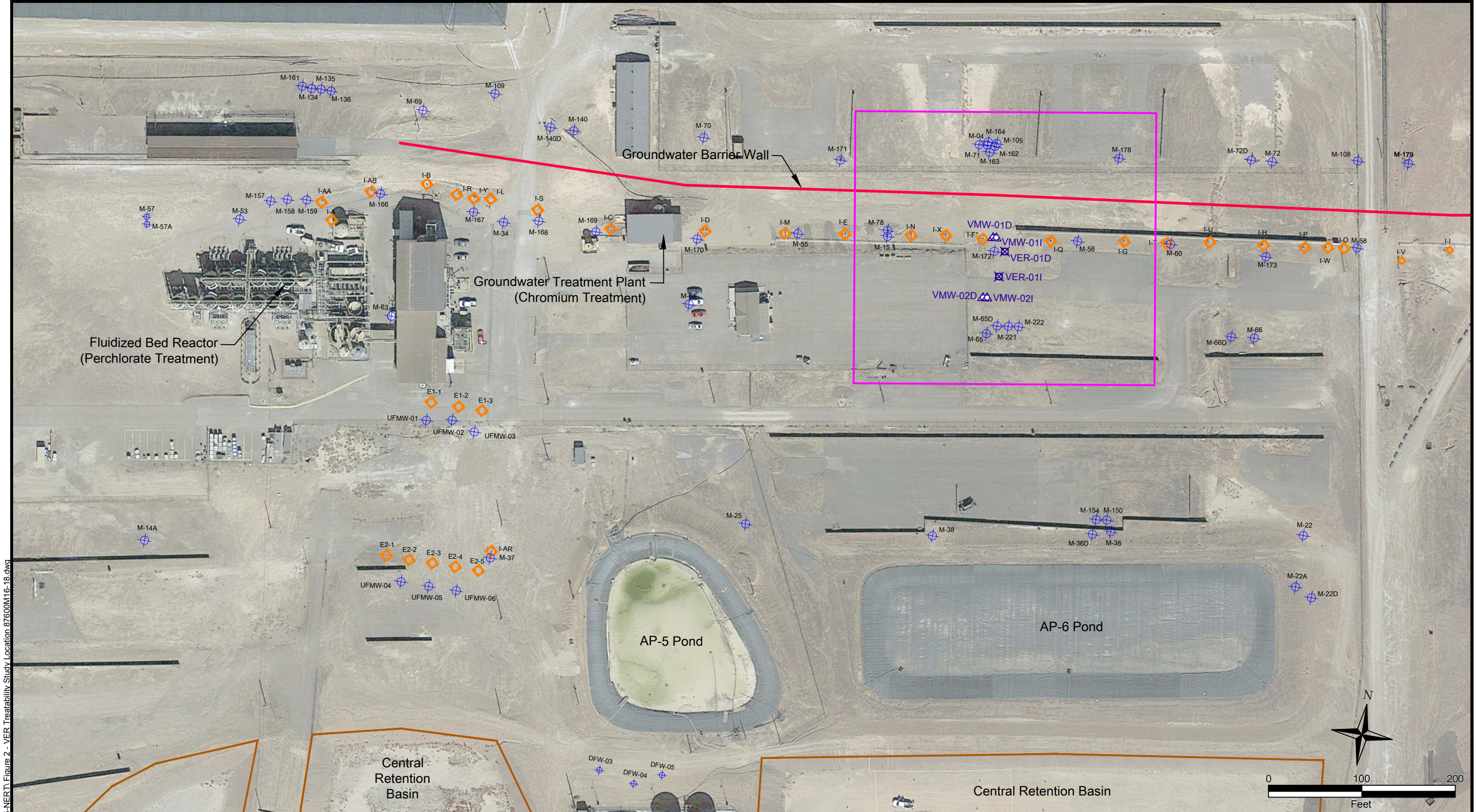
Kyle Hansen, CEM
Field Operations Manager/Geologist
Tetra Tech, Inc.

December 20, 2018

Date

Nevada CEM Certificate Number: 2167
Nevada CEM Expiration Date: September 18, 2020

Figures



\\fs318fs11.tl.local\ces\8760015-NERT\1 Figure 2 - VER Treatability Study Location 87600M16-18.dwg

Legend	
	M-55 Monitoring Well
	I-M Extraction Well
	VER Treatability Study Area
	VER-011 Intermediate VER Well Location
	VER-01D Deep VER Well Location
	VMW-011 Intermediate VER Monitoring Well
	VMW-01D Deep VER Monitoring Well

Notes:
 1. Imagery Source: Aerotech Mapping, August 2016.
 2. Monitoring well, extraction well, and groundwater barrier wall locations based on Figure 1 and Plate 1 in 2016-2017 Annual Performance Report (Ramboll Environ, 2017), Figure 7-1b in RI Data Evaluation Tech Memo (Ramboll Environ, 2016), and field observations.

TETRA TECH

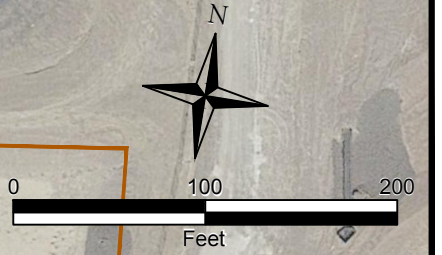
www.tetrattech.com
 150 S. 4th Street, Unit A
 Henderson, Nevada 89015
 Phone: (702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

VACUUM ENHANCED RECOVERY TREATABILITY STUDY RESULTS REPORT
 HENDERSON, NEVADA

VER TREATABILITY STUDY LOCATION

Project No:	117-7502018
Date:	MAY 9, 2018
Designed By:	DVK
Figure No.	1



Tables

Table 1
Summary of Post-VER Test Groundwater Analytical Results for VER-01I and VER-01D
VER Treatability Study

Well Location	Sample ID	Sample Date	Perchlorate by USEPA Method 314.0 (mg/L)	Chlorate by USEPA Method 300.1B (mg/L)	Hexavalent Chromium by USEPA Method 7199 (mg/L)	Total Chromium by USEPA Method 7199 (mg/L)	Chloroform by USEPA Method 8260B (mg/L)
VER-01I	VER-01I-20171108 (baseline)	11/08/17	300	680	2.2	2.5	0.11
	VER-01I-B-BL (t = 0-hours)	01/11/18	930	2,400	8.4	8.8	0.46
	VER-01I-20181015 (Oct 2018 sample)	10/15/18	300	740	2.3	2.6	0.12
VER-01D	VER-01D-20171107 (baseline)	11/07/17	53	140	0.040	0.17	0.029
	VER-01D-BL (t = 0-hours)	01/23/18	4.6	21	0.024	0.044	0.0047
	VER-01D-20181015 (Oct 2018 sample)	10/15/18	3.6	9.1	0.0043	0.028	0.0023

Notes:

USEPA United States Environmental Protection Agency
mg/L Milligram per liter