

TECHNICAL MEMORANDUM

To: Nevada Environmental Response Trust

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

From: Dan Pastor and Dana Grady

Date: October 19, 2018

Subject: **Galleria Drive Bioremediation 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 which summarizes Tetra Tech's progress during August 2018 toward successfully implementing the Galleria Drive Bioremediation Treatability Study.

Task Progress Update: August 2018

Task M17 – Galleria Drive Bioremediation Treatability Study

- Task Leader – Dana Grady/Dan Pastor
- Current Status
 - Phase 1 pre-design field activities were performed from April to June 2018 to gather relevant data and information required to optimize the final treatability study design (targeted treatment interval and depth, contaminant concentrations, etc.). Based on the results of the recent Phase 1 pre-design activities, it was determined that a Phase 1 Work Plan Modification was necessary as Phase 1 investigation results yielded information that perchlorate is deeper than expected, i.e., in the deeper Upper Muddy Creek formation (UMCf) [90 -110 feet below ground surface (ft bgs)]. As a result, a Treatability/Pilot Study Modification No. 3 was submitted to NDEP on August 29, 2018, to recommend bench-scale and step-rate injection testing on the 90 – 110 ft bgs interval. This Modification No. 3 was approved by NDEP on August 30, 2018. Following implementation of this modification, the Phase 1 findings and resulting Phase 2 treatability study design will be presented to NDEP, EPA and the NERT Stakeholders, followed by a third-party cost evaluation and submittal of the Galleria Drive Treatability Study Work Plan Addendum.
 - Initial bench-scale testing at UNLV was performed using the soil and groundwater from the upper UMCf (60 – 85 ft bgs). Results from the initial batch microcosm testing indicated that perchlorate concentrations decreased to below the detection limit (<0.011 milligrams per liter (mg/L) by 18 days after start-up in the batch microcosm set-up using emulsified vegetable oil. Following NDEP approval of Modification No. 3, additional bench-scale testing to evaluate in-situ bioremediation

- on the deep UMCf (90 – 110 ft bgs) was initiated at the end of August and is currently in progress. Updates will be provided as they become available in future monthly progress reports.
- Schedule and Progress Updates
 - Activities associated with the Treatability/Pilot Study Modification No. 3 began at the end of August and will continue through 2018. Updated information will be provided on the progress of these additional activities in forthcoming monthly progress reports.
 - Bench-scale testing is on-going and will include testing on the deep UMCf (90 – 110 ft bgs interval).
 - Step-rate injection tests are scheduled to be completed in September 2018.
 - Phase 1 findings and final Phase 2 design will be presented in the first or second quarter of 2019.
 - Health and Safety
 - There were no safety incidents related to Task M17 during August 2018.

CERTIFICATION

Galleria Drive Bioremediation 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: Jay A Steinberg, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

not individually, but solely as President

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: 10/19/18

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 Galleria Drive Bioremediation Treatability Study Monthly Progress Report.



October 19, 2018

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

Date

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