



NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**

STATE OF NEVADA
Department of Conservation & Natural Resources

Brian Sandoval, Governor
Bradley Crowell, Director
Greg Lovato, Administrator

December 29, 2017

Jay A. Steinberg
Nevada Environmental Response Trust
35 East Wacker Drive, Suite 1550
Chicago, IL 60601

**Re: Tronox LLC (TRX) Facility
Nevada Environmental Response Trust (Trust) Property
NDEP Facility ID #H-000539**
Nevada Division of Environmental Protection (NDEP) Response to: *Unit 4 Source Area
In-Situ Bioremediation Treatability Study Work Plan*

Dated: December 13, 2017

Dear Mr. Steinberg,

The NDEP has received and reviewed the Trust's above-identified Deliverable and provides comments in Attachment A. A revised Deliverable should be submitted **by 2/5/2018** based on the comments found in Attachment A. The Trust should additionally provide an annotated response-to-comments letter as part of the revised Deliverable.

Please contact the undersigned with any questions at wdong@ndep.nv.gov or 702-486-2850 x252.

Sincerely,

Weiquan Dong, P.E.
Bureau of Industrial Site Cleanup
NDEP-Las Vegas City Office

WD:cp

EC:

James Dotchin, NDEP BISC Las Vegas
Carlton Parker, NDEP BISC Las Vegas
Allan Delorme, Ramboll Environ
Alison Fong, U.S. Environmental Protection Agency, Region 9
Andrew Barnes, Geosyntec
Andrew Steinberg, Nevada Environmental Response Trust
Anna Springsteen, Neptune & Company Inc.
Betty Kuo Brinton, MWDH2O
Brenda Pohlmann, City of Henderson
Brian Waggle, Hargis + Associates

Carol Nagai, MWDH2O
Chinny Esakkiperumal, Olin Corporation
Chris Ritchie, Ramboll Environ
Chuck Elmendorf, Stauffer Management Company, LLC
Dan Pastor, P.E. TetraTech
Dave Share, Olin
Dave Johnson, LVVWD
Derek Amidon, Tetrattech
Ebrahim Juma, Clean Water Team
Ed Modiano, de maximis, inc.
Eric Fordham, Geopentech
Gary Carter, Endeavour
George Crouse, Syngenta Crop Protection, Inc.
Harry Van Den Berg, AECOM
Jay Johnson, Central Arizona Water Conservation District
Jay Steinberg, Nevada Environmental Response Trust
Jeff Gibson, Endeavour
Jill Teraoka, MWDH2O
Joanne Otani
Joe Kelly, Montrose Chemical Corporation of CA
Joe Leedy, Clean Water Team
John Edgcomb, Edgcomb Law Group
John Pekala, Ramboll Environ
Kelly McIntosh, GEI Consultants
Kevin Fisher, LV Valley Water District
Kirk Stowers, Broadbent & Associates
Kirsten Lockhart, Neptune & Company Inc.
Kim Kuwabara, Ramboll Environ
Kurt Fehling, The Fehling Group
Kyle Gadley, Geosyntec
Kyle.Hansen, Tetrattech
Lee Farris, BRC
Marcia Scully, Metropolitan Water District of Southern California
Maria Lopez, Water District of Southern California
Mark Duffy, U.S. Environmental Protection Agency, Region 9
Mark Paris, Landwell
Michael J. Bogle, Womble Carlyle Sandridge & Rice, LLP
Michael Long, Hargis + Associates
Micheline Fairbank, AG Office
Mickey Chaudhuri, Metropolitan Water District of Southern California
Nicholas Pogoncheff, PES Environmental, Inc.
Orestes Morfin, CAP
Paul Black, Neptune and Company, Inc.
Paul Hackenberry, Hackenberry Associates, LLC
Patti Meeks, Neptune & Company Inc.
Peggy Roefer, CRC
Ranajit Sahu, BRC
Richard Pfarrer, TIMET
Rick Kellogg, BRC
Scott Bryan, Central Arizona Project
Steve Clough, Nevada Environmental Response Trust
Steven Anderson, LVVWD
Tanya O'Neill, Foley & Lardner L
Todd Tietjen, SNWA

Attachment A

1. The contaminant mass (Perchlorate, chlorate, chromium and chloroform) used in this workplan was cited from the Unit 4 and 5 Buildings Investigation Second Mobilization (Tetra Tech, Inc., 2017). The contaminant mass in Unit 4 and 5 Buildings Investigation Second Mobilization was estimated with the "volumetrics" module of the Earth Volumetric Studio software. NDEP asked more details about the estimated mass in the letter of June 8, 2017. NERT submitted the RI Study Area Mass Estimate and Expanded Performance Metrics Technical Approach on October 5, 2017 and NDEP approved the mass estimate approach on October 20, 2017. NDEP requests that NERT revisit the perchlorate, chlorate, chromium, and chloroform mass estimated in the following the mass estimate approach dated on October 5, 2017. NDEP also suggests that the nitrate mass to be estimated. The refined mass estimate should be the baseline to measure the effects from the proposed treatability, so it must be done before the flushing, injection and extraction.
2. American Pacific Corporation (AMPAC) reported the results from a similar in-situ bioremediation treatability study for their source area of perchlorate-impacted groundwater (Geosyntec Consultants, 2003). The system used was a recirculation loop consisting of a single injection and single extraction well. Groundwater impacted with perchlorate was extracted, amended with electron donor (initially ethanol, later citric acid) and reinjected back to the groundwater to promote the biodegradation of perchlorate. Operational challenges were biological and chemical fouling of the injection and extraction wells. NDEP requests that NERT review the study and explain how the fouling will be prevented or reduced in the proposed study.
3. The injection wells for the soil flushing were screened in deeper vadose zone, which means that the contaminants in the shallow vadose zone will not be flushed. This flushing proposed here is different from previous two soil flushing sites where the water was applied on the surface. Please explain how the limited injection wells will deliver the water to the contaminated mass between the injection wells and the zones above the injection well screen intervals. Did Tetra Tech or other companies have successful cases to flush the vadose zone with the screens of the injection wells set lower?
4. NERT should consider nitrate and sulfate to be analyzed for soils and pore water because changes in their concentration can be related to the biodegradation processes.
5. The groundwater water extracted may still have some substrate. If the groundwater extracted is then treated with the existing FBRs, what is the impact of the residue substrate to the GWETS operation?