TETRA TECH

MEMORANDUM

To:	Nevada Environmental Response Trust Jay Steinberg, Solely as President Andrew Steinberg Steve Clough
Cc:	Nevada Division of Environmental Protection James Dotchin Carlton Parker Weiquan Dong
From:	Dan Pastor and Derek Amidon
Date:	April 15, 2017
Subject:	**Seep Area Bioremediation Treatability Study Progress Update**

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memo which summarizes Tetra Tech's progress made during March 2017 toward successfully implementing the Seep Area Bioremediation Treatability Study.

Task Progress Update: March 2017

Task M11 – Seep Area Bioremediation Treatability Study

- Task Leader – Dana Grady
- Current Status
    - As part of the preliminary field activities, soil boring and monitoring well installation began on February 20, 2017 and was completed on March 17, 2017. A total of 10 soil borings and 16 monitoring wells (four single monitoring wells and six paired monitoring wells) were installed during this phase. Both soil samples and discrete groundwater samples were collected for analysis of perchlorate, nitrate, and other relevant geochemical and microbial parameters depending on sample type, depth, and location. Data evaluation and tabulation is on-going.
    - During this field effort, soil was also collected from select borings and transported to UNLV for bench-scale testing as well as geotechnical parameter testing (such as grain size analysis and soil density). UNLV is conducting batch microcosm perchlorate biodegradation tests and emulsified oil substrate (EOS®) adsorption and desorption tests.
    - Following completion of this field effort, the lithologic logs from the recent drilling effort were compared to the corresponding geophysical survey results. The overall pattern of highs and lows in the UMCf contact corresponded very well to that predicted by the geophysical survey. However, in the boreholes installed in this effort, the UMCf was generally encountered shallower than predicted by the geophysical survey by about 10-20 feet.
    - Soil and groundwater results indicate that perchlorate contamination is present in the Upper Muddy Creek formation (UMCf). A brief summary will be submitted to present the results from UMCf soil and groundwater samples, as well as their potential correlation with the geophysical

survey results that may indicate higher-conductivity (high-TDS) groundwater located in deeper portions of UMCf.

- o Groundwater sampling activities were completed the week of March 27. Samples were collected from all newly installed monitoring wells and existing monitoring wells PC-58, PC-91, PC-92, and PC-94. In addition to data collection of field parameters (dissolved oxygen, oxidation reduction potential, pH, temperature, turbidity and conductivity), groundwater samples were also sent to Test America for analysis of perchlorate, total organic carbon, total dissolved solids, nitrate, chlorate, sulfate, dissolved metals, total metals, total phosphorus, and chloride. Data tabulation and evaluation will occur in April as results are received.

- Schedule & Progress Updates
  - This task is currently on schedule, with hydraulic testing (borehole dilution and slug tests) scheduled to occur the week of April 10, 2017.
- Health & Safety
  - There were no safety incidents related to Task M11 during March 2017.