

# TECHNICAL MEMORANDUM

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**To:** Nevada Environmental Response Trust

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

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**From:** Arul Ayyaswami and Dan Pastor

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**Date:** May 22, 2017

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**Subject:** **In-Situ Chromium Treatability Study Progress Update**

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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 made through April 2017 toward successfully implementing the In-Situ Chromium Treatability Study as outlined in the In-Situ Chromium Treatability Study Work Plan (Work Plan).

## Task Progress Update: April 2017

### Task M12 – In-Situ Chromium Treatability Study

- Task Leader – Arul Ayyaswami
- Current Status
  - As part of the preliminary field activities, one cluster injection well (CTIW-01S/D) and one dual-nested monitoring well (CTMW-03S/D) were installed from November 28 through December 7, 2016. Soil and grab groundwater samples were collected and analyzed in April to design the layout of subsequent injection and monitoring wells and for use in bench-scale testing being performed by UNLV.
  - UNLV bench-scale testing is ongoing. Results of numerous batch and column tests have shown hexavalent chromium reduction utilizing various chemical and carbon substrates. Column tests show that hexavalent chromium has been reduced; however, UNLV is continuing to run them to further evaluate the biological reduction of perchlorate.
  - In preparation for the biological reduction field test, two clustered injection wells (CTIW-02S/D and CTIW-03S/D) and three dual-nested monitoring wells (CTMW-01S/D, CTMW-02S/D, and CTMW-04S/D) were installed from March 20 to 30, 2017. Soil and grab groundwater samples

were collected and analyzed in April from each boring location. Evaluation of laboratory results is ongoing.

- A series of aquifer tests for the newly installed wells have been completed, which included short-term pumping tests and slug tests for wells with sufficient water. Results indicate that hydraulic conductivity varies from about 0.2 to 75 ft/day. Hydraulic conductivity variation generally corresponds to variation in logged lithology.
- A pre-injection baseline groundwater monitoring event was conducted for the biological reduction test area from April 3 to 6, 2017. Evaluation of laboratory results is ongoing.
- The first round of carbon substrate injections for biological reduction was completed from April 17 to 21, 2017 based on the reduction of hexavalent chromium demonstrated in the UNLV bench-scale and column tests. A total of 13,817 gallons of solution containing carbon substrate and nutrient amendments was injected. Chase water (stabilized Lake Mead water) was also injected to enhance subsurface distribution.
- Schedule and Progress Updates
  - The first performance monitoring event for the biological reduction test area will be conducted from May 2 to May 5, 2017. A total of eight performance monitoring events will be conducted on a bi-weekly and monthly schedule. Performance monitoring results will be used to evaluate the effects of the first round of carbon substrate injections and schedule required for additional carbon substrate injection events.
  - Two additional dual-nested monitoring wells are planned to be installed in the biological reduction test area. The specific locations and well construction details will be determined after evaluation of preliminary performance monitoring data.
- Health and Safety
  - There have been no health and safety incidents related to Task M12 as of April 2017.