

MEMO

Date **March 16, 2020**
To **Nevada Environmental Response Trust**
From **John Pekala, Scott Warner, and Chris Ritchie**
Copy to **Nevada Division of Environmental Protection**
United States Environmental Protection Agency
Subject **Las Vegas Wash ZVI-Enhanced Bioremediation Treatability**
Study Monthly Progress Report

TASK PROGRESS UPDATE: JANUARY 2020

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Ramboll US Corporation (Ramboll) has prepared this memorandum which summarizes Ramboll's progress during January 2020 toward successfully implementing the Las Vegas Wash Zero-Valent Iron (ZVI)-Enhanced Bioremediation Treatability Study, formerly known as the Galleria Drive ZVI-Enhanced Bioremediation Treatability Study. Treatability laboratory testing is currently being performed by PRIMA Environmental via subcontract with Ramboll on behalf of NERT.

TASK M18 – LAS VEGAS WASH ZVI-ENHANCED BIOREMEDIATION TREATABILITY STUDY

- Task Leaders – Scott Warner / Chris Ritchie
- Current Status
 - As previously reported, Phase 1 of the treatability study was completed in June 2019. Phase 2 (design and implementation of a field test) is planned to be completed in the vicinity of Las Vegas Wash Transect 1A (Transect 1A) pending completion of a data gap evaluation initiated in November 2019 consistent with Treatability/Pilot Study Modification No. 9, which was submitted to Nevada Division of Environmental Protection (NDEP) on October 8, 2019 and approved by NDEP on October 14, 2019.
 - Transect 1A field activities associated with the implementation of Treatability/Pilot Study Modification No. 9 in progress during January 2020 included hydraulic testing, which commenced on December 30, 2019 and was completed on January 10, 2020.
 - Streamlined bench-scale testing associated with the implementation of Treatability/Pilot Study Modification No. 9 is being conducted to evaluate the performance of ZVI under conditions present in Transect 1A. Transect 1A bench-scale testing continued during January 2020 and included baseline characterization of Transect 1A soil and groundwater and initiation of soil microcosm tests using Transect 1A soil and groundwater. Transect 1A bench-scale tests are being conducted for two different microcosm groups defined by test objectives. Details on the main objectives, initiation dates, and sampling dates for each soil microcosm group are provided in the following table. Multiple microcosms were inoculated with sludge from the on-site fluidized bed reactors (FBRs) to prevent potential

lags in microbial stimulation that can result from disturbance of the samples during sampling, transportation, and microcosm preparation activities.

Microcosm Group Number	Main Objective	Testing Initiation Date	January Sampling Dates Since Initiation
Group 1	Evaluate ZVI's ability to reduce perchlorate, chlorate, and nitrate under Transect 1A conditions	1/25/2020	N/A ^[1]
Group 2	Evaluate the effects of carrier agents, additives, and nutrient/carbon amendments on ZVI's performance in reducing perchlorate, chlorate, and nitrate ^[2]	1/16/2020	Week 1 – 1/23/2020 Week 2 – 1/30/2020
Notes: 1. N/A = Not Available. 2. Carrier agents include guar powder, additives include cross-linker and enzyme breaker, nutrients include vitamin B12 and diammonium phosphate, and carbon includes Emulsified Oil Substrate (EOS) 100.			

– Microcosm Test Results:

- Group 1: Initial results from the first two weeks of soil microcosm testing for Group 1 will become available in February and will be provided in the February progress report.
- Group 2: Initial results from the first two weeks of soil microcosm testing for Group 2 are presented on Figures 1 through 3. As shown on Figure 1, reduction in perchlorate concentrations from an initial concentration of 8.5 mg/L was observed after two weeks in all microcosms except for the control (i.e., no treatment) microcosm and two microcosms that were not inoculated during the first two weeks testing. As shown on Figure 2, all microcosms except for the control microcosm exhibited reduction in chlorate concentrations from an initial concentration of 35 mg/L after two weeks. As shown on Figure 3, nitrate concentrations in all microcosms except the control microcosms were reduced from an initial concentration of 47 mg/L to below the detection limit of 5 mg/L after two weeks. Microcosms from Group 2 will continue to be sampled in February, and associated data will be provided in the February progress report.

• Schedule and Progress Updates

- Streamlined bench-scale testing associated with the implementation of Treatability/Pilot Study Modification No. 9 is anticipated to be completed in April 2020. Data from bench-scale testing activities will continue to be summarized in forthcoming progress reports and will be used to inform the Phase 2 field test design.
- A Stakeholder Roundtable is anticipated to be held during third quarter 2020 to present Phase 1 field and laboratory/bench-scale data and Phase 2 details of the treatability study.

- Health and Safety
 - No safety incidents occurred during January 2020.

Attachments

Figure 1: Perchlorate Concentrations in Transect 1A Microcosms (Group 2)

Figure 2: Chlorate Concentrations in Transect 1A Microcosms (Group 2)

Figure 3: Nitrate Concentrations in Transect 1A Microcosms (Group 2)

**Las Vegas Wash ZVI-Enhanced Bioremediation Treatability Study
Progress Update**

**Nevada Environmental Response Trust
Site (Former Tronox LLC Site)
Henderson, Nevada**

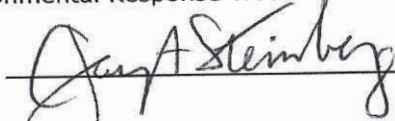
Nevada Environmental Response Trust (NERT) Representative Certification

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 system(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, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Signature:



Not Individually, but Solely
as President of the 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:

3/12/2020

Las Vegas Wash ZVI-Enhanced Bioremediation Treatability Study Progress Update

Nevada Environmental Response Trust Site (Former Tronox LLC Site) Henderson, Nevada

Responsible Certified Environmental Manager (CEM) for this project

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 provided 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.

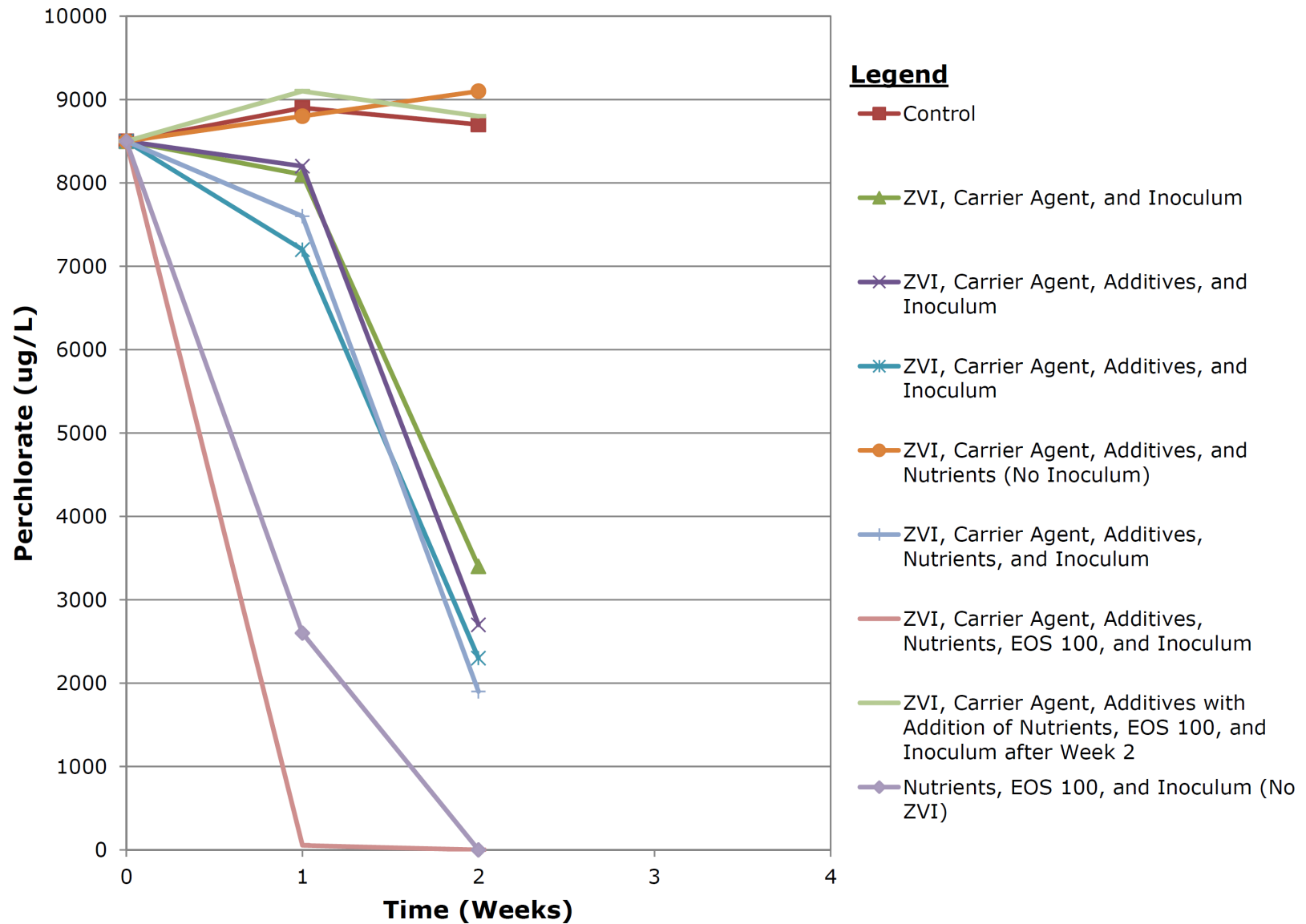


John M. Pekala, PG
Principal

March 16, 2020

Date

Certified Environmental Manager
Ramboll US Corporation
CEM Certificate Number: 2347
CEM Expiration Date: September 20, 2020



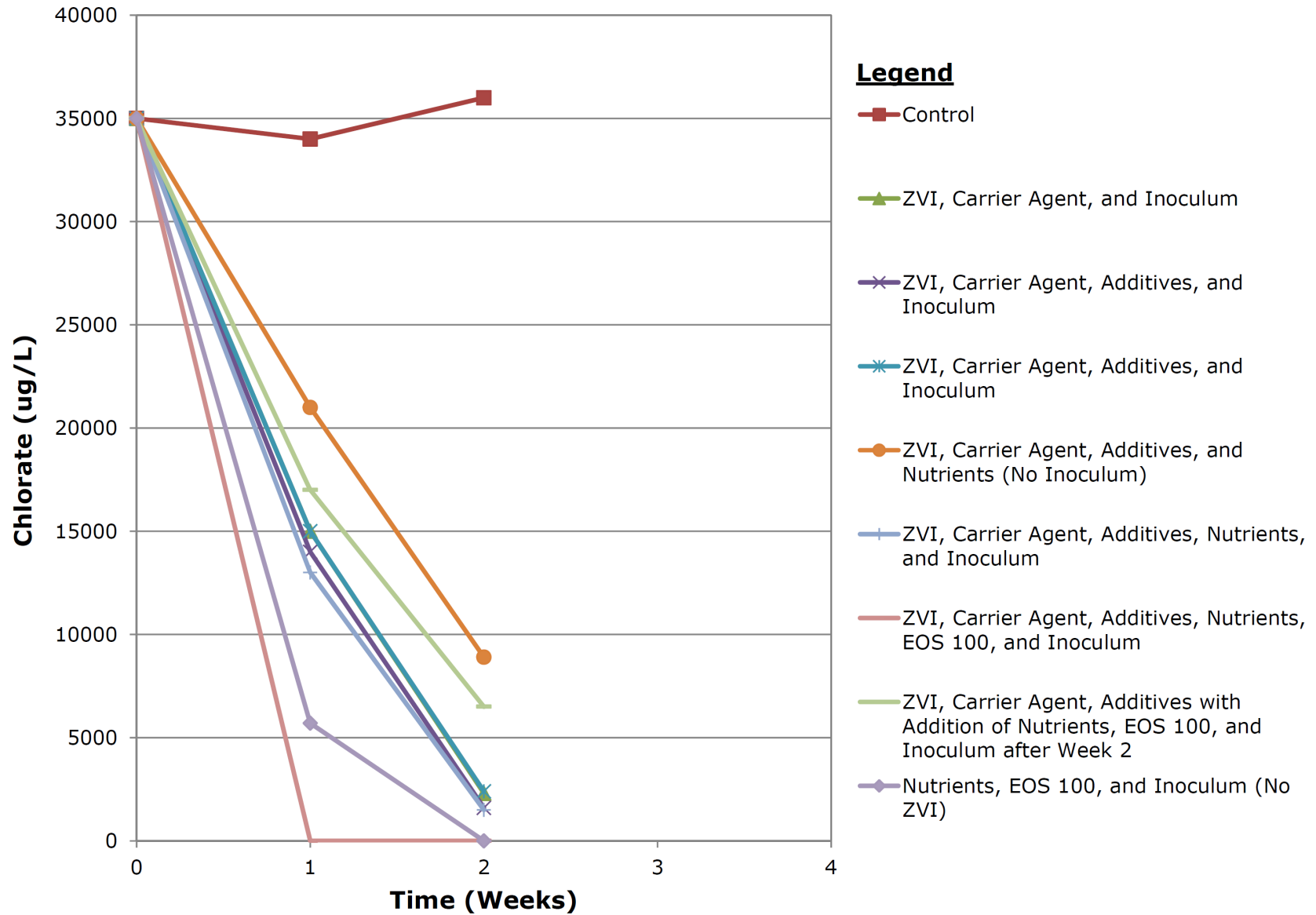
Note:
ug/L = micrograms per liter



Perchlorate Concentrations in Transect 1A Microcosms (Group 2)
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure

1



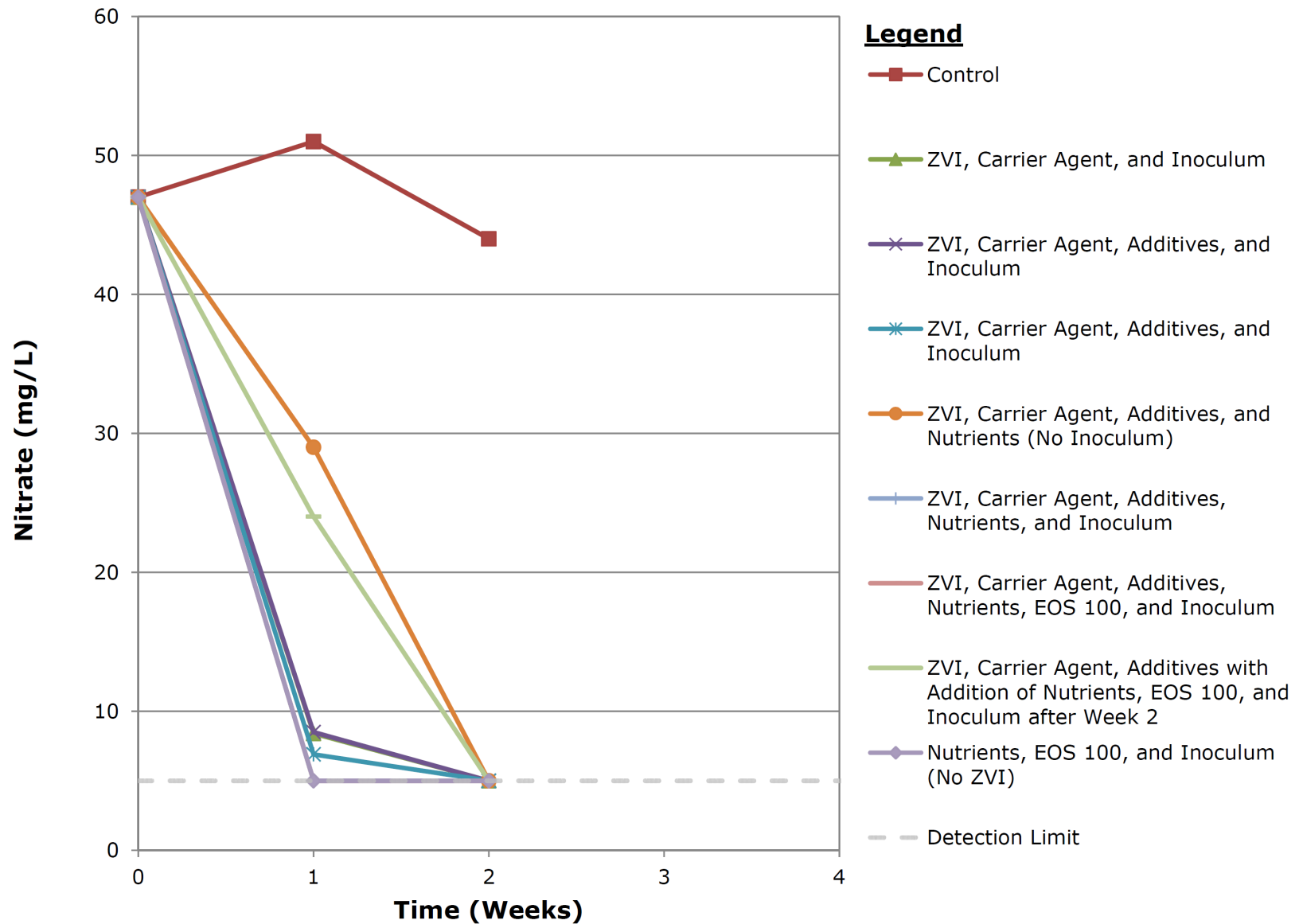
Note:
ug/L = micrograms per liter



Chlorate Concentrations in Transect 1A Microcosms (Group 2)
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure

2



Notes:

1. Non-detect nitrate concentrations are plotted at the detection limit of 5 mg/L.
mg/L = milligrams per liter



Nitrate Concentrations in Transect 1A Microcosms (Group 2)
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure

3

Drafter: UP

Date: 02/13/20

Contract Number: 1690016064

Approved:

Revised: