Addendum to the In-Situ Chromium Treatability Study Results Report
Nevada Environmental Response Trust Site
Henderson, Nevada

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LIST OF ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
bgs	below ground surface
COPCs	contaminants of potential concern
DO	dissolved oxygen
DVSR	Data Validation Summary Report
EC	electrical conductivity
ft amsl	feet above mean sea level
ft/ft	feet per foot
IDW	investigation-derived waste
IWF	Interceptor Well Field
mg/L	milligrams per liter
mL	milliliters
mV	milliVolts
NDEP	Nevada Division of Environmental Protection
NERT or Trust	Nevada Environmental Response Trust
ORP	oxidation-reduction potential
PLFA	phospholipid fatty acids
PME	performance monitoring event
Qal	Quaternary Alluvium
QA/QC	quality assurance and quality control
QAPP	quality assurance project plan
Site	Nevada Environmental Response Trust Site
SRB	sulfate reducing bacteria
TDS	total dissolved solids
Tetra Tech	Tetra Tech, Inc.
TOC	total organic carbon
UMCf	Upper Muddy Creek formation
UNLV	University of Nevada Las Vegas
VFAs	volatile fatty acids

CERTIFICATION

Addendum to the In-Situ Chromium Treatability Study Results 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

not individually, but solely as CFO

Signature: Jay A Steinberg, _____, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust 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: 1/23/19

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 Addendum to the In-Situ Chromium Treatability Study Results Report.

January 23, 2019

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

Date

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

1.0 INTRODUCTION

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this Addendum to the *In-Situ Chromium Treatability Study Results Report* to present the results of additional groundwater monitoring completed for the biological reduction study component of the In-Situ Chromium Treatability Study. The additional groundwater monitoring for the biological reduction study was performed to help finalize the evaluations of:

- groundwater velocity in the study area,
- carbon substrate longevity,
- the degree to which reduction of hexavalent chromium and other contaminants of potential concern (COPCs), such as chlorate, perchlorate, and chloroform, could occur in groundwater within the Upper Muddy Creek formation (UMCf), and
- confirm if geochemical conditions return to baseline conditions following completion of the treatability study.

The biological reduction study area is located within the Central Retention Basin at the NERT Site (Site), in Clark County, Nevada (Figure 1). Details of the treatability study procedures and initial results are presented in the *In-Situ Chromium Treatability Study Results Report, Revision 1* (Tetra Tech, Inc., 2018).

2.0 FIELD ACTIVITIES

Additional groundwater monitoring events were performed in March 2018 and June 2018 as part of the extended performance monitoring period discussed with the Nevada Division of Environmental Protection (NDEP) for the biological reduction study component of the In-Situ Chromium Treatability Study. The March 2018 groundwater monitoring event is identified as performance monitoring event (PME) #9 and the June 2018 groundwater monitoring event is identified as PME #10. For each groundwater monitoring event, groundwater levels were gauged using an interface meter at the six injection wells (CTIW-01S/D, CTIW-02S/D, and CTIW-03S/D) and 14 downgradient groundwater monitoring wells (CTMW-01S/D, CTMW-02S/D, CTMW-03S/D, CTMW-04S/D, CTMW-05S/D, CTMW-06S/D, and CTMW-07S/D) within the biological reduction study area (Figure 2). Gauging data and field observations were recorded on field data sheets (Appendix A). A comprehensive summary data table with the calculated groundwater elevations is provided in Appendix B.

As mentioned above, CTMW-07S and CTMW-07D were included in the extended performance monitoring period as both wells are located farther downgradient of the existing groundwater monitoring network and could provide additional information on the downgradient influence of the previous carbon substrate injections. These wells were installed from September 21 to 23, 2017, as part of the Remedial Investigation Modification No. 7, to further evaluate the distribution of perchlorate and other COPCs within the biological reduction study area (Tetra Tech, Inc., 2018). Shallow groundwater monitoring well CTMW-07S was screened in the Quaternary Alluvium (Qal) from 19 to 24 feet below ground surface (bgs), the same interval as the other shallow wells in the biological reduction study area. Deep groundwater monitoring well CTMW-07D was screened in the UMCf from 100 to 115 feet bgs, approximately 50 feet below the screened intervals of the other deep wells in the biological reduction study area. Additional details regarding the installation of CTMW-07S and CTMW-07D can be found in the *CTMW-07D and CTMW-07S Well Installation Technical Memorandum* (Tetra Tech, Inc., 2018), which is included as Appendix C.

During PME #9, groundwater samples were collected from 10 downgradient monitoring wells (CTMW-01S/D, CTMW-02S/D, CTMW-04S/D, CTMW-06S/D, CTMW-07S/D). During PME #10, groundwater samples were collected from eight downgradient monitoring wells (CTMW-01S/D, CTMW-02D, CTMW-04S/D, CTMW-06S/D, CTMW-07D). Although monitoring wells CTMW-02S and CTMW-07S were planned to be sampled during PME #10, groundwater samples could not be collected as insufficient groundwater was present within the monitoring wells. Groundwater monitoring wells CTMW-03S/D and CTMW-05S/D were not planned to be sampled in either performance monitoring event since they are located cross-gradient of the injection wells and analytical results from groundwater samples previously collected at these wells showed limited effects from the carbon substrate injections (Tetra Tech, Inc., 2018).

Groundwater sampling activities followed the procedures specified in *Field Sampling Plan, Revision 1* (Environ, 2014). A low-flow pump was used to purge each monitoring well at a rate between approximately 50 to 200 milliliters (mL) per minute to minimize drawdown and induce inflow of fresh groundwater. The pump discharge water was passed through a flow-through cell field water analyzer for continuous monitoring of field parameters (temperature, pH, turbidity, electrical conductivity [EC], dissolved oxygen [DO], and oxidation-reduction potential [ORP]). Field parameters were monitored and recorded on field sampling forms during purging (Appendix A). Purging was considered complete and the wells were sampled when the field parameter readings and water levels stabilized, or after a maximum of 1 hour of purging. The monitoring program for PME #9 and PME #10, including the field parameters and laboratory analyses, is provided in ***Table 1***.

Table 1 Monitoring Program for PME #9 and PME #10

Parameter	Analytical Method	PME #9	PME #10
Field Parameters			
EC	Field Meter	X	X
pH	Field Meter	X	X
DO	Field Meter	X	X
ORP	Field Meter	X	X
Temperature	Field Meter	X	X
Turbidity	Field Meter	X	X
Laboratory Analyses			
Hexavalent Chromium	SW7199	X	X
Total Chromium	SW6010B	X	X
Alkalinity	SM2320B	X	X
TOC	SM5310B	X	X
Nitrate	E300.0	X	X
Sulfate	E300.0	X	X
Sulfide	SM4500S2D	X	X
Total Nitrogen	E351.2	X	X
Total Phosphorus	E365.3	X	X
TDS	SM2540C	X	X
Ferrous Iron	HACH Method 8146	X	X
Hardness	SM2340C	X	X
Manganese	SW6010B	X	X
Dissolved Methane	EPA Method RSK-175	X	X
Dissolved Metals[1]	SW6020	X	X
Volatile Fatty Acids	SW8015-Modified	X	X
Volatile Organic Compounds	EPA Method 8260B	X	X
Perchlorate	E314.0	X	X
Chlorate/Chlorite	E300.1B	X	X
Chloride	E300.0	X	X
PLFA	Microbial Insights Bio-Trap®		X
Microbial Census	Microbial Insights Bio-Trap®		X

Notes:
PME - performance monitoring event
EC - electrical conductivity
DO - dissolved oxygen
ORP - oxidation-reduction potential
TOC - total organic carbon
TDS - total dissolved solids
PLFA - phospholipid fatty acids
[1] Dissolved metals include the following: aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, silver, thallium, uranium, vanadium, and zinc.

Investigation-derived waste (IDW) generated during the groundwater monitoring events was managed according to applicable state, federal, and local regulations and as described in “Field Guidance Document No. 001, Managing Investigation-Derived Waste” in the *Field Sampling Plan, Revision 1* (Environ, 2014). IDW that was generated during the groundwater monitoring activities included personal protective equipment, equipment decontamination water, and groundwater. Wastewater generated during purging or decontamination activities was temporarily stored in 5-gallon buckets and transferred to the GW-11 Pond.

3.0 ANALYSIS OF RESULTS

As described in the *In-Situ Chromium Treatability Study Results Report, Revision 1,* three carbon substrate injection events were performed during the biological reduction study in April, June, and August 2017. In April 2017, approximately 2,849 gallons of carbon substrate solution were injected into the shallow injection wells and approximately 5,610 gallons of carbon substrate solution were injected into the deep injection wells. In June 2017, approximately 2,211 gallons of carbon substrate solution were injected into the shallow injection wells and approximately 6,600 gallons of carbon substrate solution were injected into the deep injection wells. In August 2017, the injections were primarily focused on providing carbon substrate to the deep wells with approximately 450 gallons of carbon substrate solution injected into the shallow injection wells and approximately 6,000 gallons of carbon substrate solution injected into the deep injection wells. Additional monitoring event PME #9 was conducted approximately 46 weeks following the first carbon substrate injection event (30 weeks after the last carbon substrate injection) and additional monitoring event PME #10 was conducted approximately 62 weeks following the first carbon substrate injection event (46 weeks after the last carbon substrate injection). The following subsections present the groundwater analytical results, field parameters, microbial results, and hydrogeological evaluation for additional monitoring events PME #9 and PME #10.

3.1 GROUNDWATER ANALYTICAL RESULTS

This section presents a detailed discussion of groundwater analytical results for hexavalent chromium, total organic carbon (TOC), nitrate, chlorate, perchlorate, chloroform, sulfate, sulfide, and metals. In addition, a more generalized discussion of other useful parameters, including total dissolved solids (TDS), alkalinity, chlorite, chloride, dissolved methane, total nitrogen, and volatile fatty acids (VFAs) is also provided herein. Tabulated groundwater analytical results from both PME #9 and PME #10 events are provided in Appendix D. Results from previous monitoring events associated with this treatability study are also included for comparison purposes. Graphical presentations of the results for the extended performance monitoring period are shown on Figures 3A, 3B, 4A, and 4B, which are similar to the figures in the original report appended to include the new PME#9 and PME#10 data.

When evaluating the groundwater data, it is important to recall that the general sequence in which constituents are biologically degraded in response to injection of carbon substrate, as demonstrated with bench-scale testing by the University of Nevada Las Vegas (UNLV) is:

chromium > nitrate > chlorate > perchlorate

A Data Validation Summary Report (DVSR) was prepared for the laboratory analytical data collected during the installation of monitoring wells CTMW-07S and CTMW-07D as well as the additional groundwater monitoring events described in this addendum. The DVSR is provided as Appendix E to this addendum. The data were verified and validated in accordance with the procedures described in the *Quality Assurance Project Plan, Revision 2* (Ramboll Environ, Inc., 2017). The samples were validated based on the quality assurance project plan (QAPP) in place at time of validation and the references contained therein. Analytical field sample results from groundwater and field quality blanks were validated to Stage 2A. Approximately ninety percent of the analytical results from soil were validated to Stage 2B and at least ten percent were validated to Stage 4. The DVSR was prepared to assess the validity and usability of laboratory analytical data from well installation activities and additional groundwater monitoring completed for the biological reduction study component of the In-Situ Chromium Treatability Study. Tetra Tech collected additional quality assurance and quality control (QA/QC) samples to aid in assessing data quality. Data associated with the In-Situ Chromium Treatability Study that were submitted previously as an appendix to the *In-Situ Chromium Treatability Study Results Report* (Tetra Tech, Inc., 2018) are not included in the current DVSR (Appendix E).

3.1.1 Hexavalent Chromium

Hexavalent chromium was analyzed to monitor changes in groundwater concentrations after injections in the Qal and UMCf to ascertain the long-term effectiveness of the technology. Hexavalent chromium concentrations are presented in Appendix D and on Figures 3A and 3B.

Overall, hexavalent chromium concentrations in groundwater samples collected during the extended performance monitoring period remained significantly reduced at three Qal downgradient monitoring wells (CTMW-01S, CTMW-02S, and CTMW-06S) 46 weeks following the first carbon substrate injection event (PME #9) and at two Qal downgradient monitoring well (CTMW-01S and CTMW-06S) 62 weeks following the first carbon substrate injection event (PME #10). Specifically, during PME #9, hexavalent chromium was below detectable concentrations in groundwater samples collected from monitoring wells CTMW-01S, CTMW-02S, and CTMW-06S, which is a continuing trend from the last sampling event in March 2018 (previously reported). During PME #10, hexavalent chromium remained below detectable concentrations in groundwater samples collected from CTMW-06S, while slightly increasing at monitoring wells CTMW-01S and CTMW-04S, which correlates with the depletion of TOC (a surrogate for the injected carbon substrate) at these monitoring wells. Insufficient water was present at CTMW-02S and CTMW-07S to collect samples during PME #10.

Although significant reduction in hexavalent chromium concentrations in groundwater was observed at CTMW-06S (approximately 34 feet downgradient of the nearest injection well), the limited data set suggests that there was no evidence of reduction in hexavalent chromium concentration in groundwater at CTMW-07S (approximately 70 feet downgradient of the nearest injection well) as concentrations during this single event were comparable to pre-injection conditions at upgradient wells. Analytical results from the groundwater sample collected from CTMW-07S (see Appendix D) indicate hexavalent chromium concentrations comparable to baseline concentrations from the shallow groundwater monitoring wells within the biological reduction study area. As a result, the downgradient extent of the reduction zone is estimated to be between 34 and 70 feet. The sustained reduction of hexavalent chromium concentrations in groundwater and length of the reduction zone created downgradient of the injection wells continue to support the long-term effectiveness of this technology in the Qal.

As shown on Figure 3B, groundwater samples collected during the extended performance monitoring period from deep monitoring wells screened in the UMCf also continued to show biological reduction with hexavalent chromium concentrations in response to the carbon substrate injections. Hexavalent chromium concentrations were reduced by approximately 73% at the closest downgradient monitoring well (CTMW-01D) and 85% at the farthest downgradient monitoring well (CTMW-06D) when compared to baseline concentrations. Specificially, during PME #9 and PME #10, hexavalent chromium concentrations in groundwater remained low or continued to decrease at CTMW-01D, CTMW-02D, CTMW-04D, and CTMW-06D. Hexavalent chromium concentrations at locations CTMW-01D, CTMW-04D, and CTMW-06D during PME #10 were the lowest since baseline sampling. Although reductions in hexavalent chromium concentrations in groundwater were at a slower rate in the UMCf as compared to the Qal, significant reductions of hexavalent chromium were still observed in groundwater in the UMCf as evidenced by the results from PME #9 and PME #10. The slower rate of hexavalent chromium reduction in the UMCf compared to the Qal is primarily attributed to reduced carbon substrate distribution due to lower groundwater flow velocity and hydraulic conductivity.

3.1.2 Total Organic Carbon

TOC analytical results are often used as a surrogate parameter to track the carbon substrate injectate in the groundwater. TOC results are also an important indicator to determine the appropriate timing for reinjection activities. As a result, TOC was analyzed throughout the treatability study to monitor changes in carbon concentrations in groundwater after injections. TOC results are presented in Appendix D and on Figures 3A, 3B, 4A, and 4B.

TOC concentrations in groundwater in the Qal during the extended performance monitoring period remained elevated in several monitoring wells when compared to baseline concentrations of less than 2.5 milligrams per liter (mg/L). TOC concentrations were as high as 1,200 mg/L in groundwater collected from CTMW-01S during PME #9. Although concentrations were substantially lower during PME #10, TOC concentrations in groundwater as high as 91 mg/L were observed. TOC results from this supplemental sampling indicate that the carbon substrate has continued to persist in the Qal following the last injection event performed in August 2017.

TOC concentrations in groundwater in the UMCf remained elevated at the downgradient monitoring well closest to the injection wells (CTMW-01D), with concentrations during the extended performance monitoring period generally similar to those observed following the August 2017 injection event (greater than 300 mg/L). Concentrations at the farther downgradient well CTMW-06D continued to decline to a concentration of 20 mg/L but remained elevated when compared to the baseline concentration of 3.5 mg/L. The limiting factors to TOC propagation in the UMCf include the groundwater flow velocity and hydraulic conductivity, both of which were less than in the Qal.

3.1.3 Nitrate

Nitrate concentrations were evaluated throughout the study since it is a competing electron acceptor and carbon substrate consumer. Nitrate results are presented in Appendix D and on Figures 4A and 4B.

During the extended performance monitoring period, nitrate concentrations in groundwater in the Qal remained below detectable concentrations at CTMW-01S, CTMW-02S, and CTMW-06S but increased to as high as 130 mg/Lat CTMW-04S, which is similar to baseline concentrations of 150 mg/L. At CTMW-07S, the nitrate concentration in groundwater during PME #9 was 66 mg/L; however, no baseline or subsequent sample results were available for comparison, as there was insufficient water present within the well to collect a sample. However, the groundwater nitrate concentration in CTMW-07S during PME #9 was within the range of baseline concentrations (55 mg/L to 160 mg/L) in groundwater samples collected from other shallow wells. Overall, nitrate concentrations in groundwater remained below detectable concentrations at three of the downgradient monitoring wells (CTMW-01S, CTMW-02S, and CTMW-06S) during the extended performance monitoring period, indicating that denitrification continued to occur in the Qal in the biological reduction study area.

Nitrate concentrations in groundwater in the UMCf remained generally constant at deep wells CTMW-01D, CTMW-02D, and CTMW-06D. Overall, nitrate concentrations in groundwater throughout the treatability study were reduced at three deep wells (CTMW-01D, CTMW-02D, and CTMW-06D) by approximately 75%, 50%, and 80% respectively, compared to baseline concentrations. There was no noticeable reduction in nitrate concentrations in groundwater at CTMW-04D, indicating that appreciable rates of denitrification were not occurring in groundwater at this well.

3.1.4 Chlorate

Generally, chlorate biodegradation precedes perchlorate biodegradation, although the two processes can also occur simultaneously, particularly in the presence of organic carbon. As a result, chlorate was monitored to assess potential secondary impacts of treatment. Chlorate concentrations are presented in Appendix D and on Figures 4A and 4B.

Overall, chlorate concentrations in groundwater in the Qal throughout the treatability study were reduced by over 99% at CTMW-01S, CTMW-02S, and CTMW-06S. Chlorate concentrations in groundwater remained significantly reduced during the extended performance monitoring period at three downgradient montioring wells (CTMW-01S, CTMW-02S, and CTMW-06S) during PME #9, which was 46 weeks following the first carbon substrate injection event and at two of the five downgradient monitoring wells (CTMW-01S and CTMW-06S) during PME #10, which was 62 weeks following the first carbon substrate injection event. Well CTMW-02S was not sampled during PME #10 due to a lack of groundwater in the well. Specifically, chlorate concentrations in groundwater in the Qal remained at or just above detectable concentrations in groundwater at shallow wells CTMW-01, CTMW-02S, and

CTMW-06S. At CTMW-04S, chlorate concentrations in groundwater returned to baseline levels with concentrations of 2,600 mg/L and 3,500 mg/L during PME #9 and PME #10, respectively. The increasing chlorate concentrations in groundwater at CTMW-04S correlate with the depletion of TOC at this monitoring well. At CTMW-07S, the chlorate concentration in groundwater was 3,200 mg/L during PME #9. This chlorate concentration in groundwater is similar to the baseline chlorate concentrations in groundwater at the other shallow wells within the biological reduction study area and therfore, no indication of chlorate reduction was observed at CTMW-07S. It should be noted that chlorate concentrations in groundwater at CTMW-04S rebounded to above baseline concentrations during PME #9 and PME #10. The increased chlorate concentrations are attributed to the natural fluctuations in upgradient/cross-gradient groundwater concentrations and groundwater elevations within the shallow zone.

During the extended performance monitoring period, chlorate concentrations in groundwater in the UMCf continued to decrease at deep well CTMW-06D, decreased and then remained steady at CTMW-01D, and remained relatively consistent in groundwater samples collected from CTMW-02D and CTMW-04D. Overall, chlorate concentrations in groundwater in the UMCf were reduced by approximately 57% at CTMW-01D and by approximately 80% at CTMW-06D throughout the treatability study. At deep well CTMW-02D, chlorate concentrations in groundwater were reduced by approximately 60% by PME #4 but then increased to near baseline concentrations by PME #5.

3.1.5 Perchlorate

Perchlorate was analyzed throughout the treatability study in accordance with the *In-Situ Chromium Treatability Study Work Plan* and as part of the two additional monitoring events conducted during the extended performance monitoring period. Perchlorate concentration changes were evaluated over time to ascertain perchlorate degradation as a potential beneficial by-product of the technology. Perchlorate results from groundwater samples collected in the shallow (Qal) and deep (UMCf) wells are presented in Appendix D and on Figures 4A and 4B.

Perchlorate concentrations in groundwater in the Qal throughout the treatability study have been reduced by over 99.9% at CTMW-01S, CTMW-02S, and CTMW-06S. Specifically, perchlorate concentrations in groundwater remained significantly reduced when compared to baseline at three downgradient montioring wells (CTMW-01S, CTMW-02S, and CTMW-06S) during PME #9, which was 46 weeks following the first carbon substrate injection event, with concentrations at these wells ranging from less than 0.0025 mg/L to 0.13 mg/L during this event. Perchlorate concentrations in groundwater also remained significantly reduced when compared to baseline at two of the five downgradient monitoring wells (CTMW-01S and CTMW-06S) during PME #10, which was 62 weeks following the first carbon substrate injection event, with concentrations at these wells of 0.15 mg/L and 0.066 mg/L, respectively, during this event. As noted previously, well CTMW-02S was not sampled during PME#10 due to a lack of groundwater in the well. At CTMW-04S, perchlorate concentrations in groundwater were above baseline values with a maximum concentration of 870 mg/L. The increased perchlorate concentrations are attributed to the natural fluctuations in upgradient/cross-gradient groundwater concentrations and groundwater elevations within the shallow zone. At CTMW-07S, the perchlorate concentration in groundwater during PME #9 was 510 mg/L, which is consistent with the baseline concentrations for the other shallow wells within the biological reduction study area. Therefore, there was no indication of perchlorate reduction at CTMW-07S.

With respect to perchlorate degradation in the UMCf, during the treatability study and the additional monitoring events, the perchlorate concentrations were reduced by up to approximately 36% at CTMW-01D (1,400 mg/L at baseline to 900 mg/L at PME #9), 33% at CTMW-04D (980 mg/L at baseline to 660 mg/L at PME #9), and 76% at CTMW-06D (1,000 mg/L at baseline to 240 mg/L at PME #10). No significant perchlorate reduction was observed at the remaining deep wells. Perchlorate concentrations in groundwater from deep well CTMW-01D hit an all-time low in PME #9 but increased by PME #10. CTMW-06D exhibited a steady and sustained decreasing trend during both PME #9 and PME #10. Perchlorate concentrations in groundwater at the remaining deep wells either increased or remained relatively consistent.

3.1.6 Chloroform

Chloroform was analyzed throughout the treatability study in accordance with the *In-Situ Chromium Treatability Study Work Plan* and as part of the two additional monitoring events conducted during the extended performance monitoring period. Chloroform concentration changes were evaluated over time to ascertain chloroform degradation as a potential beneficial by-product of the technology. Chloroform is also amendable to in-situ biological reduction and is expected to be reduced following the reduction of nitrate (Bouwer & McCarty, 1983). Chloroform results from groundwater samples collected in the shallow (Qal) and deep (UMCf) wells are presented in Appendix D and on Figures 5A and 5B.

Chloroform concentrations in groundwater in the Qal were reduced by over 98% at CTMW-01S, CTMW-02S, and CTMW-06S during the treatability study with baseline concentrations ranging from 0.670 mg/L to 0.950 mg/L at these wells to concentrations ranging from less than 0.00025 mg/L to 0.0049 mg/L during PME #10. During PME #9 and PME #10, chloroform concentrations in groundwater in the Qal remained substantially reduced or continued to decline at these shallow wells compared to baseline concentrations. Although chloroform concentrations in groundwater samples collected from monitoring well CTMW-04S indicated substantial decreases during the treatability study (0.72 mg/L at baseline to 0.048 mg/L at PME #8), concentrations returned to near baseline values during the additional monitoring with a maximum concentration of 0.580 mg/L. At CTMW-07S, the chloroform concentration in groundwater during PME #9 was 0.830 mg/L, which is consistent with the baseline concentrations for the other shallow wells. Therefore, no indication of chloroform reduction was assumed at CTMW-07S.

During the treatability study, chloroform concentrations in groundwater in the UMCf at deep wells CTMW-01D, CTMW-02D, CTMW-04D, and CTMW-06D were reduced compared to baseline values, with some of the lowest concentrations observed during PME #9. Baseline concentrations at these wells ranged from 1.5 mg/L to 1.8 mg/L while concentrations at these wells during PME #9 ranged from 0.440 mg/L to 0.990 mg/L. During PME#10, chloroform concentrations in groundwater began to return to baseline concentrations at CTMW-01D, CTMW-02D, and CTMW-04D but continued to reduce at CTMW-06D to 0.270 mg/L. Overall, the maximum reduction in chloroform concentrations in groundwater in the UMCf at CTMW-01D, CTMW-02D, CTMW-04D, and CTMW-06D was 60%, 34%, 40%, and 82%, respectively, when compared to concentrations during the baseline or first sampling event.

3.1.7 Sulfate and Sulfide

Groundwater within the treatability study area has high native sulfate concentrations. Generally, sulfate reduction occurs only under very reducing conditions and after hexavalent chromium, nitrate, perchlorate, and chlorate reduction has occurred. Sulfide is a product of sulfate reduction and measurements of sulfide concentrations in groundwater can be used in conjunction with pH and ORP changes and changes in ferrous iron concentrations to understand if sulfate reduction is occurring. Sulfate and sulfide results are presented in Appendix D.

Sulfate concentrations in groundwater in the Qal remained decreased compared to baseline concentrations at shallow wells CTMW-01, CTMW-02S, and CTMW-06S. During PME #10, sulfate concentrations in groundwater increased at shallow wells CTMW-01S and CTMW-06S. At CTMW-04S, sulfate concentrations in groundwater returned to baseline levels with concentrations of 1,500 mg/L and 1,400 mg/L during PME #9 and PME #10, respectively. At CTMW-07S, the sulfate concentration in groundwater was 1,400 mg/L during PME #9. This sulfate concentration in groundwater is similar to the baseline sulfate concentrations in groundwater at the other shallow wells within the biological reduction study area and therfore no indication of sulfate reduction was assumed at CTMW-07S.

During the treatability study, sulfate reduction was observed in groundwater samples collected from monitoring wells CTMW-01S, CTMW-02S, and CTMW-06S and this general reducing trend continued during the additional monitoring. Although detectable concentrations of sulfide (a product of sulfate reduction) were also present in groundwater during several performance monitoring events at CTMW-01S, CTMW-02S, CTMW-04S, and CTMW-

06S, concentrations remained less than 1.0 mg/L indicating that sulfide was not accumulating. The decrease in sulfate concentrations and presence of sulfide indicate sulfate reduction was occurring and highly reducing conditions were present in the shallow treatment zone. Typically, sulfate reduction occurs when there is an abundance of carbon substrate and the ORP remains below -220 millivolts (mV). The primary concerns with sulfate reduction are the formation of hydrogen sulfide and the consumption of additional carbon substrate. During this treatability study, the accumulation of hydrogen sulfide was not observed. The results of this treatability study can be used to design future carbon substrate injections to limit sulfate reducing conditions.

Overall, there was limited sulfate reduction observed in the deep wells. The most significant reductions in sulfate concentrations in groundwater in the UMCf were observed at deep wells CTMW-01D and CTMW-06D, where concentrations were reduced from 1,900 mg/L to 990 mg/L (48% reduction) and from 1,500 to 860 mg/L (43% reduction), respectively. Sulfide was rarely detected in groundwater within the UMCf at a concentration above the detection limit, which corroborates with the data indicating that sulfate reduction was not occurring to a significant extent within the UMCf during the biological reduction study.

3.1.8 Metals

As presented in ***Table 1***, a suite of dissolved metals was analyzed in groundwater samples collected as part of PME #9 and PME #10. Field measurements for ferrous iron were also collected as part of the performance monitoring events. Results of each parameter analyzed are presented in the comprehensive data tables provided in Appendix D. In general, metal concentrations such as iron and manganese decreased during PME #9 and #10, in the Qal, particularly in the farther downgradient wells, as geochemical conditions return to baseline levels. Arsenic concentrations remained elevated in some shallow wells but was detected in the range of baseline concentrations for the biological reduction study area at the farthest downgradient shallow monitoring well (CTMW-07S) indicating that arsenic increases are likely temporarily localized to the treatment area. In the UMCf, dissolved metal concentrations of arsenic, iron and manganese generally increased during PME #9 and #10. Any increases in metal concentrations such as arsenic, iron, and manganese within the treatment zone are spatially limited to groundwater within the biological treatability study area, and concentrations are expected to return to baseline concentrations as the geochemical conditions return to baseline levels (Borden, 2015). A focused evaluation of concentration changes of three metals (arsenic, iron, and manganese) during PME #9 and PME #10 is provided below. Reducing conditions in the Qal and UMCf during the treatability study can cause these metals to become more soluble.

3.1.8.1 Arsenic

Arsenic can be released from minerals present in the saturated subsurface when reducing conditions are created following the injection of a carbon substrate. The potential for the release of arsenic from these minerals and subsequent transfer to groundwater is an important factor to understand when evaluating this technology for application in a particular geologic setting. In general, increases in arsenic concentrations in groundwater tend to be localized within the area of reducing conditions created by the carbon substrate injection and are temporary in nature. Once the reducing conditions created by the substrate injection dissipate and the original groundwater conditions return, or when groundwater from the reducing area flows to downgradient areas not influenced by the injections, arsenic concentrations tend to return to previous concentrations (The Interstate Technology & Regulatory Council, 2008). As the amount of carbon substrate in the injection area declines, arsenic concentrations in groundwater are also expected to decline and minimal arsenic will be released from the subsurface minerals (Borden, 2015). Furthermore, the presence of sulfate and biogenic sulfide generation under reducing conditions also tend to precipitate and immobilize arsenic over time as metal sulfides (Borden, et. al, 2015). Because the area of the biological reduction study is within the capture zone of the Interceptor Well Field (IWF) and a considerable distance upgradient of a receiving body of water, it is quite unlikely that temporal increases in arsenic in groundwater associated with the substrate injection area would impact arsenic concentrations farther downgradient.

The baseline groundwater sampling event conducted in April 2017 indicated that dissolved arsenic concentrations in groundwater within the Qal ranged from 0.065 mg/L to 0.12 mg/L in the biological reduction study area. Following carbon substrate injections, arsenic concentrations increased in several downgradient monitoring wells, with the highest arsenic detection of 0.91 mg/L in groundwater collected from CTMW-01S. As a result, arsenic was evaluated during the additional monitoring events to quantify the expected reduction in arsenic concentrations once the groundwater condition return to its natural state following depletion of carbon substrate. During PME #9 and PME #10, arsenic concentrations in groundwater started to decrease at downgradient well CTMW-01S but increased to 1.3 mg/L at CTMW-02S. Farther downgradient, the arsenic concentration in CTMW-04S decreased to 0.061 mg/L during PME #10, below the baseline concentration of 0.065 mg/L. The arsenic concentration in groundwater at CTMW-06S decreased between PME #9 and PME #10 but remained elevated above the baseline concentration. Overall, except at CTMW-02S, the arsenic concentrations in groundwater decreased during PME #9 and PME #10 at each downgradient shallow monitoring well from the maximum arsenic concentration in groundwater. Arsenic concentrations in groundwater at the farthest downgradient monitoring well, CTMW-07S, were 0.12 mg/L during PME #9, which is within the range of the baseline concentrations within the Qal at the biological reduction study area, indicating that the increase in arsenic concentrations observed during the treatability study are likely temporarily localized to the biological reduction study area.

The baseline groundwater sampling event conducted in April 2017 indicated that arsenic concentrations in groundwater within the deep monitoring wells ranged from below detectable concentrations to 0.100 mg/L in the biological reduction study area. During PME #9 and PME #10, arsenic concentrations in groundwater generally stayed within the range of the baseline concentrations with a maximum concentration in groundwater of 0.110 mg/L at CTMW-04D.

3.1.8.2 Iron

Iron can be reduced, mobilized, and precipitated out into the aquifer under anaerobic conditions, a phenomenon that can sometimes decreases hydraulic conductivity in the aquifer. Groundwater samples collected during PME #9 and PME #10 were analyzed for total and dissolved iron concentrations to evaluate the potential mobilization of iron. Field measurements for ferrous iron were also collected to evaluate the oxidation state of iron. Total and dissolved iron concentrations in shallow groundwater during PME #9 and PME #10 were generally less than concentrations detected previously during the treatability study. Ferrous iron was detected in groundwater at the shallow wells at concentrations up to 4.0 mg/L during PME #9 and PME #10, above the maximum detected baseline concentration of 0.40 mg/L. The maximum concentration of ferrous iron was observed at CTMW-02S during PME #9.

Like groundwater in the Qal, dissolved and total iron concentrations within groundwater of the UMCf fluctuated throughout the performance monitoring events, but the magnitude of the fluctuations and concentrations in groundwater within the UMCf was one to two orders of magnitude less than in the shallow groundwater. Total iron concentrations in groundwater in the UMCf during PME #9 and PME #10 were generally less than concentrations detected previously during the treatability study, except for CTMW-06D which exhibited an increasing trend from less than 0.050 mg/L during PME #4 to a maximum concentration of 2.1 mg/L during PME #10. Dissolved iron concentrations in groundwater in the UMCf during PME #9 and PME #10 were generally less than concentrations detected previously during the treatability study and similar to baseline concentrations. Ferrous iron was not detected in groundwater at the deep wells during PME #9 and PME #10.

3.1.8.3 Manganese

Manganese was analyzed to assess the potential for biologically driven dissolution of manganese oxide on aquifer solids, which can cause a reduction in hydraulic conductivity. During PME #9 and PME #10, dissolved and total manganese concentrations in shallow groundwater decreased to a maximum concentration of 1.6 mg/L compared to a maximum concentration of 7.1 mg/L during previous performance monitoring events at the shallow wells. An increasing trend of dissolved and total manganese concentrations in groundwater was observed at deep

wells CTMW-01D, CTMW-02D, and CTMW-06D with a maximum concentration of 1.2 mg/L at CTMW-01D during PME #10.

3.1.9 Additional Analytes

Several other parameters were analyzed in accordance with the *In-Situ Chromium Treatability Study Work Plan* and as part of the two additional monitoring events conducted during the extended performance monitoring period. A summary of these parameters and their significance is presented below. Results of each parameter analyzed are presented in the comprehensive data tables provided in Appendix D.

- TDS was analyzed to assess the potential for elevated salt concentrations to delay the rate of hexavalent chromium biodegradation. Overall, TDS concentrations in groundwater ranged up to 20,000 mg/L throughout the biological reduction study. During PME #9 and PME #10, TDS concentrations in groundwater ranged between 3,500 and 10,000 mg/L in the shallow wells and 8,000 mg/L and 12,000 mg/L in the deep wells The reductions observed in hexavalent chromium concentrations in groundwater during the treatability study (similar to the bench-scale treatability study) indicate that TDS concentrations at these levels did not hinder microbial activity and biodegradation of hexavalent chromium.
- Alkalinity increases can occur from microbial respiration and the production of carbon dioxide, which in solution could combine with native calcium to form calcium carbonate. Throughout the biological reduction study, alkalinity values in groundwater at the shallow wells significantly increased when compared to baseline concentrations (less than 200 mg/L) with observed alkalinity concentrations as high as 6,300 mg/L. During PME #9 and PME #10, alkalinity values in groundwater ranged between 210 and 3,700 mg/L within the Qal and ranged between 180 mg/L and 1,400 mg/L in the UMCf. These increases in groundwater alkalinity compared to baseline concentrations indicate an increased level of microbial activity and serve as an indirect indicator of biodegradation. As expected, alkalinity concentrations are generally decreasing as groundwater geochemistry returns to natural conditions.
- Although the reduction of perchlorate should result in an increase in chloride concentrations, chloride may not be a useful indirect indicator of biodegradation because of its high native concentrations at the Site. Chloride concentrations in groundwater within the shallow wells ranged between 780 and 1,600 mg/L during PME #9 and PME #10. In general, chloride concentrations in groundwater within the shallow wells decreased or remained stable when compared to PME #8. However, when compared to baseline concentrations, an increase in chloride concentrations was observed in groundwater at five of the seven shallow wells. The most significant increase in chloride concentrations in groundwater within the shallow wells was at CTMW-02S, where chloride concentrations increased from a baseline concentration of 780 mg/L to 1,600 mg/L during PME #10. A similar pattern was observed in groundwater collected from the deep monitoring wells. Chloride concentrations in groundwater within the deep wells ranged between 1,200 mg/L and 2,700 mg/L during PME #9 and PME #10. When compared to baseline concentrations, chloride concentrations in groundwater increased at three of the seven deep wells (CTMW-01D, CTMW-02D, and CTMW-06D). The most significant increase was at CTMW-06D, where chloride concentrations in groundwater increased from a baseline concentration of 1,300 mg/L to 2,000 mg/L during PME #10. The increase in chloride concentrations in groundwater with the Qal and UMCf following carbon substrate injections provides supplementary evidence of perchlorate reduction.
- Methanogenic conditions (signified by biological methane production) require highly reducing conditions that are generally not necessary for hexavalent chromium biodegradation. Dissolved methane was sampled during the treatability study to determine if methanogenesis was occurring. In general, an increasing trend of dissolved methane concentrations in groundwater was observed at all monitoring locations within the Qal and UMCf when compared to baseline values or results from the first sampling event. However, based on dissolved methane concentration data, methanogenesis within the treatability study area was limited.

- Total nitrogen was only detected in groundwater samples collected from CTMW-01S, CTMW-02S, and CTMW-06S during PME #9 and PME #10. The highest total nitrogen concentration of 180 mg/L was measured in groundwater collected from CTMW-01S. During the treatability study, the total nitrogen concentration increased in groundwater at CTMW-01S, CTMW-02S, and CTMW-06S, which is attributed to the introduction of nutrients into the aquifer as part of the carbon substrate injections.
- High concentrations of carbon substrates in a highly reducing environment can lead to the generation of organic acids and intermediate fermentation-based products such as acetone and methyl ethyl ketone (Fowler, 2011). These products act as electron donors in the further degradation of electron acceptors under both aerobic and anaerobic conditions (Fowler, 2011). Overall, concentrations of acetone and methyl ethyl ketone in groundwater at the shallow wells increased following the carbon substrate injections but decreased over time to baseline or near baseline. Acetone concentrations in groundwater increased from less than 0.25 mg/L at all shallow wells during baseline to a maximum concentration of 2.8 mg/L during PME #2 in groundwater samples collected from CTMW-01S. Subsequent monitoring events indicated a decreasing trend in acetone concentrations, with groundwater concentrations decreasing at CTMW-01S to 0.054 mg/L during PME #10. Methyl ethyl ketone concentrations in groundwater were below 0.063 mg/L at all shallow wells during baseline and reached a maximum groundwater concentration of 11 mg/L during PME #8 at CTMW-01S. Methyl ethyl ketone concentrations in groundwater subsequently decreased to below 0.013 mg/L for all shallow wells sampled during PME #10. Within the deep wells, acetone and methyl ethyl ketone concentrations in groundwater increased from below detectable concentrations up to 0.51 mg/L and 1.3 mg/L at CTMW-01D. Concentrations of acetone and methyl ethyl ketone in groundwater samples collected from downgradient wells, CTMW-04D and CTMW-06D, were below detectable concentrations during PME #10, indicating that the increased concentrations of acetone and methyl ethyl ketone are localized.
- VFAs were analyzed during PME #9 and PME #10. These acids are produced continually during hydrolysis of the long-chain fatty acids of $EOS_{PRO}^{®}$ (part of the carbon substrate injected) and are more readily available organic compounds for biodegradation. Acetic acid, n-butyric acid, and propionic acid were all detected in Qal and UMCf groundwater samples at concentrations greater than baseline concentrations previously during the treatability study. VFAs returned to below detectable concentration levels during PME #10. Concentrations of VFAs in groundwater at the deep wells increased at CTMW-01D but were below detectable concentrations at the other deep wells during PME #10. The highest concentrations of VFAs observed in groundwater within the Qal and UMCf generally correlate to wells where substrate presence was observed based on increased TOC concentrations.

3.2 FIELD PARAMETERS

Several field parameters were analyzed in accordance with the *In-Situ Chromium Treatability Study Work Plan* and as part of the two additional monitoring events conducted during the extended performance monitoring period. A summary of these parameters and their significance is presented below. Results of each field parameter analyzed are presented in the comprehensive data tables provided in Appendix D.

- DO measurements are a useful parameter to identify geochemical conditions in the groundwater. The absence of dissolved oxygen is used to confirm that anaerobic conditions have been achieved and are being sustained. Anaerobic conditions are essential for hexavalent chromium biodegradation since hexavalent chromium reduction does not proceed under aerobic conditions. Although DO concentrations decreased to levels indicative of anaerobic conditions during the treatability study, supplemental monitoring events PME #9 and PME #10 indicate that DO concentrations in groundwater in the Qal were generally reflective of aerobic conditions. During the study, the anaerobic conditions indicated by the DO concentrations are consistent with the observed degradation of hexavalent chromium, perchlorate, chlorate, and nitrate. During PME #9 and PME #10, DO concentrations in groundwater in the UMCf

indicated anaerobic conditions at deep wells CTMW-01D and CTMW-06D and reduced DO concentrations at CTMW-02D and CTMW-04D compared to baseline conditions. DO concentrations during PME #10 remained low (less than 0.86 mg/L), indicating anaerobic conditions remained approximately 62 weeks following the first carbon substrate injection event. DO concentration reductions in groundwater at CTMW-01D and CTMW-06D are consistent with the TOC increases observed at these wells.

- ORP readings may provide a valuable tool to identify redox conditions in groundwater and ascertain reducing conditions. At some sites, ORP readings correlate well with DO values and, therefore, provide a means to verify the extent of the reducing conditions that develop in response to the carbon substrate injections. It should be noted that in aquifers with several electron acceptors and electron pairs, such as iron pairs, nitrogen pairs, perchlorate/chlorate/chloride, and sulfur pairs, it is possible that interference may occur with respect to redox measurements. As with DO measurements, decreases in ORP measurements were observed during the study in groundwater in the Qal at shallow monitoring wells CTMW-01S, CTMW-02S, and CTMW-06S. ORP measurements were as low as -127 mV during PME #10 at CTMW-06S, indicating that reducing conditions generally remained within these wells. During PME #9 and PME #10, ORP measurements of groundwater samples collected from the deep wells were positive, indicating that the groundwater has returned to an oxidizing environment. As DO concentrations remained low in groundwater samples collected from the deep wells during PME #9 and PME #10, the increase in ORP is attributed to other changes in general groundwater chemistry. Decreases in ORP measurements in groundwater were observed during the biological reduction study in deep wells CTMW-01D, CTMW-02D, CTMW-03D, and CTMW-04D. In general, lower ORP measurements were observed during the performance monitoring event following carbon substrate injections #2 and #3, with measurements as low as -193 mV in groundwater at CTMW-03D during PME #4. During the PME #8 event, the ORP measurements were as low as -130 mV at CTMW-04D, which indicated reducing conditions were present.
- Groundwater pH and temperature are common environmental factors that could affect microbial activity, with microorganisms generally preferring a pH between 6 and 8 standard units and warmer temperatures. Biological reduction due to carbon substrate injection often leads to acid production, which then results in lowering of pH and causes potential stress on native microorganisms. Based on the sampling data collected during PME #1 through PME #10, groundwater pH and temperature within the biological reduction study area groundwater in both the Qal and UMCf generally remained within ideal ranges, with pH ranging from 5.1 to 8.7 standard units and temperatures greater than 20 degrees Celsius. Although lower pH values were observed in groundwater within the nearest downgradient shallow monitoring wells following the first injection event, subsequent injection events included sodium bicarbonate as a precaution to help buffer the solution and avoid large fluctuations in pH associated with the low pH industrial sugar wastewater solution and geochemical responses to the microbial activity.

3.3 MICROBIAL RESULTS

During the additional extended performance monitoring period, four new Bio-Trap® samplers were deployed in wells CTMW-01S, CTMW-01D, CTMW-03S, and CTMW-03D within the biological reduction study area on March 12, 2018. These wells were selected since they had previously been selected for microbial analysis as part of PME #5. The samplers were in place for over 3 months and were retrieved and shipped to Microbial Insights for analyses on June 21, 2018. The results for the microbial analysis associated with PME #10 groundwater monitoring are provided in ***Table 2*** and presented in Appendix F.

Table 2 Bio-Trap® Results Collected During PME #10 Groundwater Monitoring

Parameter	PME #10			
	CTMW-01S	CTMW-01D	CTMW-03S	CTMW-03D
Sulfate Reducing Bacteria (cells/bead)	2.21×10^4	$<2.50 \times 10^2$	7.88×10^2	2.99×10^1
Perchlorate Reductase (cells/bead)	$<2.50 \times 10^2$	$<2.50 \times 10^2$	$<2.50 \times 10^2$	$<2.50 \times 10^2$
Total Biomass (cells/mL)	2.72×10^6	6.00×10^4	7.75×10^4	2.33×10^5
Community Structure (% total PLFA)				
Firmicutes (TerBrSats)	12.50	32.56	0.00	0.80
Proteobacteria (Monos)	58.97	46.17	93.11	79.63
Anaerobic metal reducers (BrMonos)	0.70	6.41	1.52	3.15
SRB/Actinomycetes (MidBrSats)	0.93	0.00	0.00	0.00
General (Nsats)	25.61	14.86	5.37	15.90
Eukaryotes (polyenoics)	1.30	0.00	0.00	0.52
Physiological Status (Proteobacteria Only)				
Slowed growth	0.87	1.12	0.61	4.43
Decreased Permeability	0.05	0.00	0.00	0.82

Total microbial biomass (cells per bead) in groundwater between PME #5 and PME #10 increased at CTMW-01S, decreased at CTMW-01D and CTMW-03S, and remained relatively consistent at CTMW-03D. Overall, the numbers indicate a reasonable microbial population given the challenging TDS concentrations and considering that the target contaminant for this biological study is chromium. However, the perchlorate reductase gene decreased to levels below the reporting limit in all four wells indicating a decline in the presence of perchlorate-reducing bacteria, likely due to the limited carbon substrate remaining at these wells.

The sizeable proportion of Proteobacteria in all four wells indicates a proliferation of the appropriate bacterial community that is gram negative, can utilize a variety of carbon sources, and has adapted easily to the groundwater environment. Generally, these proportions increased compared to the previous microbial sampling, except for CTMW-01D, where they decreased but are still significant at 46%. Firmicutes remained relatively consistent across the four wells except for CTMW-01D, where they increased from 6.06% of the community population to 32.56%, indicating the likelihood of a local increase in fermentable carbon substrates and resulting anaerobic fermenting bacteria at this well. Proportions of metal reducing bacteria and sulfate reducing bacteria (SRB)/actinomycetes remain low across the two events (less than 10%) indicating redox conditions that are not overly reducing, thereby limiting and controlling sulfate reduction. Eukaryotes percentages decreased from the previous microbial sampling, which indicates that these scavengers of valuable contaminant-reducing bacteria do not pose a significant threat in this groundwater.

Ratios for slowed growth and for decreased permeability of the cell membrane provide information on the “health” of the gram negative microbial community and how this population is responding to the conditions present in the environment. Higher numbers (i.e., greater than 0.5) are generally reflective of a community that is stressed and has become more toxic and not as supportive of the microbial community, due to a lack of available carbon substrate, increase in toxic conditions, or the presence of toxic intermediate degradation compounds. Lower ratios (less than 0.5) generally indicate availability of substrate and the creation of an environment that is supportive of a diverse microbial community. Results of the physiological status indicate that the ratios for slowed growth are on the higher side, indicating an environment that is likely to be lacking in carbon substrate. However, the ratios of decreased permeability are on the lower side, which indicates that toxicity itself may not be an inherent issue.

Generally, the ratios for slowed growth and for decreased permeability remained consistent across PME #5 and PME #10.

3.4 HYDROGEOLOGICAL EVALUATION

Groundwater level measurement data and calculated elevation data for the 20 wells (6 injection wells and 14 monitoring wells) gauged during the biological reduction study (including PME #9 and PME #10) are summarized in Appendix B. The groundwater elevation results for PME #9 and PME #10 are discussed below.

During the treatability study, groundwater elevations decreased by an average of 0.46 feet in the shallow wells and 0.55 feet in the deep wells from the baseline gauging event to PME #10. During PME #9, groundwater elevations ranged from 1,733.68 feet above mean sea level (ft amsl) at CTMW-07S to 1,735.51 ft amsl at CTIW-01S in the shallow wells. In the deep wells, groundwater elevations ranged from 1,733.87 ft amsl at CTMW-06D to 1,735.11 ft amsl at CTIW-01D. Water levels generally increased by an average of 0.50 feet in the shallow wells and 0.47 feet in the deep wells compared to the previous performance monitoring event, PME #8, conducted in October 2017. During PME #10, groundwater elevations ranged from 1,733.70 ft amsl at CTMW-06S to 1,734.99 ft amsl at CTIW-01S in the shallow wells. In the deep wells, groundwater elevations ranged from 1,733.45 ft amsl at CTMW-06D to 1,734.59 ft amsl at CTIW-01D. Water levels generally decreased by an average of 0.58 feet in the shallow wells and 0.54 feet in the deep wells compared to the previous performance monitoring event, PME #9. The groundwater elevation at CTMW-07D was 1,736.67 ft amsl, a decrease of 0.19 feet compared to the previous performance monitoring event, PME #9.

In general, a downward vertical gradient was observed at the biological reduction study area during PME #9 and PME #10 with the exception of CTMW-07S and CTMW-07D which exhibited an upward vertical gradient during PME #9 and CTMW-03S and CTMW-03D which exhibited an upward vertical gradient during PME #10. The average vertical hydraulic gradient between the shallow and deep wells at the biological reduction study area was approximately 0.0153 feet per foot (ft/ft) downward during PME #9 (excluding CTMW-07S and CTMW-07D)and 0.0156 ft/ft downward during PME #10 (excluding CTMW-03S and CTMW-03D), generally consistent with the average downward vertical gradient of 0.018 ft/ft observed during the biological reduction study. An upward groundwater gradient of 0.038 ft/ft was observed at well pair CTMW-07S and CTMW-07D during PME #9. An upward groundwater gradient of 0.0022 ft/ft was also observed at well pair CTMW-03S and CTMW-03D during PME #10.

During PME #10, the overall groundwater flow direction across the biological reduction study area in the shallow zone (Qal) was to the north to northeast with a horizonal hydraulic gradient of 0.0123 ft/ft, and in the deep zone (UMCf) the overall flow direction was to the northeast with a horizontal hydraulic gradient of 0.0154 ft/ft (Figures 3A and 3B). During the treatability study, the average hydraulic gradient calculated in the study area for wells screened in the Qal was calculated to be 0.019 feet per foot (ft/ft) in the area around the monitoring wells and 0.055 ft/ft in the area between the injection and monitoring wells to the north and northeast. The average hydraulic gradient calculated in the study area for wells screened in the UMCf was calculated to be 0.021 ft/ft to the northeast.

Locally, in the southeast portion of the biological reduction study area, near well CTIW-02S, the groundwater flow direction is north-northwest with a horizontal hydraulic gradient of 0.044 ft/ft. In the southwest portion of the biological reduction study area, the apparent groundwater flow direction is north-northeast with a hydraulic gradient of 0.0381 ft/ft. These two localized variations in the groundwater flow direction and horizontal hydraulic gradient in the vicinity of the injection wells are most likely related to local variations in hydraulic conductivity.

Groundwater levels, gradient, and flow direction obtained during PME #9 and PME #10 was used to further refine the groundwater velocity estimates for the biological reduction study area. For the purposes of refining the groundwater velocity estimates, hydraulic conductivity values were selected from the Specific Capacity Test Results for the shallow zone and slug test results for the deep zone, which are provided in Appendix C of the *In-*

Situ Chromium Treatability Study Results Report (Tetra Tech, Inc., 2018). Shallow hydraulic conductivity values were calculated by averaging the estimated hydraulic conductivity values (Theis, unconfined) for wells CTIW-01S, CTIW-02S, and CTIW-03S. Deep hydraulic conductivity values were calculated by averaging the mean hydraulic conductivity for wells CTIW-01D, CTIW-02D, and CTIW-03D. In the shallow (Qal) zone, the groundwater flow velocity, calculated using locations CTIW-01S, CTIW-02S, and CTIW-03S and downgradient wells CTMW-01S, CTMW-02S and CTMW-06S, was estimated to be approximately 6 to 20 ft/day. These high flow velocities are supported by the fact that significant concentrations of TOC were observed in wells CTMW-01S and CTMW-06S during the first sampling event (PME #1) after injection, so arrival of groundwater containing high TOC at these wells had likely occurred prior to that sampling event. For example, CTMW-01S TOC values increased from 2.4 to 2,300 mg/L within 2 weeks after the injection. It is highly unlikely that the groundwater containing high TOC arrived at these wells the same day as sampling; rather, the increased TOC concentrations likely occurred at these wells within the first week after injection. In the deep (UMCf) zone, the groundwater flow velocity, calculated using locations CTIW-01D, CTIW-02D, and CTIW-03D and downgradient wells CTMW-01D, CTMW-02D, and CTMW-06D, was estimated to range from about 0.1 to 0.4 ft/day. Based on the last injection date in August 2017, the arrival of groundwater containing increased TOC concentrations from that injection event was predicted to occur between October and December 2017, depending on the location. In fact, increased concentrations of TOC in groundwater were observed at well CTMW-02D in October 2017, as predicted.

As mentioned in the *In-Situ Chromium Treatability Study Results Report* (Tetra Tech, Inc., 2018), decreases in hydraulic conductivity were observed in the vicinity of shallow monitoring wells CTMW-01S and CTMW-02S and deep monitoring well CTMW-02D. These decreases were probably related to other factors such as the reduction in saturated thickness between aquifer test events and/or bioaccumulation associated with the injection events as opposed to the precipitation of metals. The data obtained for iron and manganese during PME #9 and PME #10 combined with the arrival of increased TOC concentrations provides evidence that the increase in iron and manganese concentrations were unlikely to have substantially impacted hydraulic conductivity.

4.0 CONCLUSIONS

The following is a summary of the general conclusions based on the extended performance monitoring conducted within the biological reduction study area:

- Consistent with the results from PME #1 through PME #8 presented in the *In-Situ Chromium Treatability Study Results* Report, data obtained from the extended performance monitoring period further demonstrates that in-situ treatment by biological reduction has been effective at reducing the concentrations of hexavalent chromium and other COPCs (such as nitrate, chlorate, perchlorate, and chloroform) in groundwater within the Qal and UMCf. In the Qal, hexavalent chromium, nitrate, chlorate, perchlorate, and chloroform concentration in groundwater were reduced by over 99% throughout the treatability study when compared to baseline concentrations. In addition, chromium, nitrate, chlorate, perchlorate, and chloroform concentrations in groundwater in the Qal remained reduced at several downgradient monitoring wells during PME #10, which was 62 weeks following the first carbon substrate injection event and 46 weeks following the last carbon substrate injection event. In the UMCf, hexavalent chromium, nitrate, chlorate, perchlorate, and chloroform concentration in groundwater were reduced by up to 85%, 81%, 80%, 76%, and 82% throughout the treatability study when compared to baseline concentrations. The COPC concentration reductions in groundwater in the UMCf were observed to occur more slowly and to a lesser extent than groundwater in the Qal, but significant reductions were still achieved and appear to be ongoing at the time of PME #10. The slower and limited COPC reduction in the UMCf compared to the Qal is primarily attributed to reduced carbon substrate distribution due to lower groundwater flow velocity and hydraulic conductivity.
- The additional TOC data obtained through the extended performance monitoring period allowed for further refinement of the estimated residence time of the selected combination of carbon substrates in groundwater. Based on observations of the TOC concentrations in groundwater between the third carbon substrate injection event and PME #10, the selected combination of carbon substrates appears to have a residence time of at least 46 weeks in the shallow groundwater. This conclusion is based on the observed TOC concentration of 91 mg/L during PME #10 at monitoring well CTMW-01S which is approximately 15 feet downgradient of injection well CTIW-01S. For the deep wells, the TOC concentration remained elevated in CTMW-01D during PME #10, which indicates that the residence time of carbon substrate in the deeper zone is also at least 46 weeks. In fact, the substrate residence time in the UMCf will likely be greater than 46 weeks as the TOC concentration remained high at 320 mg/L in well CTMW-01D at the time of PME #10.
- The additional metals data obtained through the extended performance monitoring period provided further evidence that increases in dissolved metal concentrations associated with the biological reduction of hexavalent chromium were localized to the treatment zone and temporary in nature, with concentrations continuing to decrease as geochemical conditions return to baseline conditions. As presented in the *In-Situ Chromium Treatability Study Results Report,* dissolved metal concentrations in groundwater, such as arsenic, iron, and manganese, increased in groundwater at several downgradient monitoring wells during the initial monitoring period for the biological reduction study (i.e., PME #1 through PME #8). However, concentrations of dissolved metals generally decreased in these wells across PME #9 and PME #10. While arsenic concentrations in groundwater increased at several downgradient monitoring wells during PME #9 and PME #10, the concentrations in groundwater at the farthest downgradient monitoring well (CTMW-07S) was detected within the range of baseline concentrations, indicating that the increase in arsenic concentrations observed during the treatability study are likely temporarily localized. In general, concentrations have either decreased at or below baseline concentrations or have remained elevated above baseline concentrations but have decreased since maximum concentrations were observed during a prior PME. The overall decreasing trends in dissolved metal concentrations are expected to continue as geochemical conditions return to baseline conditions.

- CTMW-07D was included in the extended performance monitoring sampling to provide additional information on the potential for downward vertical migration of the COPCs and/or carbon substrate. Since the well was installed as part of Remedial Investigation Modification No. 7 in September 2017 at the conclusion of the initial treatability study period, this analysis was not previously included in the *In-Situ Chromium Treatability Study Results Report.* Concentrations of COPCs in groundwater were generally an order of magnitude lower in groundwater adjacent to CTMW-07D than in the other deep wells within the biological reduction study area. The top of the screen interval for CTMW-07D was installed approximately 46 feet deeper than the bottom of the nearest deep monitoring well (CTMW-06D). Based on the results of the performance monitoring events, there does not appear to be downward vertical migration of the COPCs or carbon substrate to CTMW-07D.
- The additional water level readings obtained through the extended performance monitoring period allowed for further evaluation of groundwater elevations and vertical gradient between the Qal and UMCf in the treatability study area. Water levels increased by an average of 0.50 feet in the shallow wells and 0.47 feet in the deep wells from PME #8 to PME #9 and decreased by 0.58 feet in the shallow wells and 0.54 feet in the deep wells by PME #10. In general, there is a downward vertical gradient at the Site observed throughout all performance monitoring events. The average downward vertical gradient was approximately 0.0153 feet per foot (ft/ft) downward during PME #9 and 0.0156 ft/ft downward during PME #10, generally consistent with what was observed previously during the treatability study as reported in the *In-Situ Chromium Treatability Study Results Report*. An upward groundwater gradient of 0.0022 ft/ft was observed at one well pair CTMW-03S and CTMW-03D during PME #10.
- The additional water level readings obtained through the extended performance monitoring period allowed for further evaluation of groundwater flow direction and hydraulic gradient. Consistent with what was presented in the *In-Situ Chromium Treatability Study Results Report,* the groundwater direction and hydraulic gradient vary across the Site in the Qal, but in general the groundwater flow has a northerly to northeasterly direction, with a hydraulic gradient of 0.0123 ft/ft. Variations in groundwater flow direction within the shallow zone are most likely related to local variations in hydraulic conductivity. Within the UMCf, the groundwater gradient has a northeasterly direction with a hydraulic gradient of 0.0154 ft/ft. The direction and gradients observed are generally consistent with those observed previously during the treatability study.

Overall, the results from the extended performance monitoring period strengthen many of the conclusions presented in the *In-Situ Chromium Treatability Study Results Report* and confirm trends observed near the end of the initial performance monitoring period. Additionally, the supplemental data obtained from the extended performance monitoring period provides valuable information and insight to guide future larger-scale implementation at the Site.

5.0 REFERENCES

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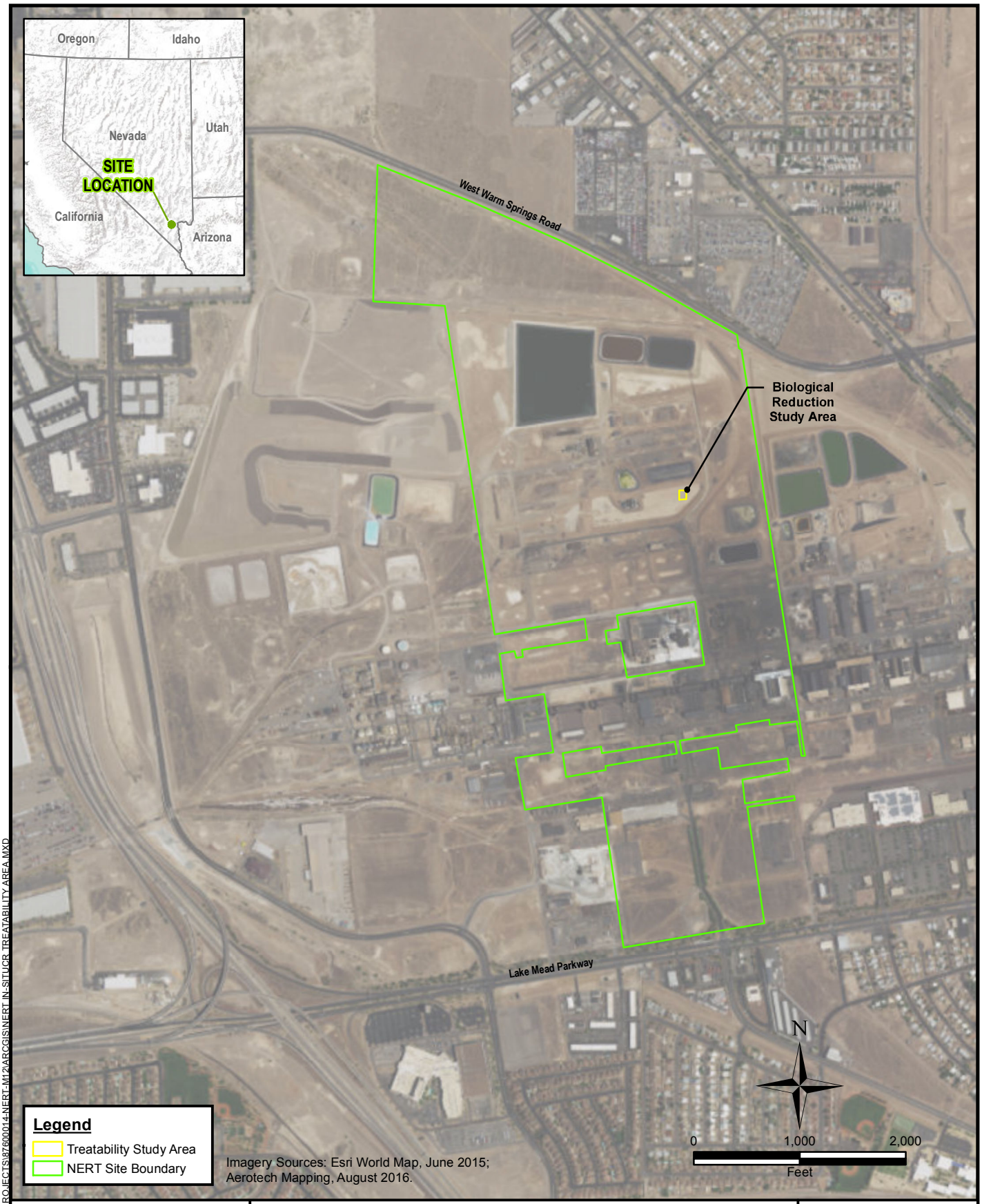
Figures



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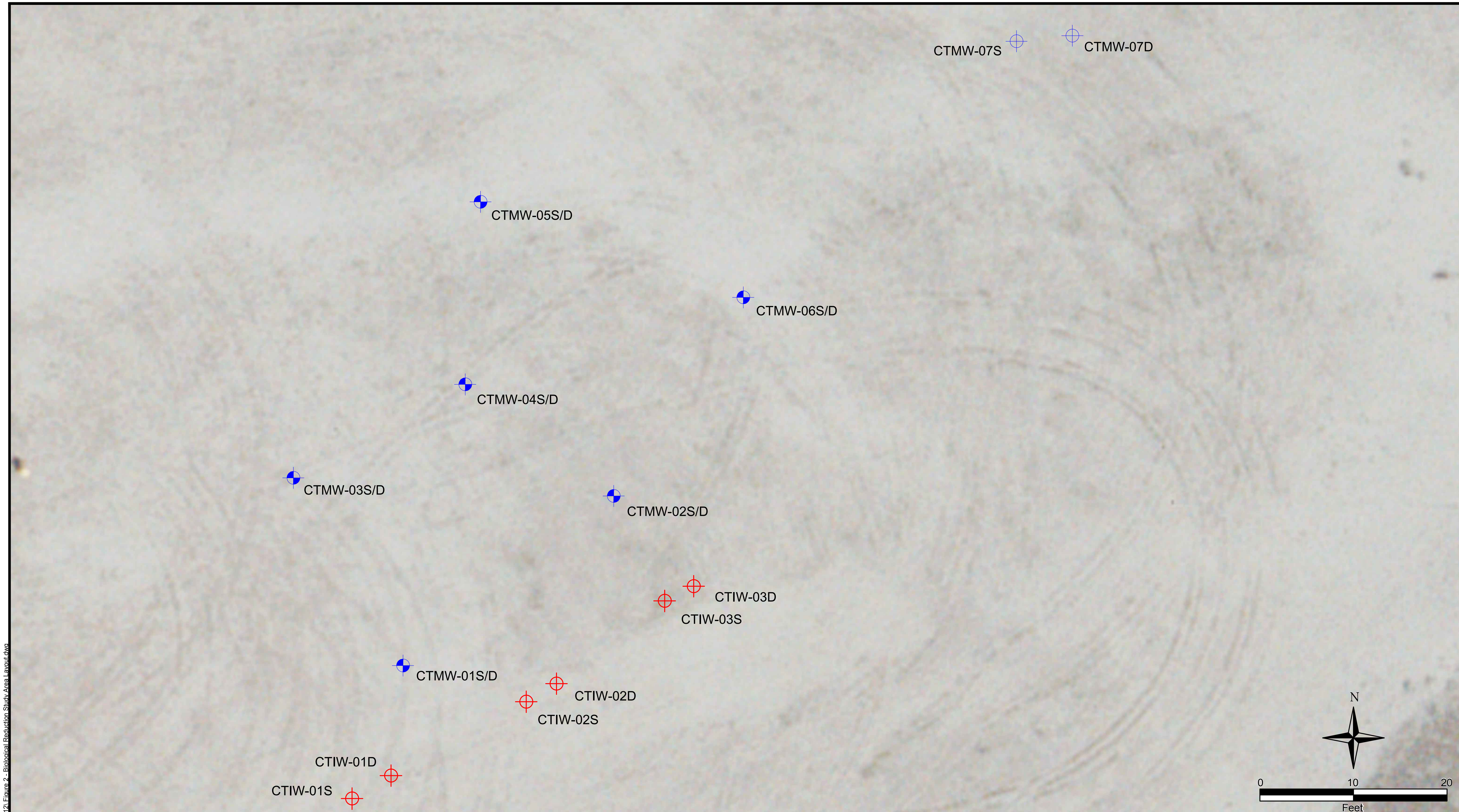
NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

SITE LOCATION MAP

Project No.:	117-7502018
Date:	JANUARY 11, 2019
Designed By:	KL
Figure No.	1



Legend

Symbol	Description		
CTMW-07S	Monitoring Well (Single Completion)	Qal	Quaternary Alluvium
CTMW-03S/D	Monitoring Well (Dual Completion)	UMCf	Upper Muddy Creek Formation
CTIW-01D	Injection Well (Single Completion)		
S	Shallow Well (Screened in Qal)		
D	Deep Well (Screened in UMCf)		

Note:
1. Imagery Source: Aerotech Mapping, August 2016.

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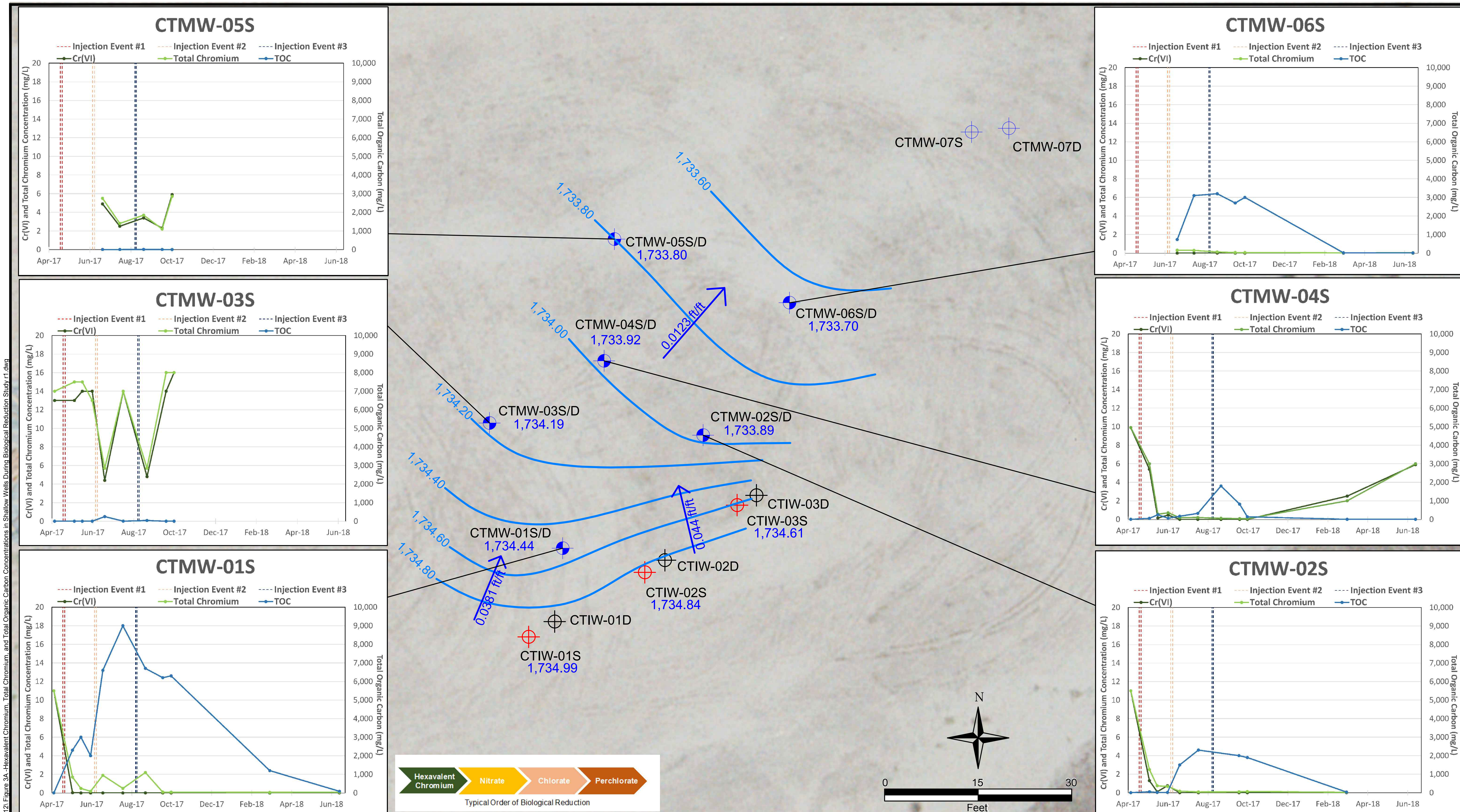
ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

BIOLOGICAL REDUCTION STUDY AREA LAYOUT

Project No:	117-7502018
Date:	JANUARY 11, 2019
Designed By:	DVK
Figure No.	2

\\tts318fs3\.tt.local\ces\87600014-NERT-M12\ Figure 2 - Biological Reduction Study Area Layout.dwg



Legend

CTMW-03S/D	Monitoring Well (Dual Completion)	1,734.80	Groundwater Elevation (feet amsl)
CTMW-07S/D	Monitoring Well (Single Completion)		Groundwater Elevation Contour (feet amsl)
CTIW-01S	Injection Well (Single Completion)		Flow Direction and Hydraulic Gradient (ft/ft)
CTIW-01D	Injection Well (Not used for contouring)	Qal	Quaternary Alluvium
S	Shallow Well (Screened in Qal)	UMCf	Upper Muddy Creek Formation
D	Deep Well (Screened in UMCf)	amsl	Above Mean Sea Level
mg/L	Milligrams per liter	ft/ft	Feet per Foot

Notes:
1. Only shallow wells used to develop shallow groundwater contours.
2. Groundwater elevations shown were measured in June 2018 as part of the Performance Monitoring Event #10.
3. CTMW-07S data not depicted because the well contained insufficient water during Performance Monitoring Event #10.
4. Imagery Source: Aerotech Mapping, August 2016.

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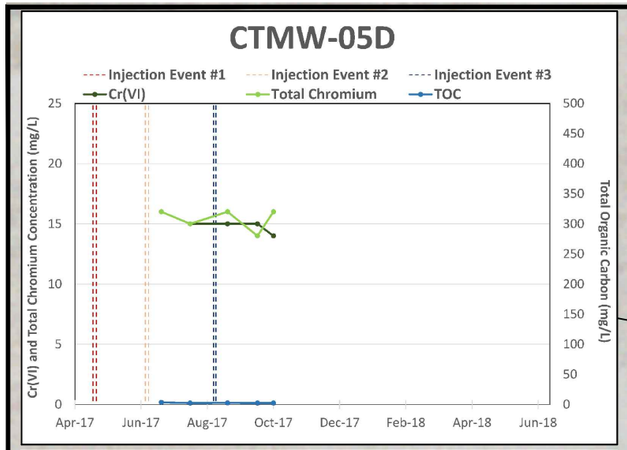
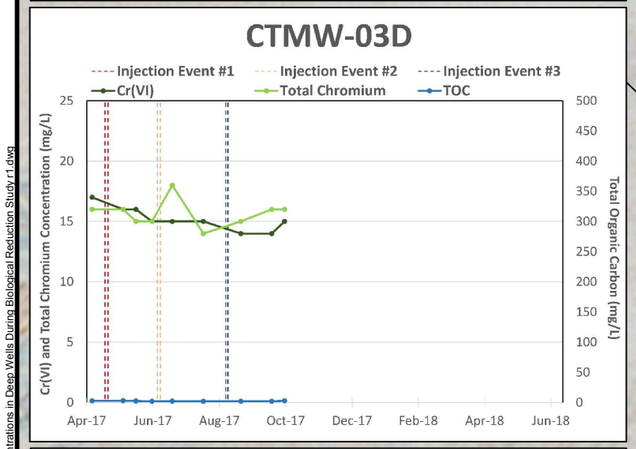
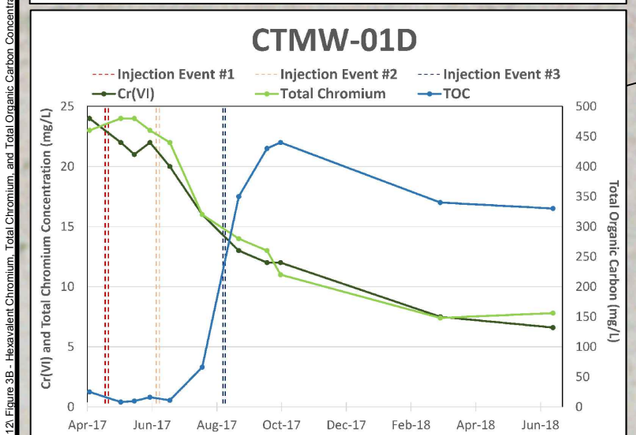
ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

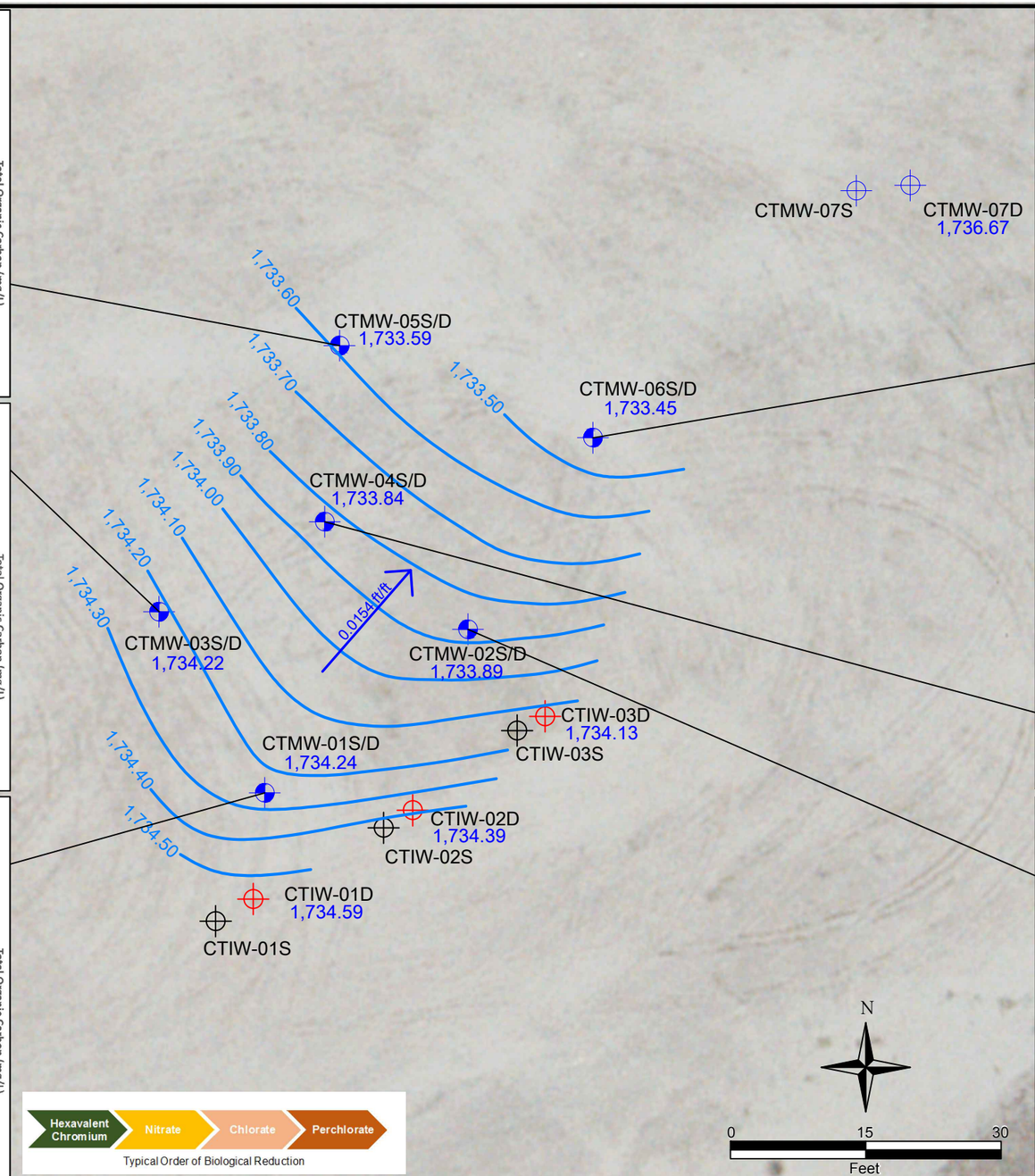
HEXAVALENT CHROMIUM, TOTAL CHROMIUM, AND TOTAL ORGANIC CARBON CONCENTRATIONS IN SHALLOW WELLS DURING BIOLOGICAL REDUCTION STUDY

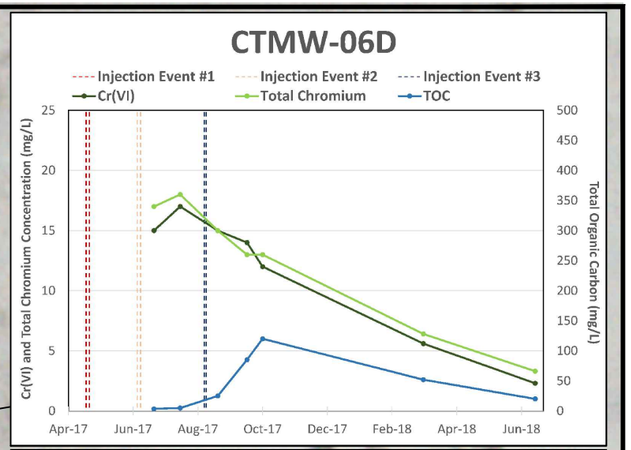
Project No:	117-7502018
Date:	JANUARY 11, 2019
Designed By:	AC
Figure No.	3A

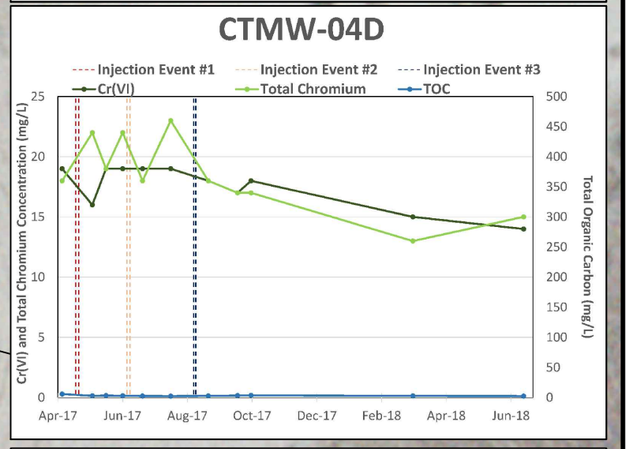


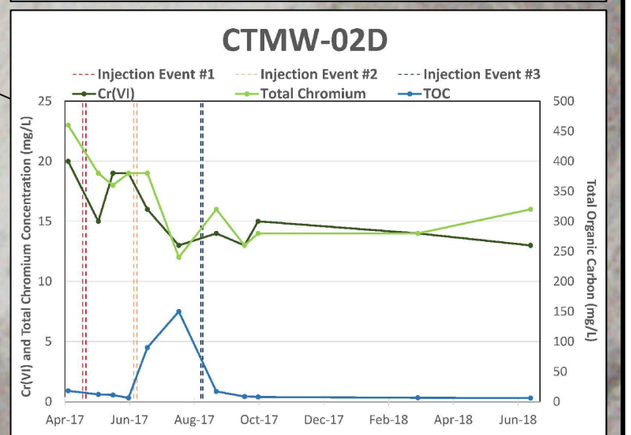












Legend

CTMW-03S/D	Monitoring Well (Dual Completion)	1,734.50	Groundwater Elevation (feet amsl)
CTMW-07S/D	Monitoring Well (Single Completion)	1,734.40	Groundwater Elevation Contour (feet amsl)
CTIW-01D	Injection Well (Single Completion)	0.0154 ft/ft	Flow Direction and Hydraulic Gradient (ft/ft)
CTIW-01S	Injection Well (Not used for contouring)	Qal	Quaternary Alluvium
S	Shallow Well (Screened in Qal)	UMCf	Upper Muddy Creek Formation
D	Deep Well (Screened in UMCf)	amsl	Above Mean Sea Level
mg/L	Milligrams per liter	ft/ft	Feet per Foot

Notes:
1. Only deep wells used to develop deep groundwater contours.
2. Groundwater elevations shown were measured in June 2018 as part of the Performance Monitoring Event #10.
3. CTMW-07D data not depicted because the screen interval is significantly deeper than other deep wells.
4. Imagery Source: Aerotech Mapping, August 2016.

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ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

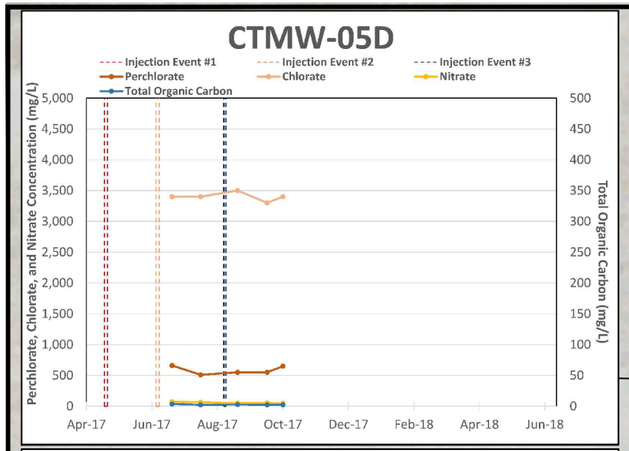
HEXAVALENT CHROMIUM, TOTAL CHROMIUM, AND TOTAL ORGANIC CARBON CONCENTRATIONS IN DEEP WELLS DURING BIOLOGICAL REDUCTION STUDY

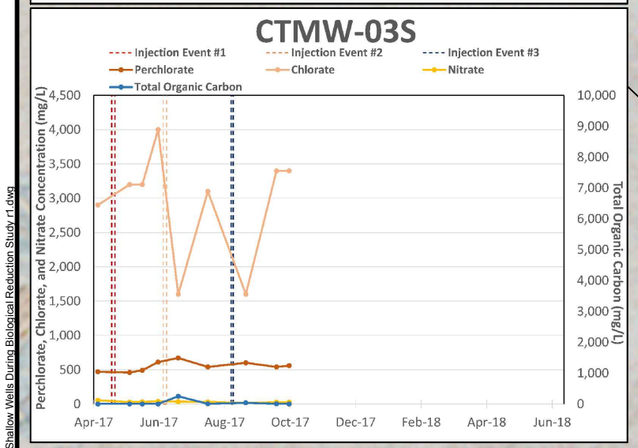
Project No:	117-7502018
Date:	JANUARY 11, 2019
Designed By:	AC

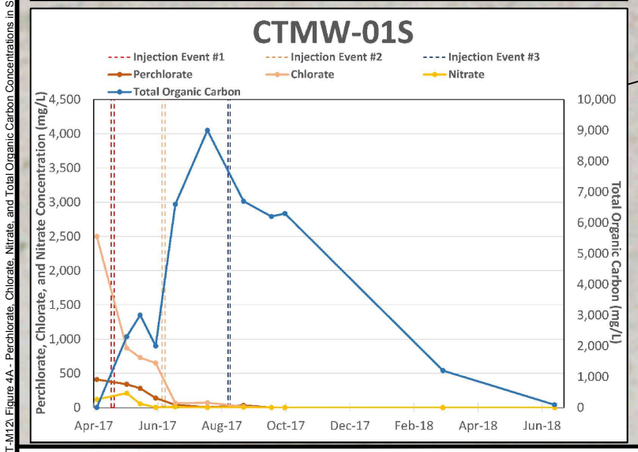
Figure No.

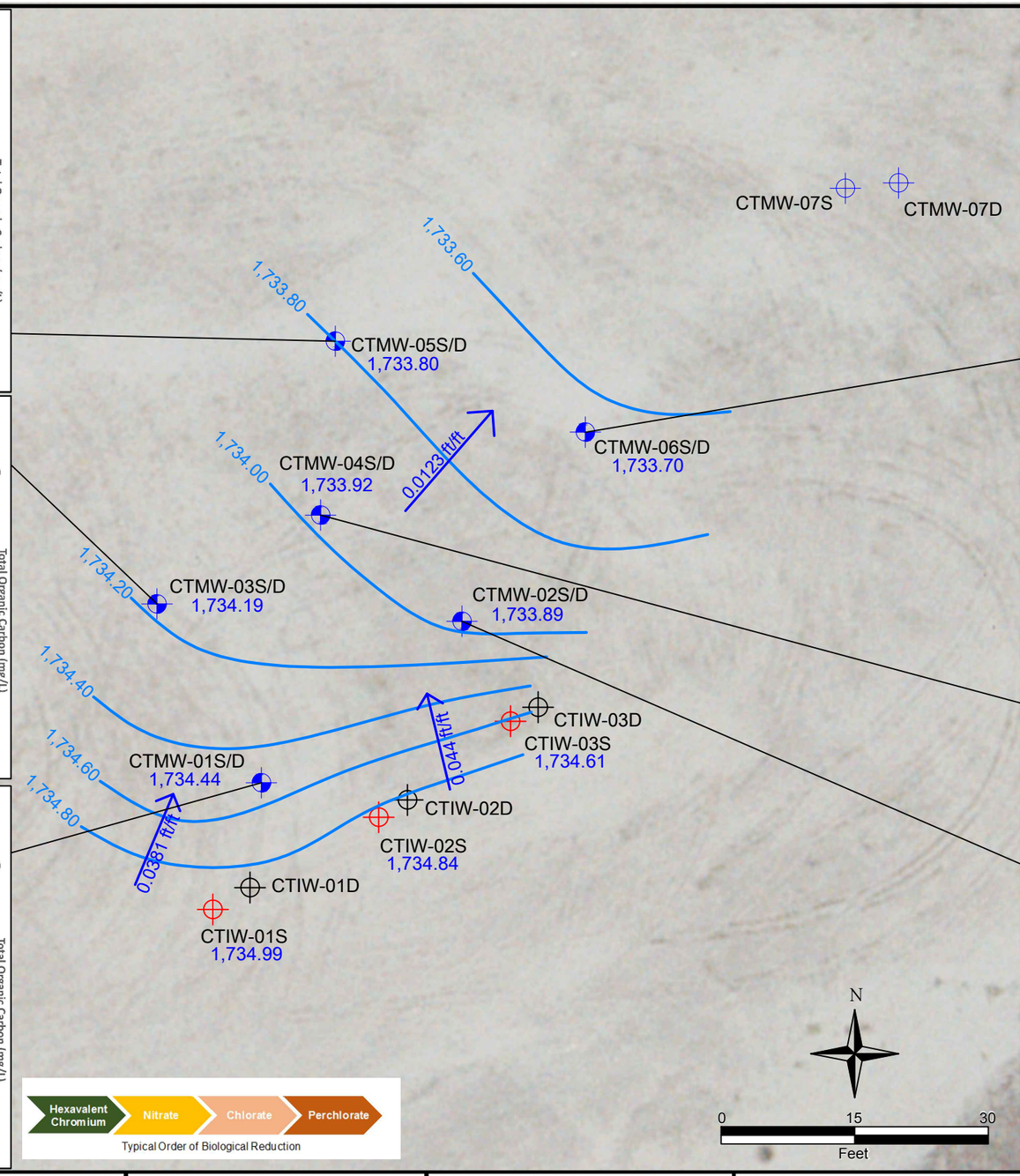
3B

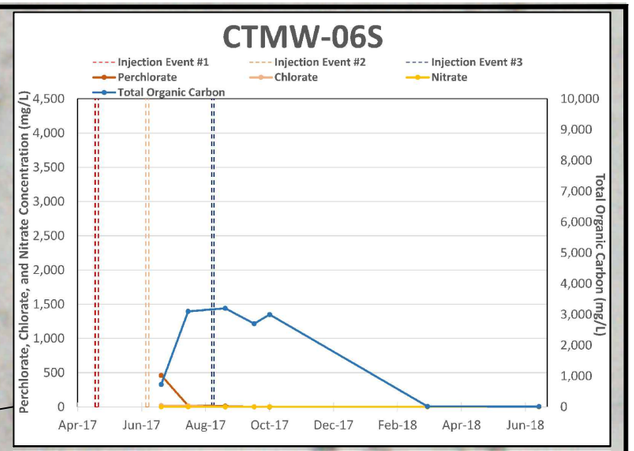
\\tts3186\3.tt.local\cas\87600014-NERT-M12\ Figure 3B - Hexavalent Chromium, Total Chromium and Total Organic Carbon Concentrations in Deep Wells During Biological Reduction Study r1.dwg

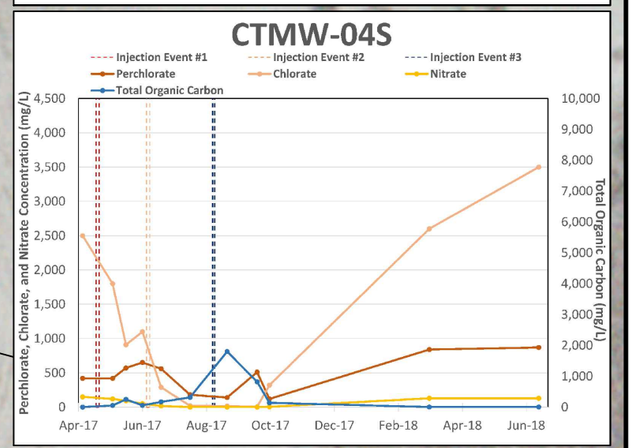


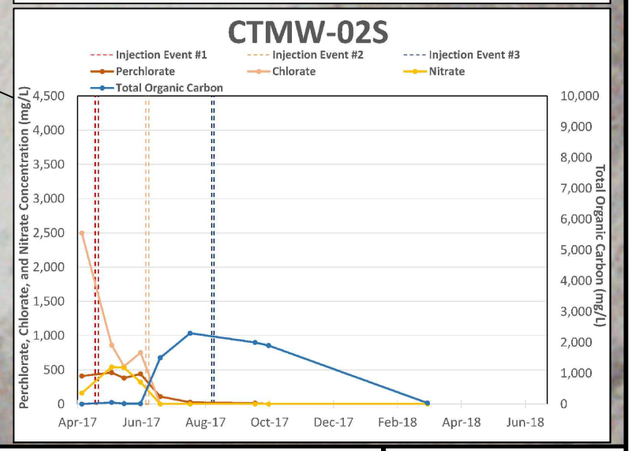












Legend

CTMW-03S/D	Monitoring Well (Dual Completion)	1,734.80	Groundwater Elevation (feet amsl)
CTMW-07S/D	Monitoring Well (Single Completion)	1,734.20	Groundwater Elevation Contour (feet amsl)
CTIW-01S	Injection Well (Single Completion)	0.0123 ft/ft	Flow Direction and Hydraulic Gradient (ft/ft)
CTIW-01D	Injection Well (Not used for contouring)	Qal	Quaternary Alluvium
S	Shallow Well (Screened in Qal)	UMCf	Upper Muddy Creek Formation
D	Deep Well (Screened in UMCf)	amsl	Above Mean Sea Level
mg/L	Milligrams per liter	ft/ft	Feet per Foot

Notes:
1. Only shallow wells used to develop shallow groundwater contours.
2. Groundwater elevations shown were measured in June 2018 as part of the Performance Monitoring Event #10.
3. CTMW-07S data not depicted because the well contained insufficient water during Performance Monitoring Event #10.
4. Imagery Source: Aerotech Mapping, August 2016.

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ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

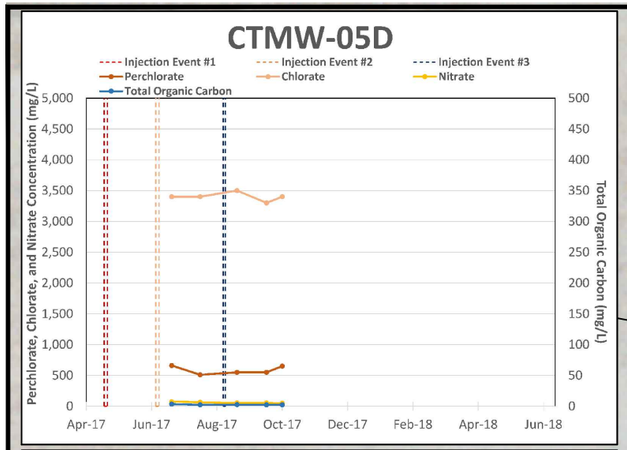
PERCHLORATE, CHLORATE, NITRATE, AND TOTAL ORGANIC CARBON CONCENTRATIONS IN SHALLOW WELLS DURING BIOLOGICAL REDUCTION STUDY

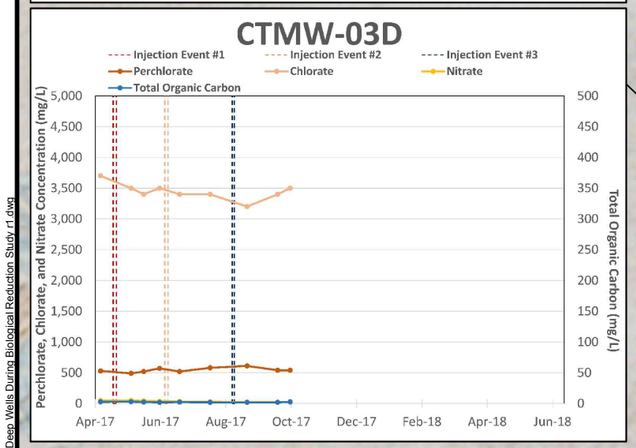
Project No:	117-7502018
Date:	JANUARY 11, 2019
Designed By:	AC

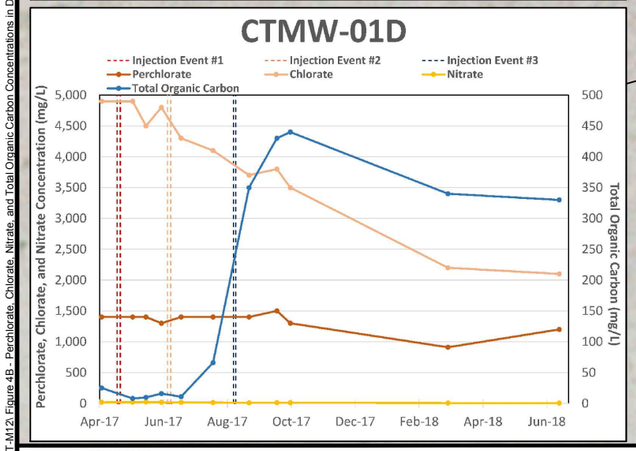
Figure No.

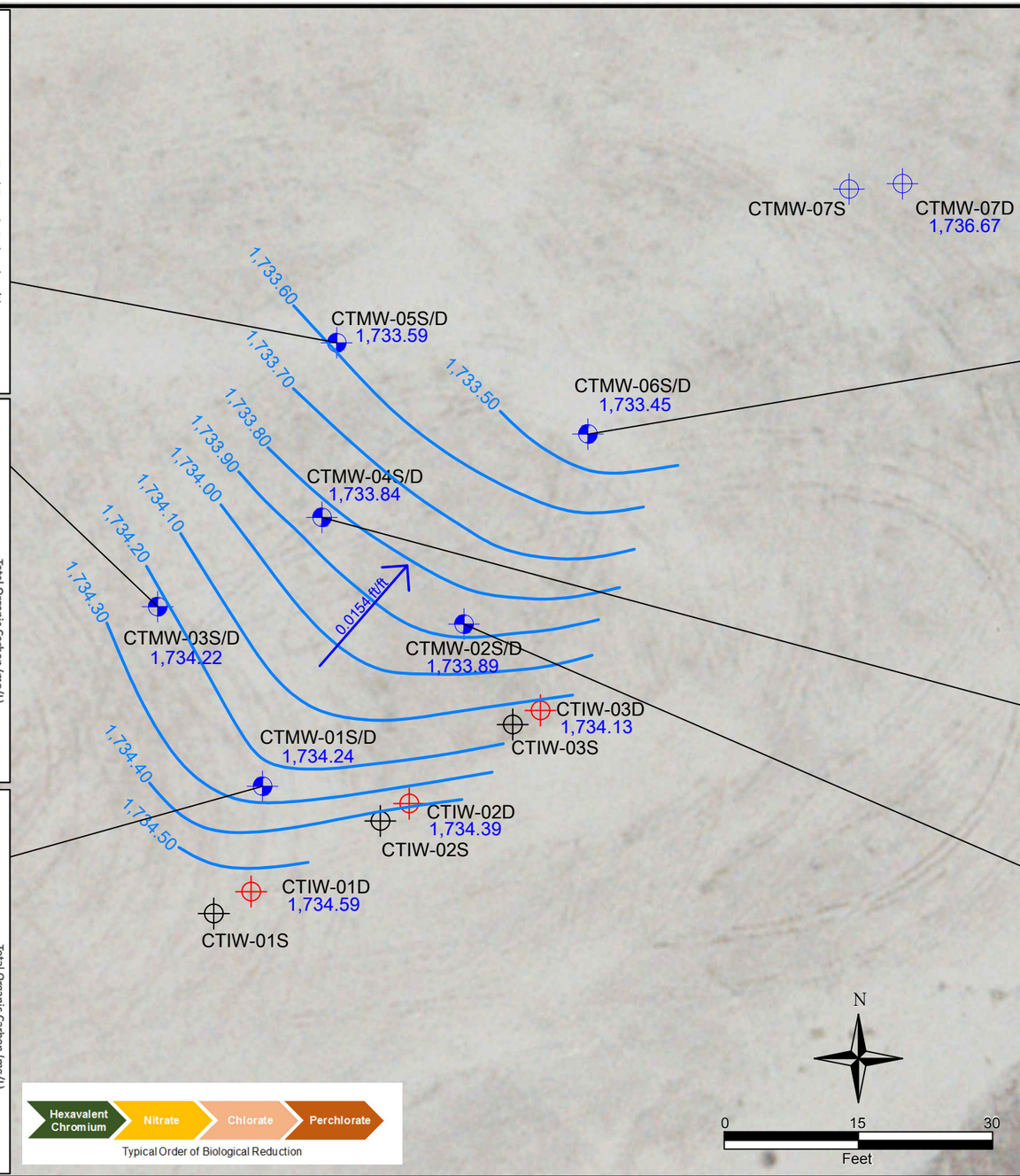
4A

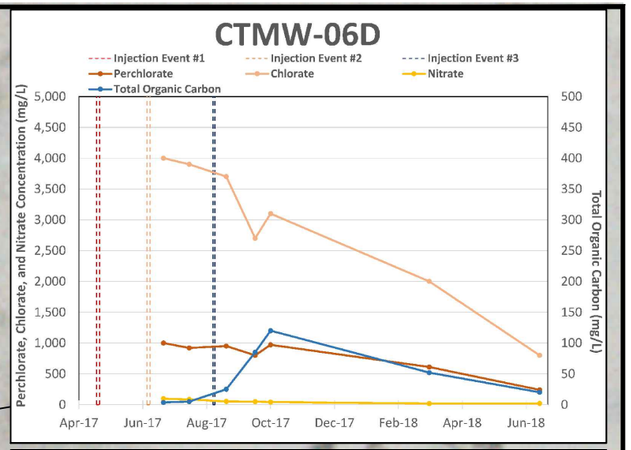
\\tts318s3.tt.local\cos\87600014-NERT-M12\ Figure 4A - Perchlorate, Chlorate, Nitrate, and Total Organic Carbon Concentrations in Shallow Wells During Biological Reduction Study r1.dwg

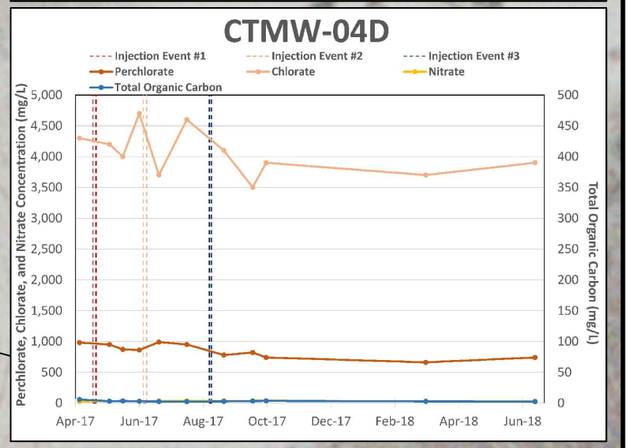


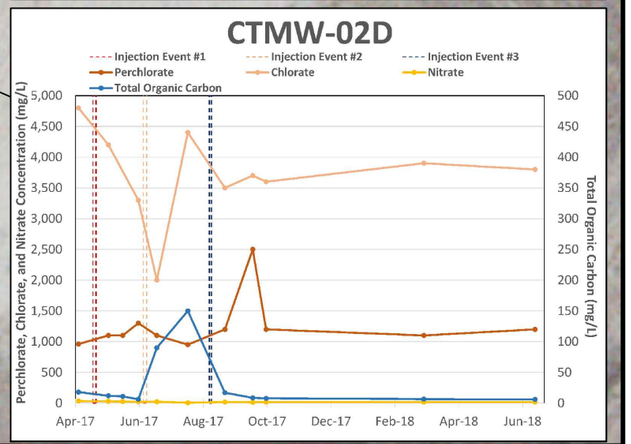












Legend

CTMW-03S/D	Monitoring Well (Dual Completion)	1,734.50	Groundwater Elevation (feet amsl)
CTMW-07S/D	Monitoring Well (Single Completion)	1,734.40	Groundwater Elevation Contour (feet amsl)
CTIW-01D	Injection Well (Single Completion)	0.0154 ft/ft	Flow Direction and Hydraulic Gradient (ft/ft)
CTIW-01S	Injection Well (Not used for contouring)	Qal	Quaternary Alluvium
S	Shallow Well (Screened in Qal)	UMCf	Upper Muddy Creek Formation
D	Deep Well (Screened in UMCf)	amsl	Above Mean Sea Level
mg/L	Milligrams per liter	ft/ft	Feet per Foot

Notes:
1. Only deep wells used to develop deep groundwater contours.
2. Groundwater elevations shown were measured in June 2018 as part of the Performance Monitoring Event #10.
3. CTMW-07D data not depicted because the screen interval is significantly deeper than other deep wells.
4. Imagery Source: Aerotech Mapping, August 2016.

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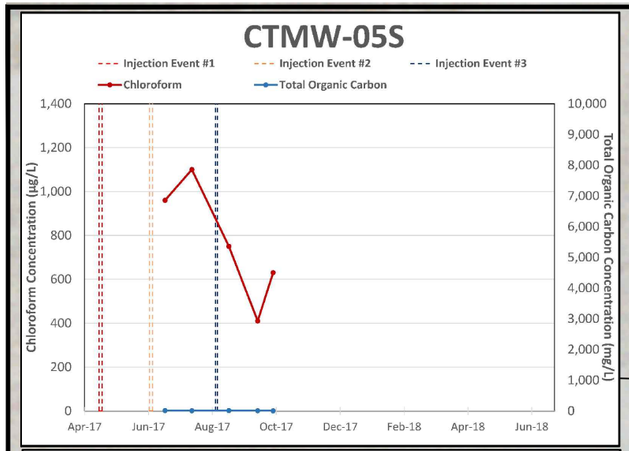
ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

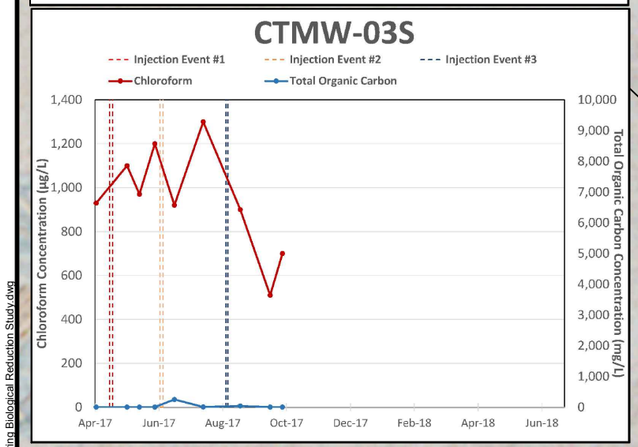
PERCHLORATE, CHLORATE, NITRATE, AND TOTAL ORGANIC CARBON CONCENTRATIONS IN DEEP WELLS DURING BIOLOGICAL REDUCTION STUDY

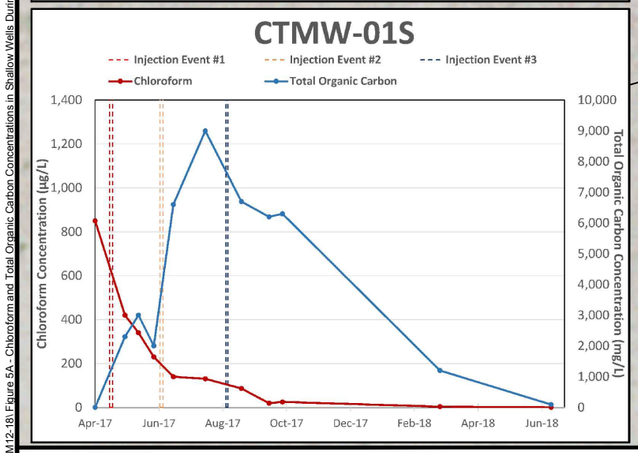
Project No:	117-7502018
Date:	JANUARY 11, 2019
Designed By:	AC

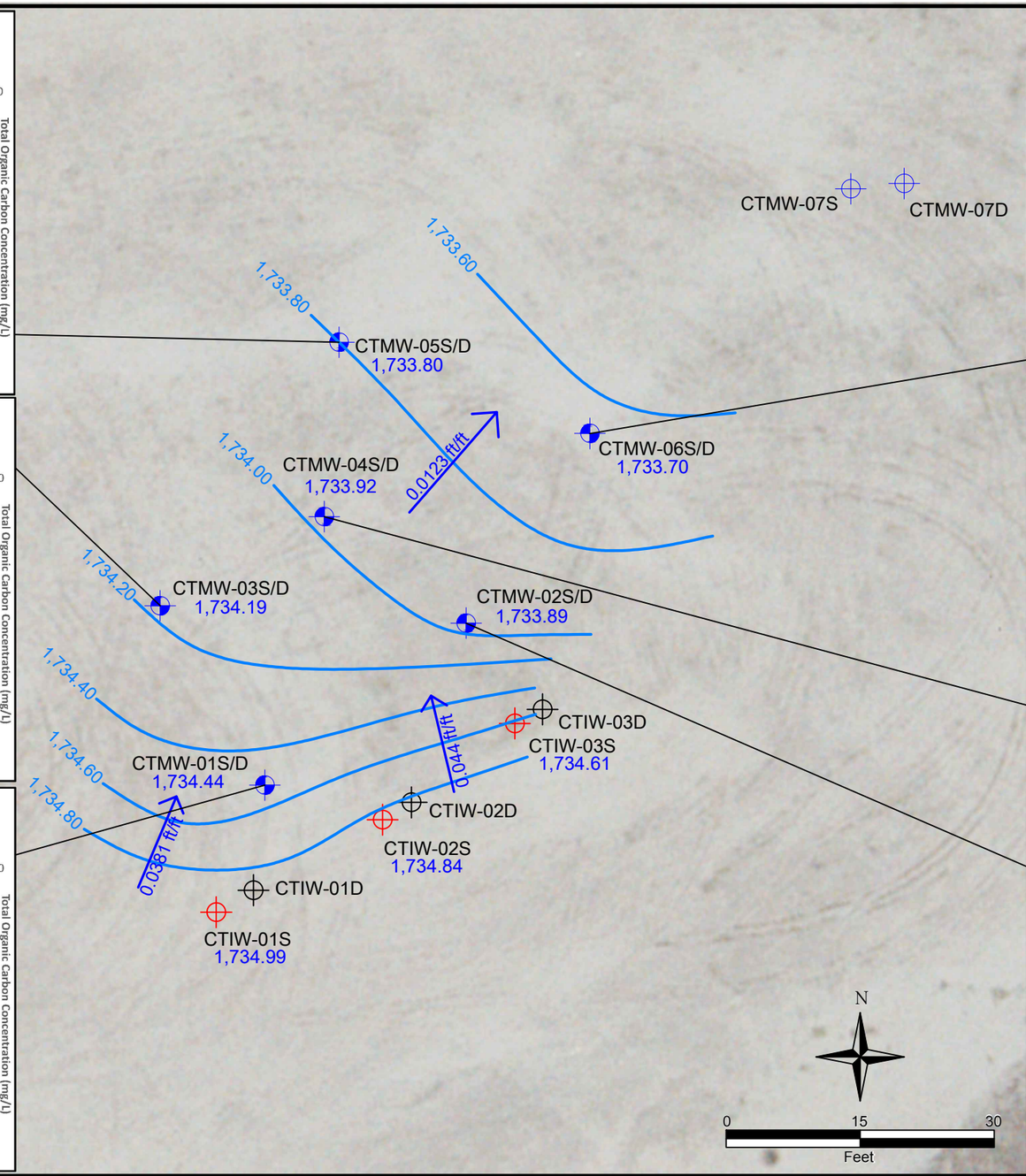
Figure No.
4B

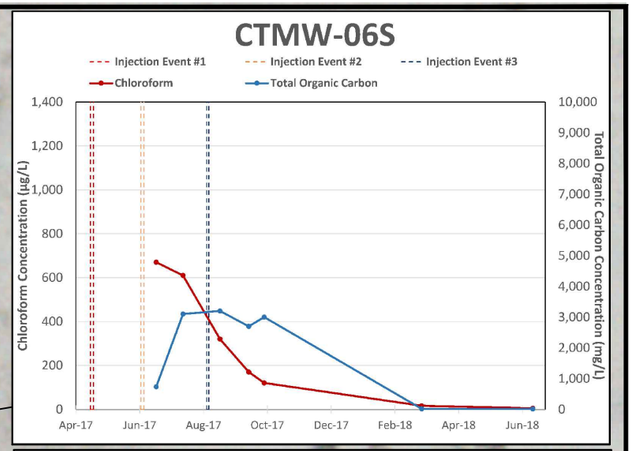
\\tts3185\3_tt.local\cas\87600014-NERT-M12_Figure 4B - Perchlorate, Chlorate, Nitrate, and Total Organic Carbon Concentrations in Deep Wells During Biological Reduction Study r1.dwg

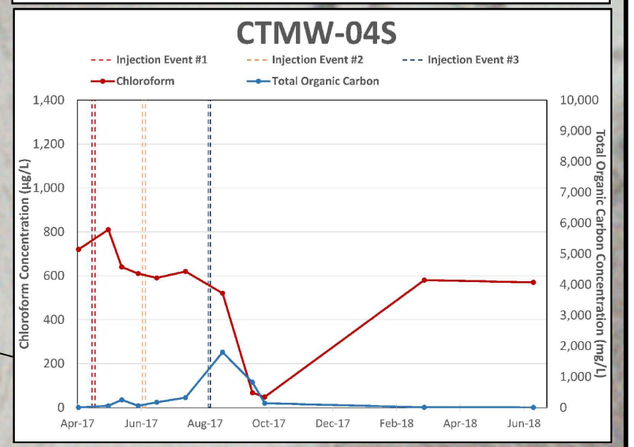


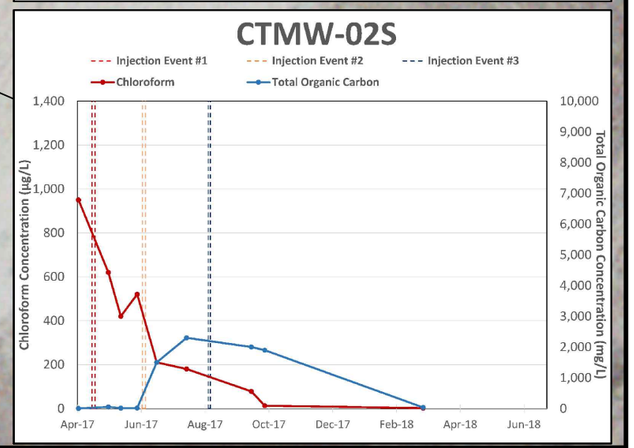












Legend

CTMW-03S/D	Monitoring Well (Dual Completion)	1,734.80	Groundwater Elevation (feet amsl)
CTMW-07S/D	Monitoring Well (Single Completion)	1,734.00	Groundwater Elevation Contour (feet amsl)
CTIW-01S	Injection Well (Single Completion)	0.0123 ft/ft	Flow Direction and Hydraulic Gradient (ft/ft)
CTIW-01D	Injection Well (Not used for contouring)	Qal	Quaternary Alluvium
S	Shallow Well (Screened in Qal)	UMCf	Upper Muddy Creek Formation
D	Deep Well (Screened in UMCf)	amsl	Above Mean Sea Level
µg/L mg/L	Micrograms per liter; Milligrams per liter	ft/ft	Feet per Foot

Notes:
1. Only shallow wells used to develop shallow groundwater contours.
2. Groundwater elevations shown were measured in June 2018 as part of the Performance Monitoring Event #10.
3. CTMW-07S data not depicted because the well contained insufficient water during Performance Monitoring Event #10.
4. Imagery Source: Aerotech Mapping, August 2016.

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NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

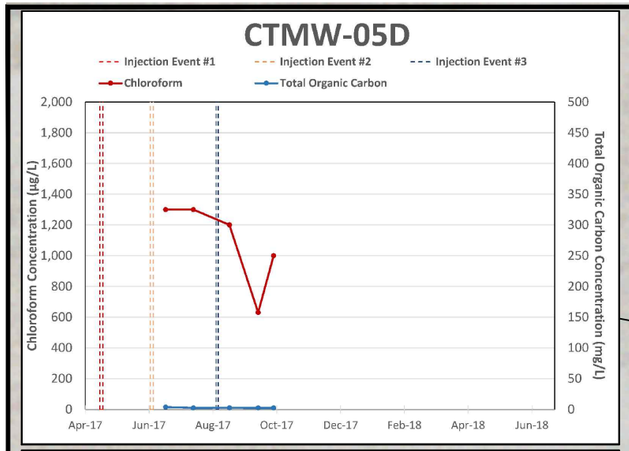
CHLOROFORM AND TOTAL ORGANIC CARBON CONCENTRATIONS IN SHALLOW WELLS DURING BIOLOGICAL REDUCTION STUDY

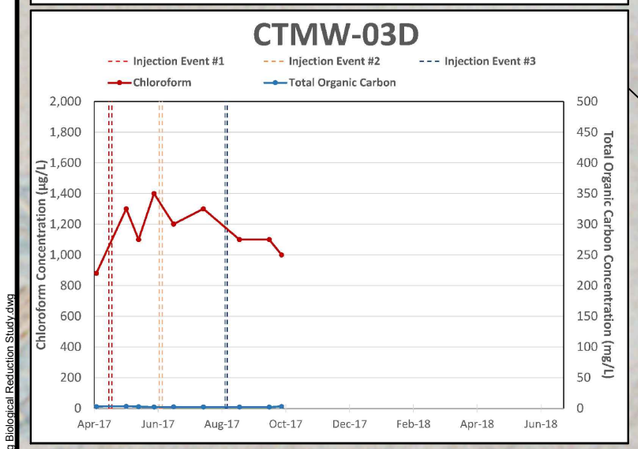
Project No:	117-7502018
Date:	JANUARY 16, 2019
Designed By:	AC

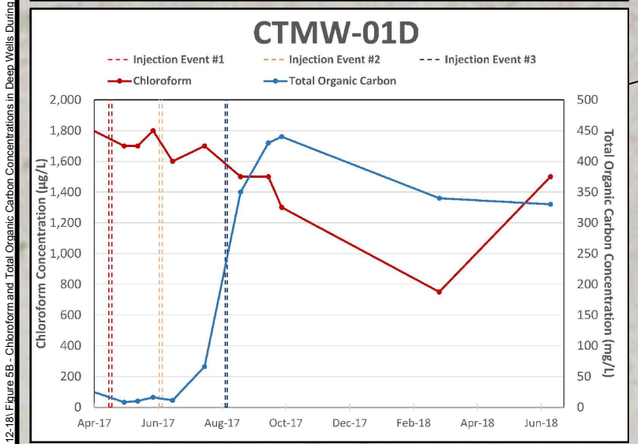
Figure No.

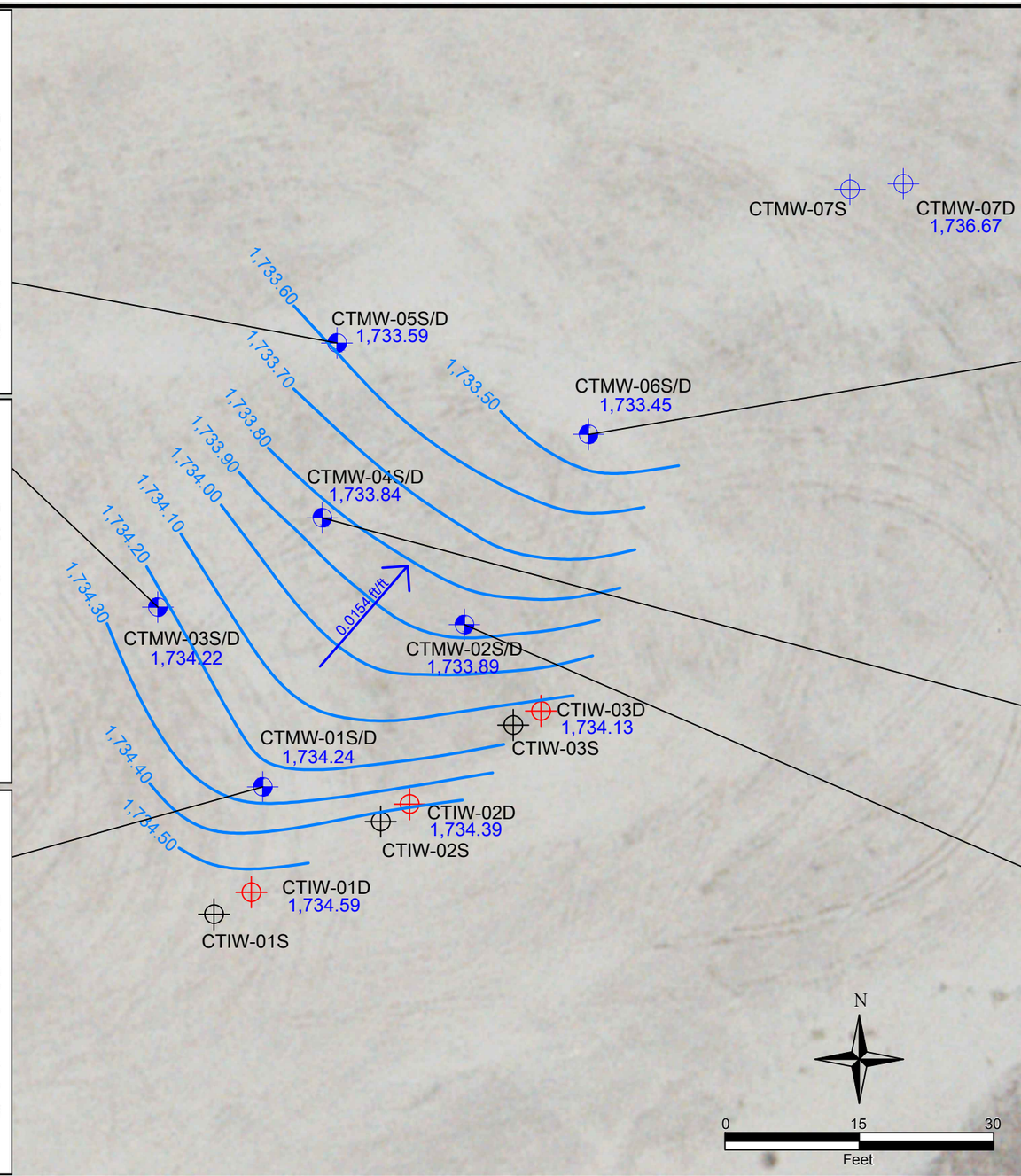
5A

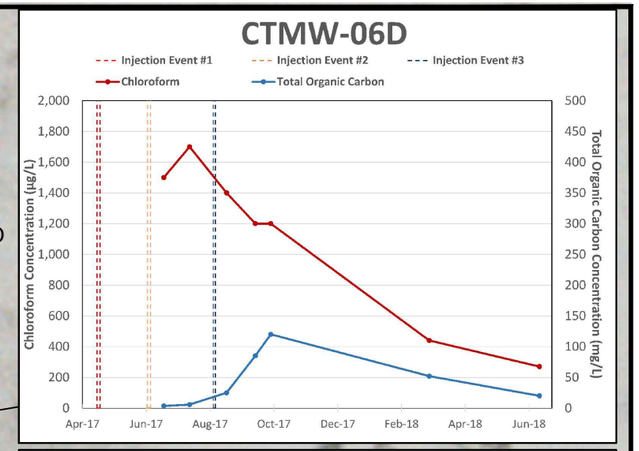
\\tts318s3.ttlocal\CES\Projects\97600M12-18\Figure 5A - Chloroform and Total Organic Carbon Concentrations in Shallow Wells During Biological Reduction Study.dwg

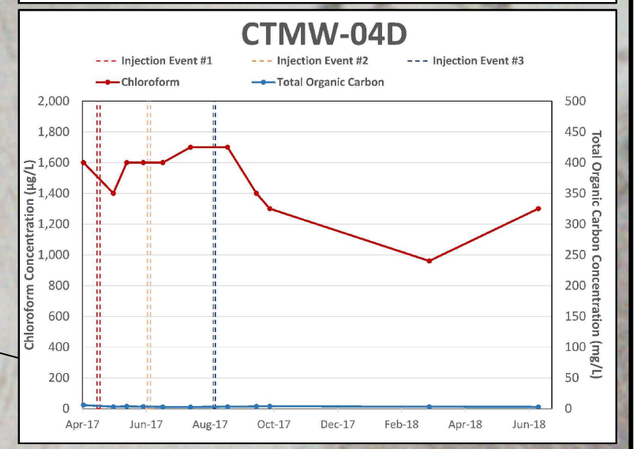


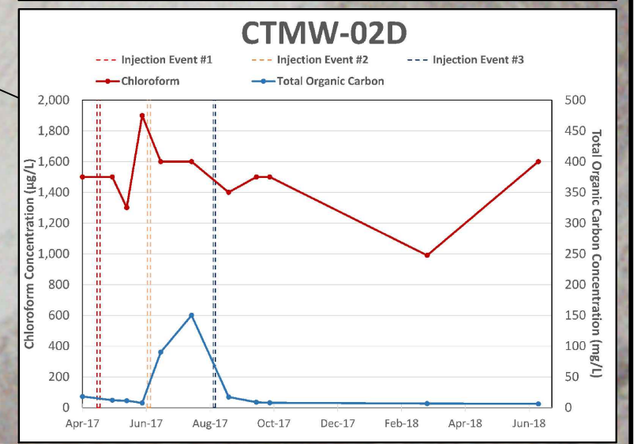












Legend

CTMW-03S/D	Monitoring Well (Dual Completion)	1,734.50	Groundwater Elevation (feet amsl)
CTMW-07S/D	Monitoring Well (Single Completion)	1,734.40	Groundwater Elevation Contour (feet amsl)
CTIW-01D	Injection Well (Single Completion)	0.0154 ft/ft	Flow Direction and Hydraulic Gradient (ft/ft)
CTIW-01S	Injection Well (Not used for contouring)	Qal	Quaternary Alluvium
S	Shallow Well (Screened in Qal)	UMCf	Upper Muddy Creek Formation
D	Deep Well (Screened in UMCf)	amsl	Above Mean Sea Level
µg/L mg/L	Micrograms per liter; Milligrams per liter	ft/ft	Feet per Foot

Notes:
1. Only deep wells used to develop deep groundwater contours.
2. Groundwater elevations shown were measured in June 2018 as part of the Performance Monitoring Event #10.
3. CTMW-07D data not depicted because the screen interval is significantly deeper than other deep wells.
4. Imagery Source: Aerotech Mapping, August 2016.

TETRA TECH
www.tetratech.com
150 S. 4th Street, Unit A
Henderson, Nevada 89015
(702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

ADDENDUM TO THE IN-SITU CHROMIUM TREATABILITY STUDY RESULTS REPORT

CHLOROFORM AND TOTAL ORGANIC CARBON CONCENTRATIONS IN DEEP WELLS DURING BIOLOGICAL REDUCTION STUDY

Project No:	117-7502018
Date:	JANUARY 16, 2019
Designed By:	AC

Figure No.
5B

\\tt3186s3.tt.local\CES\Projects\87600M12-18\Figure 5B - Chloroform and Total Organic Carbon Concentrations in Deep Wells During Biological Reduction Study.dwg

Appendix A
Gauging & Purge Logs

Gauging Logs

TETRATECH

WELL WATER LEVEL MEASUREMENT LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task No: M12	Date: 3/5/18
Task Manager Arul Ayyaswami	Field Sampler(s): Jeff Richeson	Recorded by: Jeff Richeson
Equipment Model/Type: Heron Interface meter	*Serial Number:*	*Last Calibration Date:*

Well Identification	Describe Measuring Point	Time (hrs)	Depth to Static Water Level (ft BMP)	Well Sounding Depth (ft BMP)	Condition of Well and Well Seal
CTIW-01S	TOC	0839	21.90		Good
CTIW-01D	TOC	0837	22.23		
CTIW-02S	TOC	0835	22.02		
CTIW-02D	TOC	0833	22.35		
CTIW-03S	TOC	0832	22.25		
CTIW-03D	TOC	0831	22.91		
CTMW-01S	TOC	0825	22.17		
CTMW-01D	TOC	0827	22.27		
CTMW-02S	TOC	0829	22.65		
CTMW-02D	TOC	0830	22.90		
CTMW-03S	TOC	0821	22.37		
CTMW-03D	TOC	0820	22.45		
CTMW-04S	TOC	0817	22.48		
CTMW-04D	TOC	0819	22.61		
CTMW-05S	TOC	0814	22.85		
CTMW-05D	TOC	0816	22.98		
CTMW-06S	TOC	0810	23.18		
CTMW-06D	TOC	0812	23.55		
CTMW-07S	TOC	0807	23.82		TD = 24.69 Good
CTMW-07D	TOC	0803	20.52		Good

BGS = Below Ground Surface BMP = Below Measuring Point MP = Measuring Point TOC = Top of Casing (Well Riser)

TETRA TECH

WELL WATER LEVEL MEASUREMENT LOG

NERT, Henderson, NV Project

Task Name: ~~In-Situ Cr Unit 4 Source Area~~ Bio T.S.	Task No: ~~M21~~ M12	Date: 6/21/18
Task Manager Arul Ayyaswami	Field Sampler(s): ~~Jeff Richeson~~ D.Keady	Recorded by: ~~Jeff Richeson~~ D.Keady
Equipment Model/Type: Solinst Interface Meter 122	*Serial Number:* 287869	*Last Calibration Date:* N/A

Well Identification	Describe Measuring Point	Time (hrs)	Depth to Static Water Level (ft BMP)	Well Sounding Depth (ft BMP)	Condition of Well and Well Seal
CTIW-01S	TOC	0413	22.42		Good
CTIW-01D		0414	22.75		
CTIW-02S		0415	22.61		
CTIW-02D		0417	22.92		
CTIW-03S		0421	22.71		
CTIW-03D		0422	23.35		
CTMW-01S		0423	22.72		
CTMW-01D		0424	22.90		
CTMW-02S		0425	23.32		
CTMW-02D		0426	23.43		
CTMW-03S		0427	23.02		
CTMW-03D		0429	23.01		
CTMW-04S		0431	23.08		
CTMW-04D		0432	23.16		
CTMW-05S		0434	23.44		
CTMW-05D		0435	23.66		
CTMW-06S		0437	22.73		
CTMW-06D		0438	23.97		
CTMW-07S		0443	24.79		
CTMW-07D		0445	20.71		

DK 6.21.18

DK 6.21.18

BGS = Below Ground Surface | BMP = Below Measuring Point | MP = Measuring Point | TOC = Top of Casing (Well Riser)

Purge Logs

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

Page ___ of ___

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami	Task No: M12	Well ID: CTMW-01S
Field Samplers: Jeff Richeson		Recorded by: Jeff Richeson	Date: 3/5/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 23.78	Screened/Open Interval Top: (ft BGS) 19 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom: (ft BGS) 24 (ft BMP)
Pump and Tubing Type: ~~Mega Monsoon~~ Pump with Poly Tubing Bladder w/ dedicated tubing		Pump Intake Depth: (ft BGS) 23.5 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 22.17 Time: 0825	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity ~~uS~~ mS/cm READ	Spec Conductivity CHANGE*	Dissolved Oxygen (mg/L) Horiba/YSI READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged ~~(ml)~~ L
0855	X		22.85		7.29		9.25		1.28/2.08		-133		331		100	22.17	—
0900	X		27.25		7.46		9.17		1.59/1.21		-158		424		100	22.68	0.5
0905	X		26.87		7.39		8.53		1.07/1.02		-148		639		100	723.5	1 L
0910	X		26.20		7.38		8.75		0.84/1.04		-135		352		100	723.5	1.5 L
							purged DRY @ 0910										
0930		X	Collect sample CTMW-015-20180305													22.28	

Sample ID: CTMW-015-20180305 Duplicate ID: QA/QC Samples/ID: COC Time: 0930

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: Y (N) COC Number:

Comments:

Ferrous Iron = 0.30 mg/l

Sulfide= 0.20 mg/l

Groundwater Color is Gray w/ fermenting odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface
MP - Below Measuring Point
C - Centigrade
COC - Chain of Custody
GS - Ground Surface
ID - Identification
mg/L - milligram/Liter
mV - milli Volts
min - Minute
ml - milliliter
MP - Measuring Point
NTU - Nephelometric Units
QA - Quality Assurance
QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

Page ___ of ___

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-01D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/5/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 49.41	Screened/Open Interval Top:	(ft BGS) 34 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 49 (ft BMP)
Pump and Tubing Type: QED Sample Pro with Poly Tubing		Pump Intake Depth:	(ft BGS) 41.5 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 22.27	Time: 0827	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity ~~mS/cm~~ READ	Spec Conductivity CHANGE*	Dissolved Oxygen (mg/L) READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged L (ml)
1125	X		26.15		7.93		4.16		6.45/7.02		99		265		200	22.27	—
1130	X		27.06		7.26		8.20		2.67/2.42		117		61.4		200	22.42	1L
1135	X		27.00		7.21		9.03		1.76/1.96		123		35.7		200	22.45	2L
1140	X		26.98		7.18		9.19		1.25/1.58		128 ~~114~~		9.4		200	22.47	3L
1145	X		26.88		7.15		9.26		1.18/1.47		133		6.7		200	22.48	4L
1150	X		26.92		7.10		9.31		1.10/1.39		137		7.0		200	22.48	5L

Sample ID: CTMW-01D-20180305 Duplicate ID: CTMW-01D-20180305_FD QA/QC Samples/ID: COC Time: 1150

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is ~~Clear~~ yellow w/ no odor

Signature(s): MRR

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Ass; QC - Quality C

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-02S	
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/6/18	
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 23.77	Screened/Open Interval Top:	(ft BGS) 19	(ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 24	(ft BMP)
Pump and Tubing Type: Hand Bailer		Pump Intake Depth: (ft BGS)		(ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 22.65	Time: 0829		GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (uS/cm) READ	Spec Conductivity (uS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0615	X		20.71		7.33		8.39		1.17		-61		83.2		—	22.65	1L
			purged dry @ 0620 ~1L purged														
0635		X	well recharged to 22.83' btoc. Collect Sample CTMW-02S-20180306														

Sample ID: CTMW-02S-20180306 Duplicate ID: N/A QA/QC Samples/ID: N/A COC Time: 0635

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 4 mg/l

Sulfide = 0.1 mg/l

Groundwater Color is slightly yellowish Gray w/ slight fermenting odor

Signature(s): [signature]

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface
BMP - Below Measuring Point
C - Centigrade
COC - Chain of Custody
GS - Ground Surface
ID - Identification
mg/L - milligram/Liter
mV - milli Volts
min - Minute
ml - milliliter
MP - Measuring Point
NTU - Nephelometric Units
QA - Quality Assurance
QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-02D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/5/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 49.18	Screened/Open Interval Top:	(ft BGS) 34 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 49 (ft BMP)
Pump and Tubing Type: QED Sampre Pro (bladder) with poly tubing		Pump Intake Depth:	(ft BGS) 41 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 22.90	Time: 0830	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity mS/cm READ	Spec Conductivity mS/cm CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml) L
1340	X		26.94		7.05		10.9		3.55/3.40		137		58.1		200	22.90	0
1345	X		27.46		7.02		10.4		1.68/1.31		141		47.7		200	23.13	1 L
1350	X		27.56		6.99		11.1		1.01/0.90		145		18.3		200	23.15	2 L
1355	X		27.41		7.00		12.3		0.58/0.76		149		7.5		200	23.16	3 L
1400	X		27.33		6.99		12.5		0.52/0.72		151		4.0		200	23.16	4 L
1405	X		27.32		6.99		12.6		0.50/0.69		152		1.3		200	23.15	5 L

Sample ID: CTMW-02D-20180305 Duplicate ID: QA/QC Samples/ID: COC Time: 1405

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is Yellow / No odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

Page ___ of ___

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-04S
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/7/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 24.01	Screened/Open Interval Top:	(ft BGS) 19 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 24 (ft BMP)
Pump and Tubing Type: Mega Monsoon Pump with poly tubing		Pump Intake Depth:	(ft BGS) 23.75 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 22.48	Time: 0817	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity mS (µS/cm) READ	Spec Conductivity CHANGE*	Dissolved Oxygen Horiba / YSI DO (mg/L) READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential CHANGE*	Turbidity (NTU) READ	Turbidity CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged ~~(ml)~~ L
0800	X		22.22		7.26		12.4		1.92/1.13		128		86.1		200	22.48	0L
0805	X		25.50		6.74		12.4		0.46/0.82		138		13.0		200	22.60	1L
0810	X		25.85		6.77		12.5		0.25/0.66		143		2.9		200	22.71	2L
0815	X		26.05		6.77		12.6		0.19/0.59		150		3.9		200	22.73	3L
0820	X		26.18		6.77		12.6		0.19/0.58		154		3.3		200	22.74	4L
0825	X		26.40		6.75		12.5		0.18/0.56		157		3.2		200	22.72	5L

Sample ID: CTMW-045-20180307 Duplicate ID: N/A QA/QC Samples/ID: N/A COC Time: 0825

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is light yellow / No odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-04D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/7/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 48.99	Screened/Open Interval Top:	(ft BGS) 34 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 49 (ft BMP)
Pump and Tubing Type: QED Sample Pro (bladder) with poly tubing		Pump Intake Depth: (ft BGS) 41 (ft BMP)		MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 22.61 Time: 0819		GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity MS (uS/cm) READ	Spec Conductivity MS (uS/cm) CHANGE*	Dissolved Oxygen Horiba/YSI DO (mg/L) READ	Dissolved Oxygen Horiba/YSI DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged ~~(ml)~~ L
0920	X		23.72		7.57		11.6		3.00/0.85		145		51.3		150	22.61	0L
0925	X		25.06		7.49		11.7		1.40/0.71		149		43.7		150	22.85	0.75
0930	X		25.17		7.46		11.7		0.99/0.61		152		22.5		150	22.90	1.5
0935	X		25.16		7.45		12.0		0.77/0.57		154		9.0		150	22.89	2.25
0940	X		25.23		7.45		11.6		0.66/0.54		155		9.1		150	22.87	3.0
0945	X		25.29		7.46		11.6		0.64/0.53		156		9.0		150	22.89	3.75
0950	X		25.32		7.46		11.6		0.60/0.52		157		8.3		150	22.88	4.5

Sample ID: CTMW-04D-20180307 Duplicate ID: N/A QA/QC Samples/ID: Level 4 QC COC Time: 0950

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is yellow | No odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

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NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-06S
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/6/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 24.4	Screened/Open Interval Top:	(ft BGS) 19 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 24 (ft BMP)
Pump and Tubing Type: Mega Monsoon Pump with poly tubing		Pump Intake Depth:	(ft BGS) 24 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 23.18	Time: 0810	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (uS/cm) READ	Spec Conductivity (uS/cm) CHANGE*	Dissolved Oxygen (mg/L) Horiba/YSI DO READ	Dissolved Oxygen (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml/L)
1130	X		25.00		7.04		5.48		2.06/1.01		-100		51.9		200	23.18	0L
1135	X		26.87		6.97		5.43		1.35/0.77		-119		40.5		200	23.37	1L
1140	X		26.99		7.09		5.42		0.10/0.70		-134		36.4		200	23.39	2L
1145	X		26.84		7.13		5.47		0.00/0.72		-136		33.7		200	23.40	3L
1150	X		25.96		7.14		5.53		0.00/0.75		-134		13.8		200	23.41	4L
1155	X		26.03		7.14		5.56		0.00/0.78		-132		12.1		200	23.40	5L
1200	X		25.89		7.17		5.60		0.00/0.83		-130		13.2		200	23.42	6L

Sample ID: CTMW-06S-20180306 Duplicate ID: N/A QA/QC Samples/ID: N/A COC Time: 1200

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered (Y) N COC Number:

Comments:

Ferrous Iron= 2.80 mg/l

Sulfide = 0.07 mg/l

Groundwater Color is Gray w/ strong fermenting odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-06D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/7/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 54.25	Screened/Open Interval Top:	(ft BGS) 34 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 54 (ft BMP)
Pump and Tubing Type: QED Sample Pro (bladder) with poly tubing		Pump Intake Depth:	(ft BGS) 44 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 23.55	Time: 0812	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity ~~uS/cm~~ mS READ	Spec Conductivity CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged ~~(ml)~~ L
0640	X		22.18		7.20		12.0		2.44/1.09		100		84.4		150	23.55	0 L
0645	X		23.74		7.16		12.0		1.15/0.85		100		77.1		150	23.79	0.75
0650	X		23.99		7.11		12.0		0.66/0.74		99		52.9		150	23.82	1.5
0655	X		24.00		7.08		12.0		0.49/0.69		104		35.7		150	23.81	2.25
0700	X		24.25		7.05		12.0		0.38/0.65		109		29.4		150	23.80	3.0
0705	X		24.30		7.03		12.1		0.35/0.62		112		27.5		150	23.81	3.75
0710	X		24.30		7.02		12.2		0.38/0.61		115		28.3		150	23.83	4.5

Sample ID: CTMW-06D-20180307 Duplicate ID: N/A QA/QC Samples/ID: N/A COC Time: 0710

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is yellow/ no odor

Signature(s): MR R

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-[redacted]075
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/6/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 24.4	Screened/Open Interval Top:	(ft BGS) 19 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 24 (ft BMP)
Pump and Tubing Type: Mega Monsoon Pump with poly tubing		Pump Intake Depth:	(ft BGS) 24 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 23.82	Time: 0807	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (uS/cm) READ	Spec Conductivity (uS/cm) CHANGE*	Dissolved Oxygen (mg/L) Horiba/YSI DO READ	Dissolved Oxygen (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged ~~(ml)~~ L
0935	X		25.17		7.95		9.62		4.12/2.64		137		268		100	23.82	0L
0940	X		24.97		7.67		9.64		2.95/2.70		143		235		100	23.98	0.5L
0945	X		25.12		7.54		9.70		2.27/2.82		146		42.8		100	24.02	1L
0950	X		25.07		7.48		9.71		2.30/2.91		150		39.4		100	24.05	1.5L
0955	X		25.01		7.42		9.65		2.38/3.00		155		8.6		100	24.07	2L
1000	X		24.99		7.40		9.63		2.42/2.98		160		9.7		100	24.08	2.5L
1005	X		24.97		7.38		9.60		2.37/2.96		163		8.9		100	24.08	3L

Sample ID: CTMW-075-20180306 Duplicate ID: N/A QA/QC Samples/ID: ~~MS/MSD~~ CTMW-075-20180306 (MS/MSD) COC Time: 1005

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is Yellowish w/ no odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

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NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-[redacted]07D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 3/6/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): [redacted]110	Screened/Open Interval Top:	(ft BGS) 90 [redacted] (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 110 [redacted] (ft BMP)
Pump and Tubing Type: QED Sample Pro (bladder) with poly tubing		Pump Intake Depth:	(ft BGS) 100 [redacted] (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 20.52	Time: 0803	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity mS (µS/cm) READ	Spec Conductivity CHANGE*	Dissolved Oxygen DO (mg/L) Horiba/YSI READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential CHANGE*	Turbidity (NTU) READ	Turbidity CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0820	X		21.59		10.02		1.50		3.12/4.08		-20		98.2		50	20.52	0
0825	X		23.63		9.74		1.44		2.02/1.15		-48		74.3		50	22.14	0.25
0830	X		23.81		9.71		1.44		1.82/0.92		-53		12.5		50	24.55	0.5
0835	X		24.05		9.72		1.44		1.62/0.80		-55		9.5		50	27.08	0.75
0840	X		24.01		9.69		1.44		1.50/0.75		-56		8.8		50	28.62	1 L
0845	X		23.99		9.68		1.44		1.47/0.73		-56		8.5		50	29.71	1.25 L

Sample ID: CTMW-07D-20180306 Duplicate ID: N/A QA/QC Samples/ID: N/A COC Time: 0845

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is Clear/none

Signature(s): [signature]

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface; BMP - Below Measuring Point; C - Centigrade; COC - Chain of Custody; GS - Ground Surface; ID - Identification; mg/L - milligram/Liter; mV - milli Volts; min - Minute; ml - milliliter; MP - Measuring Point; NTU - Nephelometric Units; QA - Quality Assurance; QC - Quality Control

TETRA TECH

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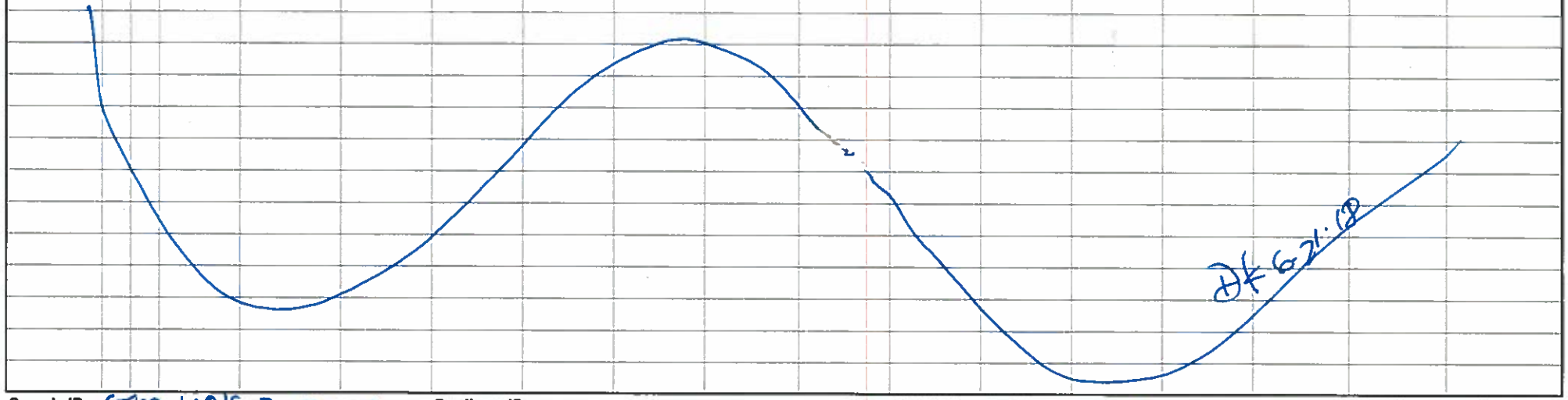
LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: Task M12-In-Situ Cr T.S.	Task Manager: Arul Ayyaswami	Task No: ~~M21/M12~~	Well ID: GTMW-01S
Field Samplers: ~~Jeff Richeson~~ D. Keady		Recorded by: ~~Jeff Richeson~~ D. Keady	Date: 6.21.18
Well Depth (ft BGS): —	MP Distance AGS (ft): — / Well Depth (ft BMP): —	Screened/Open Interval Top: —	(ft BGS) — (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb): —	Screened/Open Interval Bottom: —	(ft BGS) — (ft BMP)
Pump and Tubing Type: Rine Peristaltic Pump w/ Silicone Tubing	Pump Intake Depth: —	(ft BGS) — (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox	Depth to Water Before Pump Installation (ft BMP): —	Time: —	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity M (µS/cm) READ	Spec Conductivity M (µS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0919	X		31.85		7.94		8.03		6.82		39		534		—	—	~1000 (est)
0950		X	>90% RECHARGE; COLLECT SAMPLE.														



Sample ID: GTMW-01S-20180621 Duplicate ID: — QA/QC Samples/ID: — COC Time: 0950

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N Field Filtered: Y N COC Number:

Comments:

Ferrous Iron = 1.19 mg/L

Sulfide= 0.52 mg/L

Groundwater Color is murky yellow green

Signature(s): DK

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

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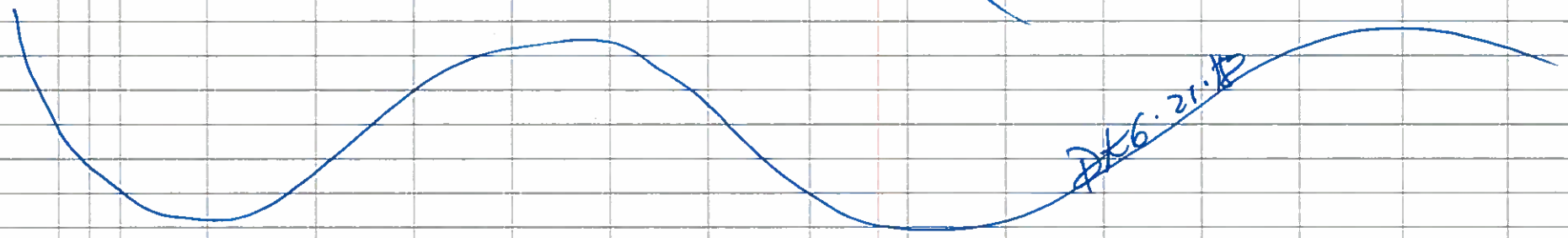
LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: Task M12 - In-Situ Cr T.S	Task Manager: Arul Ayyaswami	Task No: ~~M21~~ 12	Well ID: CTMW-01D
Field Samplers: ~~Jeff Richeson~~ D. Keady		Recorded by: ~~Jeff Richeson~~ D. Keady	Date: 6-21-18
Well Depth (ft BGS): —	MP Distance AGS (ft): — / Well Depth (ft BMP): —	Screened/Open Interval Top: —	(ft BGS) — (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb): —	Screened/Open Interval Bottom: —	(ft BGS) — (ft BMP)
Pump and Tubing Type: QED Bladder Pump w/ Poly Tubing	Pump Intake Depth: — (ft BGS) — (ft BMP)		MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox	Depth to Water Before Pump Installation (ft BMP): 22.90 Time: 0424		GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (µS/cm) READ	Spec Conductivity (µS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0733	X		27.97		6.85		12.8		4.04/3.90		143		16.8		200	22.93	Ø
0738	X		27.47		6.36		15.1		0.75/1.83		144		102		200	22.98	1000
0743	X		27.39		6.42		14.9		0.54/1.32		137		65.4		200	23.04	2000
0748	X		27.40		6.52		14.5		0.45/1.28		128		16.2		200	23.10	3000
0753	X		27.42		6.52		14.3		0.39/1.25		119		9.8		200	23.12	4000
0758	X		27.44	✓	6.52	✓	14.2	✓	0.38/1.22	✓	109	✓	3.6	✓ (<5)	200	23.12	5000
0810		X	STABILIZED; COLLECT SAMPLE														



Sample ID: CTMW-01D-20180621 Duplicate ID: CTMW-01D-20180621-FD QA/QC Samples/ID: — COC Time: 0810

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
				In-Situ Chromium Treatability Study Sampling Bottle Set

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N Field Filtered: Y N COC Number:

Comments:

Ferrous Iron = 0.00 mg/L

Sulfide= 0.00 mg/L

Groundwater Color is yellow-green; no odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: Task M12 - In-Situ CrT.S	Task Manager: Arul Ayyaswami	Task No: ~~M21~~ M12	Well ID: CTMW-025
Field Samplers: ~~Jeff Richeson~~ D.Keady		Recorded by: ~~Jeff Richeson~~ D.Keady	Date: 6.21.18
Well Depth (ft BGS):	MP Distance AGS (ft): — / Well Depth (ft BMP):	Screened/Open Interval Top:	(ft BGS) (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb): —	Screened/Open Interval Bottom:	(ft BGS) (ft BMP)
Pump and Tubing Type: Pine Peristaltic w/ Silicone tubing	Pump Intake Depth:	(ft BGS) (ft BMP)	MP Description: TOC
Equipment Decon. Method: ~~3 Bucket Rinse with Liquinox~~ N/A	Depth to Water Before Pump Installation (ft BMP): 23.32	Time: 0425	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity M (µS/cm) READ	Spec Conductivity M (µS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) Horiba READ	Dissolved Oxygen DO (mg/L) Horiba CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0544	X		INSUFFICIENT WATER/RECHARGE RATE FOR LOW FLOW.														
0550	X		PURGED DRY (APPROX. 1 L PURGED)														
0620		X	WELL RECHARGED TO 23.48 FT BTOC; COLLECT SAMPLE.														
0620		X	31.64		7.11		8.42		6.78		-88		7.0				1000

Sample ID: CTMW-025-20180621 Duplicate ID: QA/QC Samples/ID: COC Time:

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N | Field Filtered: Y N | COC Number:

Comments:
Ferrous Iron =
Sulfide=
Groundwater Color is

Signature(s):_____

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:
± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

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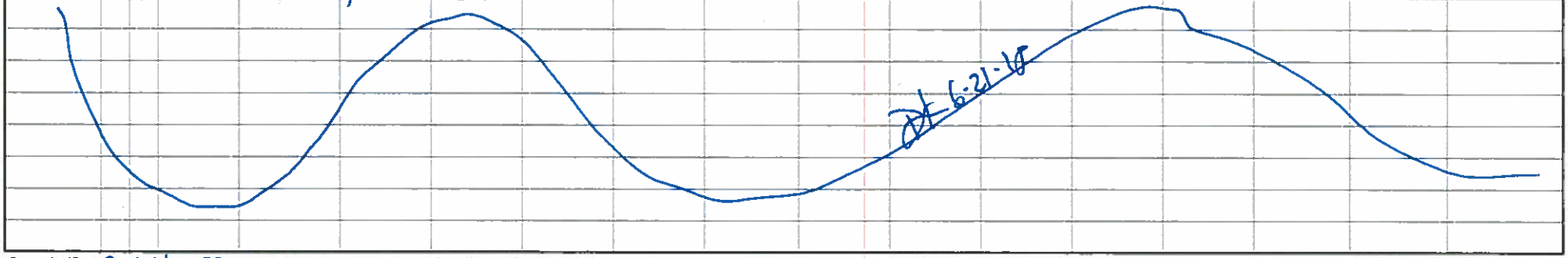
LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: Task M12 - In-Situ Cr T.S.	Task Manager: Arul Ayyaswami	Task No: ~~M21~~ M12	Well ID: CTMW-02D
Field Samplers: ~~Jeff Richeson~~ D. Keady		Recorded by: ~~Jeff Richeson~~ D. Keady	Date: 6-21-18
Well Depth (ft BGS): —	MP Distance AGS (ft): — / Well Depth (ft BMP): —	Screened/Open Interval Top: —	(ft BGS) — (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb): —	Screened/Open Interval Bottom: —	(ft BGS) — (ft BMP)
Pump and Tubing Type: QED bladder w/ Poly Tubing	Pump Intake Depth: — (ft BGS) — (ft BMP)		MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox	Depth to Water Before Pump Installation (ft BMP): 23.43 Time: 0426		GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity mS (µS/cm) READ	Spec Conductivity mS (µS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0616	X		27.80		6.85		12.5		2.51/1.06		122		124		200	24.21	0
0621	X		27.59		6.86		13.2		1.56/1.37		125		69.8		200	24.37	1000
0626	X		27.55		6.87		13.2		1.64/1.07		132		48.8		200	24.47	2000
0631	X		27.57		6.88		13.1		1.78/0.97		131		21.7		200	24.56	3000
0636	X		27.56		6.90		13.0		1.65/0.91		140		10.2		200	24.66	4000
0641	X		27.57	✓	6.91	✓	12.9	✓	1.62/0.84	✓	145	✓	4.3	✓ (<)	200	24.75	5000
0650		X	STABILIZATION; COLLECT SAMPLE.														



Sample ID: CTMW-02D-20180621 Duplicate ID: — QA/QC Samples/ID: — COC Time: 0650

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N Field Filtered: Y N COC Number:

Comments:

Ferrous Iron = 0.00 mg/L

Sulfide= 0.00 mg/L

Groundwater Color is yellow-green; no odor

Signature(s): DKY

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

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LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: Task M12 - In Situ Cr T.S.	Task Manager: Arul Ayyaswami	Task No: ~~M21~~ M12	Well ID: CTMW-045
Field Samplers: ~~Jeff Richeson~~ D. Keady		Recorded by: ~~Jeff Richeson~~ D. Keady	Date: 6-21-18
Well Depth (ft BGS): —	MP Distance AGS (ft): — / Well Depth (ft BMP): —	Screened/Open Interval Top: —	(ft BGS) — (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb): —	Screened/Open Interval Bottom: —	(ft BGS) — (ft BMP)
Pump and Tubing Type: Dino Peristaltic Pump w/ Silicone Tubing	Pump Intake Depth: — (ft BGS) — (ft BMP)		MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox	Depth to Water Before Pump Installation (ft BMP): 23.05	Time: 0431	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (µS/cm) READ	Spec Conductivity (µS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
1303	X		38.80		6.69		9.77		0.61 / 1.01		177		0.0		150	23.16	Ø
1308	X		35.18		6.67		10.3		0.56 / 0.88		174		0.0		150	23.20	750
1313	X		34.23		6.69		10.4		1.01 / 0.91		174		0.0		150	23.23	1500
1318	X		34.29	J	6.70	✓	10.4	✓	1.03 / 0.92	✓	174	✓	0.0	✓	150	23.25	2250
1330		X	STABILIZED; COLLECT SAMPLE.														

DE 6.21.18

Sample ID: CTMW-045-20180621 Duplicate ID: — QA/QC Samples/ID: — COC Time: 1330

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N Field Filtered: Y N COC Number:

Comments:

Ferrous Iron = 0.00 mg/L

Sulfide= 0.00 mg/L

Groundwater Color is yellow-green, no odor

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

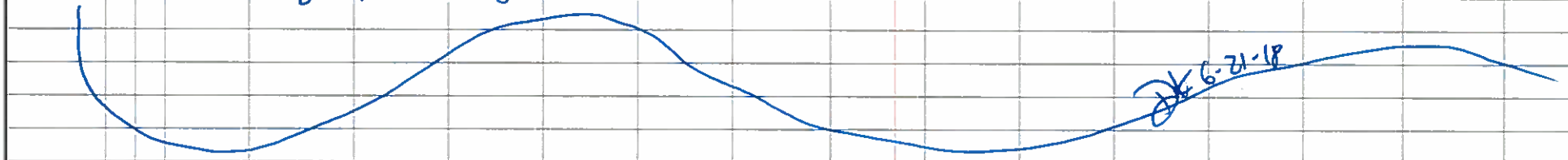
TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: Task M12 - In Situ Cr T.S.	Task Manager: Arul Ayyaswami	Task No: ~~M21~~ M12	Well ID: CTMW-04D
Field Samplers: ~~Jeff Richeson~~ D. Keady		Recorded by: ~~Jeff Richeson~~ D. Keady	Date: 6.21.18
Well Depth (ft BGS): —	MP Distance AGS (ft): —	Well Depth (ft BMP): —	Screened/Open Interval Top: — (ft BGS) — (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb): —		Screened/Open Interval Bottom: — (ft BGS) — (ft BMP)
Pump and Tubing Type: QED Bladder Pump w/ Poly Tubing	Pump Intake Depth: —	(ft BGS) — (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox	Depth to Water Before Pump Installation (ft BMP): 23.16	Time: 0432	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity mS/cm (µS/cm) READ	Spec Conductivity CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
1106	X		33.56		6.76		16.1		2.76/1.13		104		649		200	23.22	0
1111	X		30.40		7.05		10.5		0.69/0.81		118		543		200	23.29	1000
1116	X		29.72		7.22		10.5		0.50/0.77		117		505		200	23.35	2000
1121	X		29.29		7.24		10.5		0.46/0.73		118		388		200	23.37	3000
1126	X		29.38		7.25		10.5		0.41/0.71		120		192		200	23.58	4000
1131	X		29.26		7.27		10.5		0.38/0.69		119		64.3		200	23.38	5000
1136	X		29.11		7.29		10.6		0.36/0.68		120		29.9		200	23.38	6000
1141	X		29.10	✓	7.30	✓	10.6	✓	0.35/0.66	✓	120	✓	3.2	✓ (<5)	200	23.38	7000
1150		X	STABILIZED; COLLECT SAMPLE.														



Sample ID: CTMW-04D-20180621 Duplicate ID: — QA/QC Samples/ID: CTMW-04D-20180621-MS/MSD COC Time: 1150

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N Field Filtered: Y N COC Number:

Comments:

Ferrous Iron = 0.00 mg/L

Sulfide= 0.00 mg/L

Groundwater Color is yellow-green

Signature(s): D Keady

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-06S
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 6/22/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 24.4	Screened/Open Interval Top:	(ft BGS) 19 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 24 (ft BMP)
Pump and Tubing Type: ~~Mega Monsoon Pump~~ with poly tubing peristaltic pump		Pump Intake Depth:	(ft BGS) 24 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 23.71	Time: 0500	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity mS/cm (uS/cm) READ	Spec Conductivity CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0515	X		28.37		7.03		6.63		1.07/2.70		-166		65.4		200	23.71	0
0520	X		27.84		6.97		6.69		0.52/1.36		-166		57.2		100	23.87	1 L
0525	X		28.16		7.03		6.72		0.96/2.16		-136		59.4		100	23.97	1.5 L
0530	X		28.29		7.06		6.69		1.01/2.24		-131		58.1		100	23.98	2 L
0535	X		28.35		7.09		6.68		1.04/2.22		-127		57.8		100	23.99	2.5 L
0535		X															

Sample ID: CTMW-06S-20180622 Duplicate ID: N/A QA/QC Samples/ID: N/A COC Time: 0535

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.60 mg/l

Sulfide = 0.41 mg/l

Groundwater Color is clear w/ slight gray clouding

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

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NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-06D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 6/22/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 54.25	Screened/Open Interval Top:	(ft BGS) 34 (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) 54 (ft BMP)
Pump and Tubing Type: QED Sample Pro (bladder) with poly tubing		Pump Intake Depth:	(ft BGS) 44 (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 23.97	Time: 0438	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (uS/cm) READ	Spec Conductivity (uS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0655	X		27.81		7.24		10.2		4.10/0.63		-16		15.9		200	23.95	0
0700	X		27.92		7.18		9.87		3.20/0.46		-34		9.2		200	24.13	1L
0705	X		27.99		7.14		9.98		2.70/0.44		-41		8.7		200	24.17	2L
0710	X		28.07		6.98		10.3		2.38/0.40		64		8.4		200	24.18	3L
0715	X		28.14		6.95		10.4		2.00/0.36		86		8.1		200	24.19	4L
0720	X		28.14		6.94		10.3		1.94/0.36		88		8.3		200	24.18	5L
0725	X		28.17		6.93		10.3		1.91/0.35		92		8.0		200	24.19	6L

Sample ID: CTMW-06D-20180622 Duplicate ID: — QA/QC Samples/ID: — COC Time: 0725

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is light yellow

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

BMP - Below Measuring Point COC - Chain of Custody ID - Identification

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-07S
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 6/22/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP): 24.58	Screened/Open Interval Top: 19.5	(ft BGS) (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom: 24.5	(ft BGS) (ft BMP)
Pump and Tubing Type: QED Sample Pro (bladder) with poly tubing		Pump Intake Depth:	(ft BGS) (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 24.27	Time: 0420	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity (uS/cm) READ	Spec Conductivity (uS/cm) CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen DO (mg/L) CHANGE*	Redox Potential ORP (mV) READ	Redox Potential ORP (mV) CHANGE*	Turbidity (NTU) READ	Turbidity (NTU) CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0445	X																
0446			well purged dry. The water that was in the well was just pooled on bottom cap, ~100 ml purged before well went dry.														

Sample ID: Duplicate ID: QA/QC Samples/ID: COC Time:

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: Y N | Field Filtered: Y N | COC Number:

Comments:

Ferrous Iron=

Sulfide =

Groundwater Color is

Signature(s):

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

TETRA TECH

LOW FLOW GROUNDWATER SAMPLING LOG

NERT, Henderson, NV Project

Task Name: In-Situ Chromium Treatability Study	Task Manager: Arul Ayyaswami		Task No: M12	Well ID: CTMW-07D
Field Samplers: Jeff Richeson			Recorded by: Jeff Richeson	Date: 6/22/18
Well Depth (ft BGS):	MP Distance AGS (ft):	Well Depth (ft BMP):	Screened/Open Interval Top:	(ft BGS) (ft BMP)
Well Diameter (in): 2	PID/FID Readings Beneath Inner Cap (ppm cge akb):		Screened/Open Interval Bottom:	(ft BGS) (ft BMP)
Pump and Tubing Type: QED Sample Pro (bladder) with poly tubing		Pump Intake Depth:	(ft BGS) (ft BMP)	MP Description: TOC
Equipment Decon. Method: 3 Bucket Rinse with Liquinox		Depth to Water Before Pump Installation (ft BMP): 20.71	Time: 0445	GW Disposal: GW-11 Pond

Time	PURGING	SAMPLING	Temp. (°C) READ	Temp. (°C) CHANGE*	pH (pH Units) READ	pH (pH Units) CHANGE*	Spec Conductivity MS ~~uS/cm~~ READ	Spec Conductivity CHANGE*	Dissolved Oxygen DO (mg/L) READ	Dissolved Oxygen CHANGE*	Redox Potential ORP (mV) READ	Redox Potential CHANGE*	Turbidity (NTU) READ	Turbidity CHANGE*	Purge Rate (ml/min)	Depth to Water (ft BMP)	Cum. Vol. Purged (ml)
0900	X		27.35		8.37		0.913		5.41/0.75		63		12.2		100	20.71	0
0905	X		26.93		7.82		0.903		3.48/0.89		93		11.5		100	21.95	500
0910	X		27.03		7.82		0.895		3.03/0.69		98		9.9		50	24.07	1 L
0915	X		27.15		7.78		0.894		2.90/0.65		102		9.3		50	26.73	1.25 L
0920	X		27.30		7.78		0.897		2.97/0.60		103		8.9		50	28.03	1.5 L

Sample ID: CTMW-07D-20180622 Duplicate ID: — QA/QC Samples/ID: — COC Time: 0920

Sample Container Number	Material Code	Volume	Preservative	Intended Analysis and/or Method
In-Situ Chromium Treatability Study Sampling Bottle Set				

Material Codes: VOA = 40 ml glass vial; AG =Amber Glass; CG =Clear Glass; PE=polyethylene; O=Other (Specify)

Field Decontamination: (Y) N Field Filtered: (Y) N COC Number:

Comments:

Ferrous Iron= 0.0 mg/l

Sulfide = 0.0 mg/l

Groundwater Color is clear

Signature(s): Jeff R Rich

*INDICATOR PARAMETERS HAVE STABLIZED WHEN 3 CONSECUTIVE READINGS ARE WITHIN:

± 0.1 for pH; ± 3% for Specific Conductivity and Temperature; ± 10 mv for Redox Potential; ± 10% for Dissolved Oxygen and Turbidity

BGS - Below Ground Surface C - Centigrade GS - Ground Surface mg/L - milligram/Liter min - Minute MP - Measuring Point QA - Quality Assurance

Appendix B
Summary of Groundwater Elevations – Biological Reduction Study

Appendix B - Summary of Groundwater Elevations - Biological Reduction Study

In-Situ Chromium Treatability Study

Well ID	Screen Interval (feet bgs)	TOC Elevation (feet amsl)	Date Gauged	Week	Depth to Product (feet btoc)	Depth to Water (feet btoc)	Product Thickness (feet)	GW Elevation [1] (feet amsl)
CTIW-01S	18.5 - 23.5	1,757.41	04/03/17	Baseline	--	22.26	--	1,735.15
			04/18/17	Injections	--	22.31	--	1,735.10
			05/02/17	PME1	--	22.15	--	1,735.26
			05/16/17	PME2	--	22.29	--	1,735.12
			05/31/17	PME3	--	22.16	--	1,735.25
			06/19/17	PME4	--	22.03	--	1,735.38
			07/17/17	PME5	--	22.25	--	1,735.16
			08/22/17	PME6	--	22.19	--	1,735.22
			09/19/17	PME7	--	22.33	--	1,735.08
			10/03/17	PME8	22.39	22.80	0.41	1,735.00
			03/05/18	PME9	--	21.90	--	1,735.51
			06/21/18	PME10	--	22.42	--	1,734.99
CTIW-01D	33 - 38	1,757.34	04/03/17	Baseline	--	22.21	--	1,735.13
			04/18/17	Injections	--	22.26	--	1,735.08
			05/02/17	PME1	--	22.41	--	1,734.93
			05/16/17	PME2	--	22.48	--	1,734.86
			05/31/17	PME3	--	22.36	--	1,734.98
			06/19/17	PME4	--	22.21	--	1,735.13
			07/17/17	PME5	--	22.39	--	1,734.95
			08/22/17	PME6	--	22.95	--	1,734.39
			09/19/17	PME7	--	NM[2]	--	--
			10/03/17	PME8	--	22.68	--	1,734.66
			03/05/18	PME9	--	22.23	--	1,735.11
			06/21/18	PME10	--	22.75	--	1,734.59
CTIW-02S	19 -24	1,757.45	04/03/17	Baseline	--	22.49	--	1,734.96
			04/18/17	Injections	--	22.51	--	1,734.94
			05/02/17	PME1	--	22.20	--	1,735.25
			05/16/17	PME2	--	22.32	--	1,735.13
			05/31/17	PME3	--	22.37	--	1,735.08
			06/19/17	PME4	--	22.13	--	1,735.32
			07/17/17	PME5	--	22.46	--	1,734.99
			08/22/17	PME6	--	21.40	--	1,736.05
			09/19/17	PME7	--	NM[2]	--	--
			10/03/17	PME8	--	22.52	--	1,734.93
			03/05/18	PME9	--	22.02	--	1,735.43
			06/21/18	PME10	--	22.61	--	1,734.84
CTIW-02D	34 - 49	1,757.31	04/03/17	Baseline	--	22.52	--	1,734.79
			04/18/17	Injections	--	22.49	--	1,734.82
			05/02/17	PME1	--	23.21	--	1,734.10
			05/16/17	PME2	22.71	23.70	0.99	1,734.56
			05/31/17	PME3	--	23.20	--	1,734.11
			06/19/17	PME4	--	22.70	--	1,734.61
			07/17/17	PME5	--	22.88	0.01	1,734.44
			08/22/17	PME6	--	22.76	--	1,734.55
			09/19/17	PME7	--	22.75	--	1,734.56
			10/03/17	PME8	--	22.83	--	1,734.48
			03/05/18	PME9	--	22.35	--	1,734.96
			06/21/18	PME10	--	22.92	--	1,734.39
CTIW-03S	19 - 24	1,757.32	04/03/17	Baseline	--	22.53	--	1,734.79
			04/18/17	Injections	--	22.56	--	1,734.76
			05/02/17	PME1	--	22.35	--	1,734.97
			05/16/17	PME2	--	22.44	--	1,734.88
			05/31/17	PME3	--	22.51	--	1,734.81
			06/19/17	PME4	--	22.24	--	1,735.08
			07/17/17	PME5	--	22.69	--	1,734.63
			08/22/17	PME6	--	21.75	--	1,735.57
			09/19/17	PME7	--	22.50	--	1,734.82
			10/03/17	PME8	--	22.79	--	1,734.53
			03/05/18	PME9	--	22.25	--	1,735.07
			06/21/18	PME10	--	22.71	--	1,734.61
CTIW-03D	34 - 49	1,757.48	04/03/17	Baseline	--	22.80	--	1,734.68
			04/18/17	Injections	--	22.80	--	1,734.68
			05/02/17	PME1	23.65	23.79	0.14	1,733.82
			05/16/17	PME2	23.59	23.76	0.17	1,733.88
			05/31/17	PME3	--	23.33	--	1,734.15
			06/19/17	PME4	--	23.25	0.20	1,734.42
			07/17/17	PME5	--	23.18	0.02	1,734.30
			08/22/17	PME6	--	24.23	--	1,733.25
			09/19/17	PME7	--	24.11	--	1,733.37
			10/03/17	PME8	--	23.41	--	1,734.07
			03/05/18	PME9	--	22.91	--	1,734.57
			06/21/18	PME10	--	23.35	--	1,734.13
CTMW-01S	19 - 24	1,757.16	04/03/17	Baseline	--	22.21	--	1,734.95
			04/18/17	Injections	--	22.27	--	1,734.89
			05/02/17	PME1	--	22.25	--	1,734.91
			05/16/17	PME2	--	22.13	--	1,735.03
			05/31/17	PME3	--	22.28	--	1,734.88
			06/19/17	PME4	--	22.24	--	1,734.92
			07/17/17	PME5	--	22.45	--	1,734.71
			08/22/17	PME6	--	22.50	--	1,734.66
			09/19/17	PME7	--	22.85	--	1,734.31
			10/03/17	PME8	--	22.67	--	1,734.49
			03/05/18	PME9	--	22.17	--	1,734.99
			06/21/18	PME10	--	22.72	--	1,734.44
CTMW-01D	34 - 49	1,757.14	04/03/17	Baseline	--	22.37	--	1,734.77
			04/18/17	Injections	--	22.37	--	1,734.77
			05/02/17	PME1	--	22.43	--	1,734.71
			05/16/17	PME2	--	22.54	--	1,734.60
			05/31/17	PME3	--	22.46	--	1,734.68
			06/19/17	PME4	--	22.48	--	1,734.66
			07/17/17	PME5	--	22.63	--	1,734.51
			08/22/17	PME6	--	22.72	--	1,734.42
			09/19/17	PME7	--	23.77	--	1,733.37
			10/03/17	PME8	--	22.74	--	1,734.40
			03/05/18	PME9	--	22.27	--	1,734.87
			06/21/18	PME10	--	22.90	--	1,734.24
CTMW-02S	19 - 24	1,757.21	04/03/17	Baseline	--	22.47	--	1,734.74
			04/18/17	Injections	--	22.53	--	1,734.68
			05/02/17	PME1	--	22.79	--	1,734.42
			05/16/17	PME2	--	22.90	--	1,734.31
			05/31/17	PME3	--	22.85	--	1,734.36
			06/19/17	PME4	--	22.75	--	1,734.46
			07/17/17	PME5	--	22.96	--	1,734.25
			08/22/17	PME6	--	Well is dry		
			09/19/17	PME7	--	23.21	--	1,734.00
			10/03/17	PME8	--	23.26	--	1,733.95
			03/05/18	PME9	--	22.65	--	1,734.56
			06/21/18	PME10	--	23.32		1,733.89

Appendix B - Summary of Groundwater Elevations - Biological Reduction Study

In-Situ Chromium Treatability Study

Well ID	Screen Interval (feet bgs)	TOC Elevation (feet amsl)	Date Gauged	Week	Depth to Product (feet btoc)	Depth to Water (feet btoc)	Product Thickness (feet)	GW Elevation [1] (feet amsl)
CTMW-02D	34 - 49	1,757.26	04/03/17	Baseline	--	22.72	--	1,734.54
			04/18/17	Injections	--	22.71	--	1,734.55
			05/02/17	PME1	--	22.96	--	1,734.30
			05/16/17	PME2	--	23.07	--	1,734.19
			05/31/17	PME3	--	23.08	--	1,734.18
			06/19/17	PME4	--	23.12	--	1,734.14
			07/17/17	PME5	--	23.22	--	1,734.04
			08/22/17	PME6	--	23.36	--	1,733.90
			09/19/17	PME7	--	23.40	--	1,733.86
			10/03/17	PME8	--	23.36	--	1,733.90
			03/05/18	PME9	--	22.90	--	1,734.36
			06/21/18	PME10	--	23.43	--	1,733.83
CTMW-03S	19 - 24	1,757.21	04/03/17	Baseline	--	22.36	--	1,734.85
			04/18/17	Injections	--	22.44	--	1,734.77
			05/02/17	PME1	--	22.41	--	1,734.80
			05/16/17	PME2	--	22.45	--	1,734.76
			05/31/17	PME3	--	22.47	--	1,734.74
			06/19/17	PME4	--	22.40	--	1,734.81
			07/17/17	PME5	--	22.59	--	1,734.62
			08/22/17	PME6	--	22.64	--	1,734.57
			09/19/17	PME7	--	22.73	--	1,734.48
			10/03/17	PME8	--	22.74	--	1,734.47
			03/05/18	PME9	--	22.37	--	1,734.84
			06/21/18	PME10	--	23.02	--	1,734.19
CTMW-03D	34 - 49	1,757.23	04/03/17	Baseline	--	22.43	--	1,734.80
			04/18/17	Injections	--	22.51	--	1,734.72
			05/02/17	PME1	--	22.56	--	1,734.67
			05/16/17	PME2	--	22.57	--	1,734.66
			05/31/17	PME3	--	22.58	--	1,734.65
			06/19/17	PME4	--	22.58	--	1,734.65
			07/17/17	PME5	--	22.75	--	1,734.48
			08/22/17	PME6	--	22.80	--	1,734.43
			09/19/17	PME7	--	22.88	--	1,734.35
			10/03/17	PME8	--	22.85	--	1,734.38
			03/05/18	PME9	--	22.45	--	1,734.78
			06/21/18	PME10	--	23.01	--	1,734.22
CTMW-04S	19 - 24	1,757.00	04/03/17	Baseline	--	22.37	--	1,734.63
			04/18/17	Injections	--	22.41	--	1,734.59
			05/02/17	PME1	--	22.61	--	1,734.39
			05/16/17	PME2	--	22.71	--	1,734.29
			05/31/17	PME3	--	22.69	--	1,734.31
			06/19/17	PME4	--	22.66	--	1,734.34
			07/17/17	PME5	--	22.80	--	1,734.20
			08/22/17	PME6	--	22.89	--	1,734.11
			09/19/17	PME7	--	22.90	--	1,734.10
			10/03/17	PME8	--	22.98	--	1,734.02
			03/05/18	PME9	--	22.48	--	1,734.52
			06/21/18	PME10	--	23.08	--	1,733.92
CTMW-04D	34 - 49	1,757.00	04/03/17	Baseline	--	22.62	--	1,734.38
			04/18/17	Injections	--	22.64	--	1,734.36
			05/02/17	PME1	--	22.75	--	1,734.25
			05/16/17	PME2	--	22.88	--	1,734.12
			05/31/17	PME3	--	22.86	--	1,734.14
			06/19/17	PME4	--	22.85	--	1,734.15
			07/17/17	PME5	--	23.01	--	1,733.99
			08/22/17	PME6	--	23.07	--	1,733.93
			09/19/17	PME7	--	23.13	--	1,733.87
			10/03/17	PME8	--	23.12	--	1,733.88
			03/05/18	PME9	--	22.61	--	1,734.39
			06/21/18	PME10	--	23.16	--	1,733.84
CTMW-05S	19 - 24	1,757.24	06/19/17	PME4	--	23.18	--	1,734.06
			07/17/17	PME5	--	23.28	--	1,733.96
			08/22/17	PME6	--	23.36	--	1,733.88
			09/19/17	PME7	--	23.38	--	1,733.86
			10/03/17	PME8	--	23.42	--	1,733.82
			03/05/18	PME9	--	22.85	--	1,734.39
			06/21/18	PME10	--	23.44	--	1,733.80
CTMW-05D	34 - 54	1,757.25	06/19/17	PME4	--	23.36	--	1,733.89
			07/17/17	PME5	--	23.48	--	1,733.77
			08/22/17	PME6	--	23.53	--	1,733.72
			09/19/17	PME7	--	23.56	--	1,733.69
			10/03/17	PME8	--	23.54	--	1,733.71
			03/05/18	PME9	--	22.98	--	1,734.27
			06/21/18	PME10	--	23.66	--	1,733.59
CTMW-06S	19 - 24	1,757.43	06/19/17	PME4	--	23.41	--	1,734.02
			07/17/17	PME5	--	23.53	--	1,733.90
			08/22/17	PME6	--	23.59	--	1,733.84
			09/19/17	PME7	--	23.64	--	1,733.79
			10/03/17	PME8	--	23.65	--	1,733.78
			03/05/18	PME9	--	23.18	--	1,734.25
			06/21/18	PME10	--	23.73	--	1,733.70
CTMW-06D	34 - 54	1,757.42	06/19/17	PME4	--	23.74	--	1,733.68
			07/17/17	PME5	--	23.84	--	1,733.58
			08/22/17	PME6	--	23.96	--	1,733.46
			09/19/17	PME7	--	23.95	--	1,733.47
			10/03/17	PME8	--	23.95	--	1,733.47
			03/05/18	PME9	--	23.55	--	1,733.87
			06/21/18	PME10	--	23.97	--	1,733.45
CTMW-07S	19 - 24	1,757.50	10/09/17	PME8	--	Well is dry		
			03/05/18	PME9	--	23.82	--	1,733.68
			06/21/18	PME10	--	Well is dry		
CTMW-07D	100 - 115	1,757.38	10/09/17	PME8	--	21.15	--	1,736.23
			03/05/18	PME9	--	20.52	--	1,736.86
			06/21/18	PME10	--	20.71	--	1,736.67

Notes:

amsl	Above mean sea level
bgs	Below ground surface
btoc	Below top of casing
EVO	Emulsified Vegetable Oil
PME	Performance Monitoring Event
NM	Not Measured
[1]	Groundwater elevations for wells with EVO product are corrected using an average specific gravity of 0.965
[2]	Interface probe was unable to obtain any reading due to injectates in the well.

Appendix C
CTMW-07D and CTMW-07S Well Installation Technical Memorandum

TETRA TECH

TECHNICAL MEMORANDUM

To:	**Arul Ayyaswami, Tetra Tech**
Cc:	Dana Grady, Tetra Tech
From:	Carl Lenker, Tetra Tech
Date:	January 12, 2018
Subject:	CTMW-07D and CTMW-07S Well Installation, Remedial Investigation Phase 2 Modification No. 7

1.0 INTRODUCTION

On behalf of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this technical memorandum documenting the recent installation of groundwater monitoring wells CTMW-07S and CTMW-07D in the Central Retention Basin at the NERT site (Site), located in Clark County, Nevada (Figure 1). This technical memorandum presents a summary of the well installation and sampling activities performed for the installation of monitoring wells CTMW-07S and CTMW-07D in accordance with the NDEP-approved *RI Phase 2 Modification No. 7* (Tetra Tech, Inc., 2017).

2.0 MONITORING WELL INSTALLATION

Monitoring wells CTMW-07S and CTMW-07D were installed within the Central Retention Basin to better understand the vertical distribution of perchlorate and other chemicals of potential concern (COPCs) in the Upper Muddy Creek Formation (UMCf) within the Central Retention Basin. This section presents details of the installation activities, field observations, and data collected for these wells.

2.1 Installation Activities

Field work associated with the installation of monitoring wells CTMW-07S and CTMW-07D was conducted from September 21 to September 23, 2017. Locations of the monitoring wells are presented in Figure 2.

2.1.1 Pre-Drilling Activities

Tetra Tech, on behalf of NERT, prepared and submitted all required applications and obtained required permits prior to the installation of the two monitoring wells. A Monitoring Well Drilling Waiver (Nevada Administrative Code [NAC] 534.441) and a Notice of Intent to Drill Card (NAC 534.320) were submitted to

the Nevada Division of Water Resources (NDWR). The Monitoring Well Drilling Waiver also included a completed, signed, and notarized Affidavit of Intent to Plug a Monitoring Well as a required attachment.

Prior to performing intrusive field work, a geophysical survey was performed to identify any potential subsurface utilities at each boring location. The geophysical survey was conducted by Ground Penetrating Radar Systems, Inc. of Las Vegas, Nevada. In addition, all boring locations were cleared for subsurface utilities to a depth of 8 feet or to the top of a competent soil layer using a vacuum excavation rig operated in air mode. The vacuum excavation rig was operated by Cascade Drilling, LP (Cascade) of Las Vegas, Nevada.

2.1.2 Monitoring Well Installation

Two soil borings, designated CTMW-07S and CTMW-07D, were drilled within the Central Retention Basin using the hollow stem auger method by Cascade. Soil borings for CTMW-07S and CTMW-07D were advanced to a depth of 25 and 130 feet below ground surface (bgs), respectively. The soil borings were logged by a trained geologist in general accordance with ASTM International (ASTM) Standard D-2488-09 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM International, 2009a). The soil boring logs are provided in Attachment A.

During drilling activities, soil samples were collected from the deep boring only at approximately 10-foot intervals starting at a depth of 60 feet bgs to the total depth of the boring. Soil samples were transported to TestAmerica Laboratories and analyzed for perchlorate (Method E314.0), hexavalent chromium (Method SW7199), chlorate (Method 300.1B), total chromium (Method 6010B), and chloroform (Method 8260B). Soil analytical results are presented in Table 1 and copies of the laboratory reports are provided in Attachment B. These results will be included in a data validation summary report submitted as part of the forthcoming *In-Situ Chromium Treatability Study Results Report*.

Two undisturbed soil samples were also collected at 22 feet bgs from soil boring CTMW-07S and 108 feet bgs from soil boring CTMW-07D using a 2.5-inch inside diameter, 18-inch long California split barrel sampler lined with three six-inch long, 2.5-inch diameter stainless steel sleeves. Upon retrieval from the borehole, the lowermost sleeve was removed from the sampler and the ends of the sleeve were covered with Teflon™ sheets and tightly-fitting plastic caps. Samples were analyzed for physical properties (dry bulk density, grain density, porosity, and moisture content) by PTS Laboratories (PTS) of Santa Fe Springs, California. A copy of the PTS laboratory report is provided in Attachment C.

Grab groundwater samples were collected from the soil boring CTMW-07D at depths of 50 and 70 feet bgs to further assess the vertical distribution of contaminants in groundwater within the Central Retention Basin. A SimulProbe sampler was utilized to target the specific saturated intervals. The SimulProbe sampler was driven into the ground at the selected intervals by a hammer. The SimulProbe sampler was then lifted up a few inches, which opened up a hidden compartment and provided a pathway for water to channel into the canister. The water canister was closed by back pressurization and utilized compressed gas to lift the water sample to the surface through a network of tubing and check valves. Grab groundwater samples were transported to TestAmerica Laboratories for analysis of chlorate (Method 300.1B), chloroform (Method 8260B), hexavalent chromium (Method 7199), perchlorate (Method 314.0), and total chromium (Method 6010B). Grab groundwater analytical results are presented in Table 2 and laboratory reports are provided in Attachment B. These results will be included in a data validation summary report submitted as part of the forthcoming *In-Situ Chromium Treatability Study Results Report*.

After drilling to the target depth, the soil borings were converted into groundwater monitoring wells constructed of 2-inch Schedule 80 polyvinyl chloride (PVC), with screened intervals constructed of 0.010-inch slotted, 2-inch Schedule 80 PVC. Groundwater monitoring well CTMW-07S was constructed with a screen interval of 19 to 24 feet bgs. Groundwater monitoring well CTMW-07D was constructed with a screen interval of 100 to 115 feet bgs. Both wells were constructed utilizing a #2/16 sand filter pack,

placed from approximately 1 foot below to 2 feet above the screened intervals. A 5-foot hydrated bentonite seal was added above the top of the sand filter pack. Wells were cemented in place utilizing a neat cement grout consisting of 5% bentonite and 95% portland cement and completed with flush-mounted well vaults.

After installation, monitoring well CTMW-07D was developed from October 3 to October 5, 2017 following industry standard operating procedures. The well was developed using a surge block and bailer to swab and surge the filter pack and remove sediment. This process was followed by pumping with a submersible pump to purge the well of fine-grained sediment. Well development was considered complete when three to ten casing volumes of water had been removed from the well and index parameters (consisting of pH, specific conductivity, turbidity and temperature) were stable over three consecutive measurements.

Once all monitoring well installation activities were complete, a licensed land surveyor surveyed the horizontal coordinates of each well relative to North American Datum 83 with an accuracy of 0.1 foot. The elevation of the ground surface and top of well casing measuring point relative to North American Vertical Datum 88 was surveyed with accuracies of 0.1 foot and 0.01 foot, respectively. The survey data is included on the boring and well construction logs provided in Attachment A.

2.1.3 Management of Investigation-Derived Wastes

Investigation-derived waste generated during the well installations were managed according to applicable state, federal, and local regulations and as described in Field Guidance Document No. 001, Managing Investigation-Derived Waste (Environ, 2014). The investigation-derived waste that was generated during the well installations includes soil cuttings, equipment decontamination water, groundwater generated during depth-discrete groundwater sampling, and well development. Investigation-derived soil waste was stored in plastic-lined roll-off bins. Solids were characterized by collecting representative samples, as necessary, to determine disposal options. Waste water generated during well development or decontamination activities were temporarily stored in 250-gallon totes and 5-gallon buckets with lids and transferred into the GW-11 Pond. Soil bins were labeled with “pending analysis” labels, the date accumulation began, contents, source, and contact information, and stored in a designated area.

3.0 REFERENCES

ASTM International. (2009a). *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).* Standard D-2488-06.

ASTM International. (2009b). *Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.* ASTM Standard D3385-09.

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Ramboll Environ. (2015). *Annual Remedial Performance Report for Chromium and Perchlorate, Nevada Environmental Response Trust Site, Henderson, Nevada.*

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Tetra Tech, Inc. (2017). *RI Phase 2 Modification No. 7, Nevada Environmental Response Trust, Henderson, Nevada.*

Tables

Table 1

Summary of Soil Analytical Results

Remedial Investigation Phase 2 Modification No. 7

Boring ID	Sample Depth (ft bgs)	Sample ID	Sample Date	Chlorate by USEPA Method 300.1B (mg/kg)	Perchlorate by USEPA Method 314.0 (mg/kg)	Hexavalent Chromium by USEPA Method 7199 (mg/kg)	Total Chromium by USEPA Method 6010B (mg/kg)	Chloroform by USEPA Method 8260B (mg/kg)
CMTW-07D	60.0	CTMW-07D-60.0-20170921	09/21/17	290	140	0.19	15	0.061
	70.0	CTMW-07D-70.0-20170921	09/21/17	140	70	<0.094	27	0.021
	80.0	CTMW-07D-80.0-20170921	09/21/17	2.7	1.2 J-	<0.21	13	<0.0028
	90.0	CTMW-07D-90.0-20170921	09/21/17	0.18 J	0.079	<0.21	34	<0.0028
	90.0	CTMW-07D-90.0-20170921-FD	09/21/17	0.18 J	0.091	<0.21	34	<0.0029
	100.0	CTMW-07D-100.0-20170921	09/21/17	2.8	5.8	<0.23	35	<0.0030
	110.0	CTMW-07D-110.0-20170921	09/21/17	6.5	3.0	<0.23	170	<0.0036
	120.0	CTMW-07D-120.0-20170922	09/22/17	0.67	0.36	<0.27	58	<0.0035
	130.0	CTMW-07D-130.0-20170922	09/22/17	0.94	0.40	<0.22	28	<0.0029

Notes:

ID	Identification
USEPA	United States Environmental Protection Agency
ft bgs	Feet below ground surface
mg/kg	Milligram per kilogram
<	Denotes concentration is less than the laboratory method detection limit indicated.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J-	The result is an estimated quantity, but the result may be biased low.
FD	Field Duplicate

Table 2

Summary of Groundwater Grab Sample Analytical Results

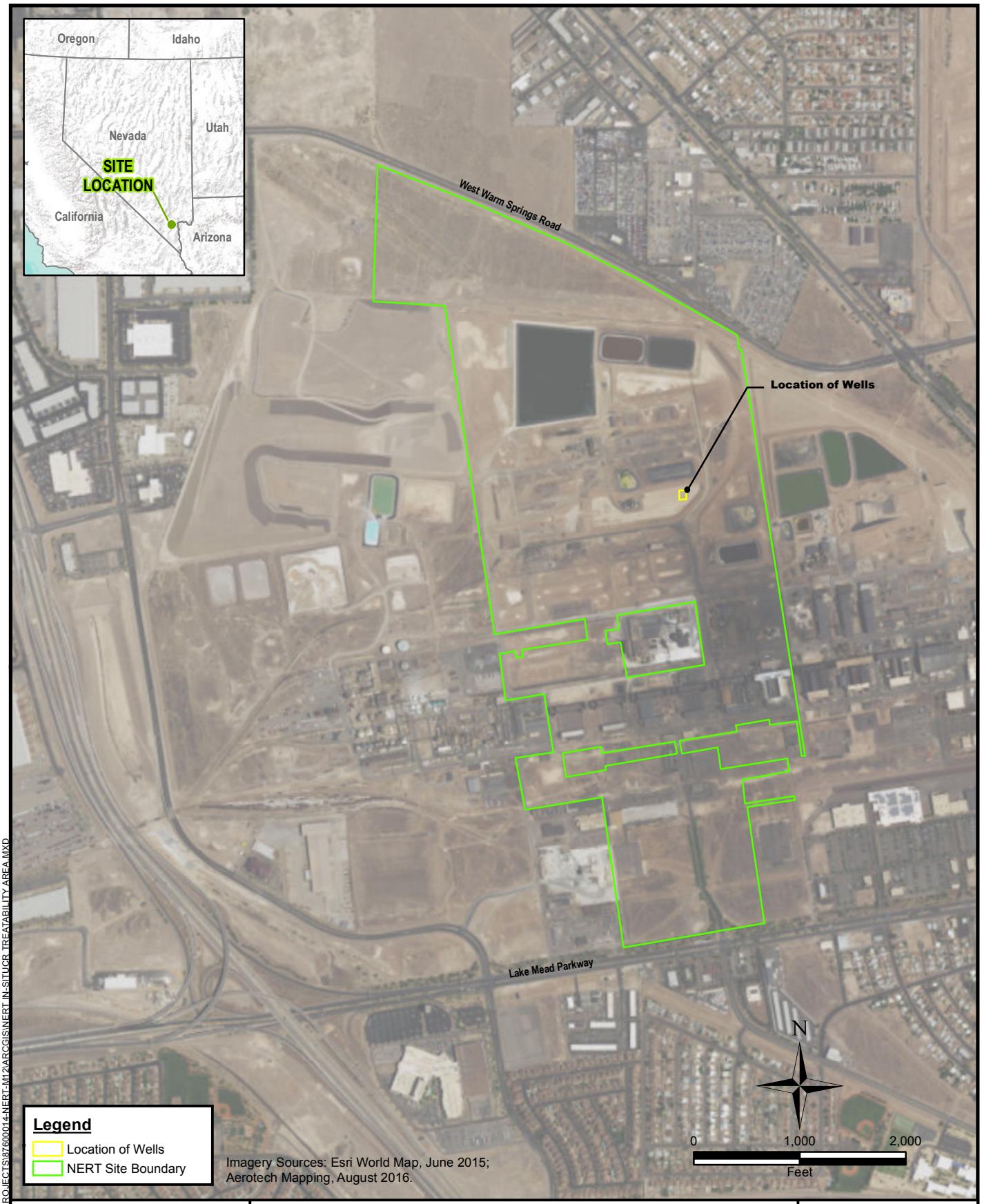
Remedial Investigation Phase 2 Modification No. 7

Boring ID	Sample Depth (ft bgs)	Sample ID	Sample Date	Chlorate by USEPA Method 300.1B (mg/L)	Perchlorate by USEPA Method 314.0 (mg/L)	Hexavalent Chromium by USEPA Method 7199 (mg/L)	Total Chromium by USEPA Method 6010B (mg/L)	Chloroform by USEPA Method 8260B (mg/L)
CTMW-07D	50.0	CTMW-07D-50.0-20170921	9/21/2017	2,800	880	11	11	0.72
	70.0	CTMW-07D-70.0-20170921	9/21/2017	2,000	700	<0.00025	3.5	0.5

Notes:

ID	Identification
USEPA	United States Environmental Protection Agency
mg/L	Milligram per liter
ft bgs	Feet below ground surface
<	Denotes concentration is less than the laboratory method detection limit indicated.

Figures



\\TTS318FS1.TTLOCAL\GIS\PROJECTS\97600014-NERT-M12\ARCGIS\NERT IN-SITU CR TREATABILITY AREA.MXD

TETRA TECH

www.tetratech.com

150 S. 4th Street, Unit A
Henderson, Nevada 89015
Phone: (702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

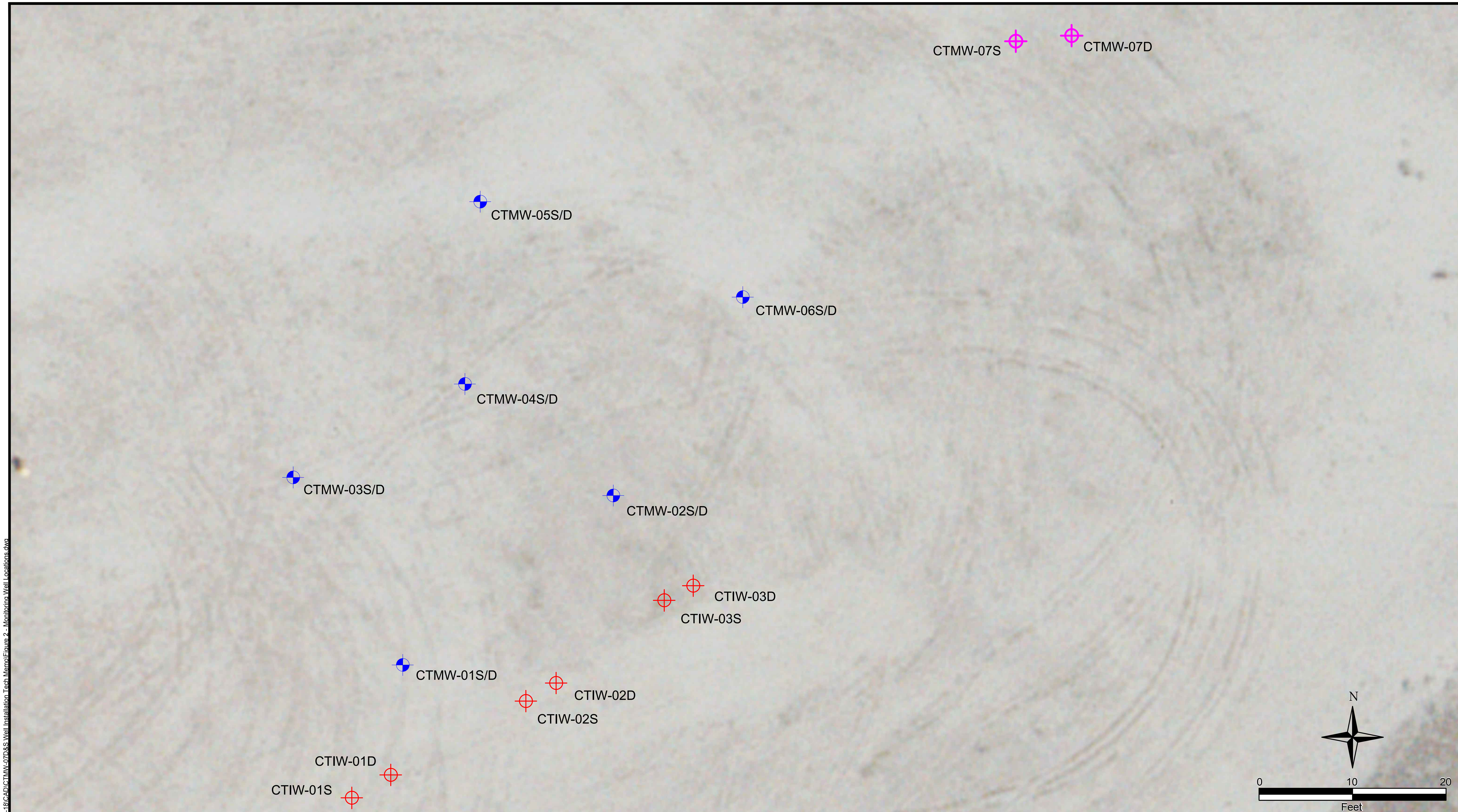
CTMW-07D and CTMW-07S Well Installation Technical Memorandum

SITE LOCATION MAP

Project No.:	117-7502018
Date:	NOVEMBER 15, 2017
Designed By:	KL

Figure No.

1



Legend

Symbol	Description		
CTMW-07S	Newly-Installed Monitoring Well (Single Completion)	Qal	Quaternary Alluvium
CTMW-03S/D	Previously-Installed Monitoring Well (Dual Completion)	UMCf	Upper Muddy Creek Formation
CTIW-01D	Previously-Installed Injection Well (Single Completion)		
S	Shallow Well (Screened in Qal)		
D	Deep Well (Screened in UMCf)		

Note:
1. Imagery Source: Aerotech Mapping, August 2016.

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NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

CTMW-07D AND CTMW-07S WELL INSTALLATION TECHNICAL MEMORANDUM

MONITORING WELL LOCATIONS

Project No:	117-7502018
Date:	NOVEMBER 15, 2017
Designed By:	DVK
Figure No.	2

\\tts318fs3\.tt.local\ces\Projects\87600M12-18\CAD\CTMW-07D&S Well Installation Tech Memo\Figure 2 - Monitoring Well Locations.dwg

Attachment A
Boring and Well Construction Logs

TETRA TECH
Tetra Tech
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Telephone: (949) 809-5000
Fax: (949) 809-5010

BORING NUMBER CTMW-07D

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DATE STARTED 9/21/17 **COMPLETED** 9/23/17 **NORTHING:** 26719284.26 US feet **EASTING:** 828212.828 US feet

DRILLING CONTRACTOR Cascade Drilling **GROUND ELEVATION** 1757.377 ft **HOLE SIZE** 8 in

DRILLING METHOD Hollow Stem Auger **GROUND WATER LEVELS:**

LOGGED BY Jeff Richeson **CHECKED BY** M. Crews **AT TIME OF DRILLING:** 22.50 ft / Elev 1734.88 ft

NOTES Well completed with and 18" traffic-rated well box. **AFTER DRILLING:** 21.15 ft / Elev 1736.23 ft

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0						Casing Type: Schedule 80 PVC
					(SM) Silty SAND, (10, 65,25,0) (50,30,20), 7.5 YR 5/4 brown, fine to coarse grained sand, gravel <3" A/SA, dense, dry. (Alluvium)	
5					(SM) Silty SAND with Gravel, (15,55,30,0) (60,40,0), 7.5YR 6/4 light brown, gravel <1.5" A/SR, fine to medium grained sand, dense, dry. (Alluvium)	
10					10.0 1747.4	
					(SW) SAND with Silt and Gravel, (15,70,15,0) (30,40,30), 10YR 4/4 dark yellowish brown, fine to coarse grained sand, gravel <3" SA/SR, dense, moist. (Alluvium)	
15					15.0 1742.4	
					(SW) SAND with Gravel, (15,80,5,0) (25,35,40), 10YR 4/4 dark yellowish brown, gravel <2" SA/SR, fine to coarse grained sand, dense, moist. (Alluvium)	
20					20.0 1737.4	

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BORING NUMBER CTMW-07D

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
	SS	22-21-24 (45)			(SW) SAND, (5,85,10,0) (30,50,20), 10YR 6/3 pale brown, gravel <1" SA/SR, fine to coarse grained sand, dense, moist. (Alluvium) *(continued)*	
					22.0 — 1735.4	
					22.5 (SM) Silty SAND, (0,75,25,0) (30,45,25), 10YR 6/3 pale brown, fine to coarse grained sand, cemented, very dense, moist. (Alluvium) — 1734.9	
					(SW) SAND, (10,80,10,0) (30,40,30), 10YR 6/3 pale brown, gravel <3" SA/SR, medium dense to dense, wet. (Alluvium)	
					24.0 — 1733.4	
25					25.0 (ML) SILT with Sand, (0,25,75,0) (100,0,0), 10YR 5/4 yellowish brown, low plasticity, firm to stiff, moist. (UMCf) — 1732.4	
					(ML) Clayey SILT, (0,1,74,25) (100,0,0), 7.5 YR 6/3 light brown, medium to high plasticity, cemented nodules <0.5" SR present throughout interval, stiff, moist. (UMCf)	
30					(ML) Clayey SILT, (0,1,74,25) (100,0,0), 7.5 YR 6/3 light brown, high plasticity, cemented nodules <1" SA/SR present throughout interval (~20% of sample white cemented nodules), stiff, moist. (UMCf)	2" Schedule 80 PVC
35					35.0 — 1722.4	
					(ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf)	
40					40.0 — 1717.4	
					(ML) Clayey SILT, (0,0,75,25), 7.5YR 5/4 brown, high plasticity, firm, wet. (UMCf)	
					44.0 — 1713.4	
45						

(Continued Next Page)

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BORING NUMBER CTMW-07D

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
45					(ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf) *(continued)*	Neat Cement Grout (5%Bentonite/95% Portland Cement)
50					50.0 1707.4 (ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, high plasticity, stiff, wet. (UMCf)	
					54.0 1703.4 (ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf)	
55					57.0 1700.4 (ML) Clayey SILT, (0,0,75,25), 7.5YR 5/4 brown, cemented white nodules <1" SR, high plasticity, firm, wet. (UMCf)	
60	SS	7-9-9 (18)			60.0 1697.4 (ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf)	
					63.0 1694.4 63.5 1693.9 (SP-SC) SAND with Clay, (0,80,0,20) (0,30,70), 10YR 3/3 dark brown, medium to coarse grained sand, dense, wet. (UMCf)	
65					65.0 1692.4 (ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf) (ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, high plasticity, stiff, wet. (UMCf)	
					67.0 1690.4 (ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, cemented white nodules <3" SR (~35% of sample comprised of cemented nodules), low to medium plasticity, stiff to very stiff, moist. (UMCf)	

(Continued Next Page)

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BORING NUMBER CTMW-07D

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
70	SS	7-10-12 (22)			(ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf) *(continued)*	
					71.5 — 1685.9	
					(ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, cemented white nodules <3" SR (~35% of sample comprised of cemented nodules), low to medium plasticity, stiff to very stiff, moist. (UMCf)	
					(ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf)	
75					75.0 — 1682.4	
					(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, high plasticity, stiff, wet. (UMCf)	
					78.0 — 1679.4	
					(ML) SILT, (0,0,95,5), 10YR 5/4 yellowish brown, white cemented nodules present <0.75", low plasticity, stiff, moist. (UMCf)	
80					80.0 — 1677.4	
	SS	12-12-10 (22)			(SP-SC) SAND with Clay, (0,80,0,20) (0,30,70), 10YR 3/3 dark brown, medium to coarse grained sand, dense, wet. (UMCf)	
					81.5 — 1675.9	
					(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, high plasticity, stiff, wet. (UMCf)	
85					85.5 — 1671.9	
					(ML) SILT, (0,0,95,5), 7.5YR 4/6 strong brown, trace of cemented white nodules <1" SR, low to medium plasticity, stiff to very stiff, moist. (UMCf)	
90					90.0 — 1667.4	
	SS	3-3-23 (26)			(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, high plasticity, stiff, wet. (UMCf)	
					91.0 — 1666.4	
					(ML) SILT, (0,0,100,0), 10YR 6/3 pale brown, ~50% of sample comprised of cemented nodule, highly reactive to HCL, non plastic, very hard, moist to wet. (UMCf)	
					92.5 — 1664.9	

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BORING NUMBER CTMW-07D

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
95					(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, high plasticity, stiff, wet. (UMCf) *(continued)*	Hydrated Bentonite Pellets
					(ML) Clayey SILT, (0,0,75,25), 7.5YR 5/4 brown, cemented nodules present <0.5", high plasticity, firm, wet. (UMCf)	
					97.0 1660.4	
					(ML) SILT, (0,0,100,0), 10YR 6/3 pale brown, ~50% of sample comprised of cemented nodule, highly reactive to HCL, non plastic, very hard, moist to wet. (UMCf)	
					99.0 1658.4	
100	SS	0-7-15 (22)			(ML) Clayey SILT, (0,0,75,25), 7.5YR 5/4 brown, cemented nodules present <0.5", high plasticity, firm, wet. (UMCf)	
105					(ML) Clayey SILT, (0,0,70,30), 7.5YR 4/6 strong brown, few large <1.5" cemented nodules, high plasticity, stiff, wet. (UMCf)	2" Schedule 80 PVC 0.010" Slotted Screen
110	SS	4-4-13 (17)				#2/16 Sand
115					(ML) Clayey SILT, (0,0,75,25), 10YR 5/4 yellowish brown, cemented nodule present at 119' bgs, high plasticity, stiff, moist. (UMCf)	

(Continued Next Page)

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BORING NUMBER CTMW-07D

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
					(ML) Clayey SILT, (0,0,75,25), 10YR 5/4 yellowish brown, cemented nodule present at 119' bgs, high plasticity, stiff, moist. (UMCf) *(continued)*	
120	SS	6-9-12 (21)			(ML) Clayey SILT, (0,0,70,30), 10YR 5/4 yellowish brown, high plasticity, hard, moist. (UMCf)	Hydrated Bentonite Pellets
125					(ML) Clayey SILT, (0,0,75,25), 10YR 5/4 yellowish brown, cemented nodules present (~10% of sample comprised of cemented nodules), high plasticity, stiff, moist. (UMCf) 1632.4	
					125.0 (ML) 100% of sample is comprised of cemented nodule, highly reactive to HCL, 10YR 8/1 white. (UMCf)	
					127.0 1630.4	
					(CH) Silty CLAY, (0,0,40,60), 10YR 8/1 white, highly weathered cemented nodule, high plasticity, hard, moist. (UMCf)	
					128.5 1628.9	
130	SS	8-50			(ML) 100% of sample is comprised of cemented nodule, highly reactive to HCL, 10YR 8/1 white. (UMCf)	
					131.5 1625.9	

Bottom of borehole at 131.5 feet.

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BORING NUMBER CTMW-07S

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DATE STARTED 9/23/17 **COMPLETED** 9/23/17 **NORTHING:** 26719283.85 US feet **EASTING:** 828206.898 US feet

DRILLING CONTRACTOR Cascade Drilling **GROUND ELEVATION** 1757.501 ft **HOLE SIZE** 8 in

DRILLING METHOD Hollow Stem Auger **GROUND WATER LEVELS:**

LOGGED BY Jeff Richeson **CHECKED BY** M. Crews **AT TIME OF DRILLING:** 22.50 ft / Elev 1735.00 ft

NOTES Well completed with and 18" traffic-rated well box. **AFTER DRILLING:** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION	CONSTRUCTION DIAGRAM
0					(SM) Silty SAND, (10, 65,25,0) (50,30,20), 7.5 YR 5/4 brown, fine to coarse grained sand, gravel <3" A/SA, dense, dry. (Alluvium)	Casing Type: Schedule 80 PVC
5					(SM) Silty SAND with Gravel, (15,55,30,0) (60,40,0), 7.5YR 6/4 light brown, gravel <1.5" A/SR, fine to medium grained sand, dense, dry. (Alluvium)	Neat Cement Grout (5% Bentonite/95% Portland Cement)
10					10.0 (1747.5) (SW) SAND with Silt and Gravel, (15,70,15,0) (30,40,30), 10YR 4/4 dark yellowish brown, fine to coarse grained sand, gravel <3" SA/SR, dense, moist. (Alluvium)	2" Schedule 80 PVC
15					15.0 (1742.5) (SW) SAND with Gravel, (15,80,5,0) (25,35,40), 10YR 4/4 dark yellowish brown, gravel <2" SA/SR, fine to coarse grained sand, dense, moist. (Alluvium)	Hydrated Bentonite
20					20.0 (1737.5)	#2/16 Sand

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BORING NUMBER CTMW-07S

CLIENT Nevada Environmental Response Trust (NERT) **PROJECT NAME** NERT RI Phase 2 Mod. 7

PROJECT NUMBER 117-7502918 **PROJECT LOCATION** Henderson, NV

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	ENVIRONMENTAL DATA	GRAPHIC LOG	MATERIAL DESCRIPTION		CONSTRUCTION DIAGRAM
	SS	22-21-24 (45)			(SW) SAND, (5,85,10,0) (30,50,20), 10YR 6/3 pale brown, gravel <1" SA/SR, fine to coarse grained sand, dense, moist. (Alluvium) *(continued)*	1735.5	2" Schedule 80 PVC 0.010" Slotted Screen
					22.0		
					(SM) Silty SAND, (0,75,25,0) (30,45,25), 10YR 6/3 pale brown, fine to coarse grained sand, cemented, very dense, moist. (Alluvium)	1735.0	
					22.5		
					(SW) SAND, (10,80,10,0) (30,40,30), 10YR 6/3 pale brown, gravel <3" SA/SR, medium dense to dense, wet. (Alluvium)	1733.5	#2/16 Sand
					24.0		
25					(ML) SILT with Sand, (0,25,75,0) (100,0,0), 10YR 5/4 yellowish brown, low plasticity, firm to stiff, moist. (Alluvium)	1732.5	
					25.0		

Bottom of borehole at 25.0 feet.

Attachment B
Analytical Laboratory Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

TestAmerica Job ID: 440-192727-1
Client Project/Site: NERT In-Situ Cr Treatability, M12

For:
Tetra Tech, Inc.
17885 Von Karman Ave, Ste 500
Irvine, California 92614

Attn: Mike Crews

Authorized for release by:
10/9/2017 3:27:44 PM

Patty Mata, Senior Project Manager
(949)261-1022
patty.mata@testamericainc.com

Table of Contents

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-192727-1	CTMW-07D-50.0-20170921	Water	09/21/17 11:25	09/21/17 18:51
440-192727-2	CTMW-07D-60.0-20170921	Solid	09/21/17 11:50	09/21/17 18:51
440-192727-3	CTMW-07D-70.0-20170921	Water	09/21/17 13:15	09/21/17 18:51
440-192727-4	CTMW-07D-70.0-20170921	Solid	09/21/17 13:20	09/21/17 18:51
440-192727-5	Trip Blank	Water	09/21/17 07:00	09/21/17 18:51
440-192727-6	CTMW-07D-80.0-20170921	Solid	09/21/17 13:50	09/21/17 18:51
440-192727-7	CTMW-07D-90.0-20170921	Solid	09/21/17 14:35	09/21/17 18:51
440-192727-8	CTMW-07D-100.0-20170921	Solid	09/21/17 15:05	09/21/17 18:51
440-192727-9	CTMW-07D-110.0-20170921	Solid	09/21/17 15:25	09/21/17 18:51
440-192727-10	CTMW-07.D-60.0-20170921-EB	Water	09/21/17 12:20	09/21/17 18:51
440-192727-11	CTMW-07D-90.0-20170921-FD	Solid	09/21/17 14:35	09/21/17 18:51

Job ID: 440-192727-1

Laboratory: TestAmerica Irvine

Narrative

Job Narrative
440-192727-1

Comments
No additional comments.

Receipt
The samples were received on 9/22/2017 7:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.5º C and 4.0º C.

GC/MS VOA
Method(s) 8260B: Internal standard (ISTD) response for 1,4-Dichlorobenzene-d4 for the following sample was outside acceptance criteria: CTMW-07D-90.0-20170921-FD (440-192727-11). This ISTD does not correspond to any of the requested target compounds; therefore, the data have been reported.

Method(s) 8260B: The samples were collected in properly preserved vials for analysis of volatile organic compounds (VOCs). However, when verified by the laboratory, the pH was 6 and the following samples was analyzed after 7 days from sampling: CTMW-07D-50.0-20170921 (440-192727-1) and CTMW-07D-70.0-20170921 (440-192727-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

HPLC/IC
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: CTMW-07D-50.0-20170921

Lab Sample ID: 440-192727-1

Date Collected: 09/21/17 11:25
Matrix: Water
Date Received: 09/21/17 18:51

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	720		5.0	2.5	ug/L			10/02/17 16:41	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*10/02/17 16:41*	*10*
Dibromofluoromethane (Surr)	*114*		*76 - 132*		*10/02/17 16:41*	*10*
Toluene-d8 (Surr)	*106*		*80 - 128*		*10/02/17 16:41*	*10*

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2800000		200000	100000	ug/L			09/26/17 02:13	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/26/17 02:13*	*10000*

Method: 314.0 LL - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	880000		10000	5000	ug/L			10/04/17 09:14	10000

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	11000		2000	250	ug/L			09/22/17 08:13	1000

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	11		0.025	0.013	mg/L		09/28/17 10:15	09/28/17 18:33	5

Client Sample ID: CTMW-07D-60.0-20170921

Lab Sample ID: 440-192727-2

Date Collected: 09/21/17 11:50
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 79.0

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	61		2.5	1.3	ug/Kg	☼		09/28/17 14:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*79 - 120*		*09/28/17 14:20*	*1*
Dibromofluoromethane (Surr)	*102*		*60 - 120*		*09/28/17 14:20*	*1*
Toluene-d8 (Surr)	*108*		*79 - 123*		*09/28/17 14:20*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	290000		51000	13000	ug/Kg	☼		09/28/17 07:57	200

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*96*		*90 - 115*		*09/28/17 07:57*	*200*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	140		25	6.0	mg/Kg	☼		10/07/17 11:38	500

Client Sample ID: CTMW-07D-60.0-20170921

Lab Sample ID: 440-192727-2

Date Collected: 09/21/17 11:50
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 79.0

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	0.19		0.13	0.063	mg/Kg	☼	09/25/17 09:22	09/26/17 14:29	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	15		1.3	0.63	mg/Kg	☼	09/28/17 07:51	09/28/17 15:34	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	21.0		0.1	0.1	%			09/22/17 17:05	1

Client Sample ID: CTMW-07D-70.0-20170921

Lab Sample ID: 440-192727-3

Date Collected: 09/21/17 13:15
Matrix: Water
Date Received: 09/21/17 18:51

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	500		5.0	2.5	ug/L			10/02/17 17:11	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*10/02/17 17:11*	*10*
Dibromofluoromethane (Surr)	*115*		*76 - 132*		*10/02/17 17:11*	*10*
Toluene-d8 (Surr)	*108*		*80 - 128*		*10/02/17 17:11*	*10*

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2000000		200000	100000	ug/L			09/26/17 02:49	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*102*		*90 - 115*		*09/26/17 02:49*	*10000*

Method: 314.0 LL - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	700000		10000	5000	ug/L			10/04/17 09:32	10000

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		2.0	0.25	ug/L			09/22/17 08:26	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	3.5		0.050	0.025	mg/L		09/28/17 10:15	09/29/17 10:13	10

Client Sample ID: CTMW-07D-70.0-20170921

Lab Sample ID: 440-192727-4

Date Collected: 09/21/17 13:20
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 53.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	21		3.7	1.9	ug/Kg	☼		09/28/17 14:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*		*09/28/17 14:46*	*1*

Client Sample ID: CTMW-07D-70.0-20170921

Lab Sample ID: 440-192727-4

Date Collected: 09/21/17 13:20
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 53.5

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*103*		*60 - 120*		*09/28/17 14:46*	*1*
Toluene-d8 (Surr)	*106*		*79 - 123*		*09/28/17 14:46*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	**140000**		38000	9400	ug/Kg	☼		09/28/17 04:56	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/28/17 04:56*	*100*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**70**		3.7	0.88	mg/Kg	☼		10/06/17 21:45	50

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.19	0.094	mg/Kg	☼	09/25/17 09:22	09/26/17 14:41	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**27**		1.8	0.92	mg/Kg	☼	09/28/17 07:51	09/28/17 15:36	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**46.5**		0.1	0.1	%			09/22/17 17:05	1

Client Sample ID: Trip Blank

Lab Sample ID: 440-192727-5

Date Collected: 09/21/17 07:00
Matrix: Water
Date Received: 09/21/17 18:51

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.50	0.25	ug/L			10/02/17 17:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*10/02/17 17:40*	*1*
Dibromofluoromethane (Surr)	*109*		*76 - 132*		*10/02/17 17:40*	*1*
Toluene-d8 (Surr)	*109*		*80 - 128*		*10/02/17 17:40*	*1*

Client Sample ID: CTMW-07D-80.0-20170921

Lab Sample ID: 440-192727-6

Date Collected: 09/21/17 13:50
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 70.7

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.8	1.4	ug/Kg	☼		09/28/17 10:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*110*		*79 - 120*		*09/28/17 10:22*	*1*
Dibromofluoromethane (Surr)	*100*		*60 - 120*		*09/28/17 10:22*	*1*
Toluene-d8 (Surr)	*109*		*79 - 123*		*09/28/17 10:22*	*1*

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Client Sample ID: CTMW-07D-80.0-20170921

Lab Sample ID: 440-192727-6

Date Collected: 09/21/17 13:50
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 70.7

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2700		280	71	ug/Kg	☼		09/27/17 22:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*95*		*90 - 115*		*09/27/17 22:20*	*1*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	1.2	F1	0.11	0.027	mg/Kg	☼		10/06/17 18:06	2

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.43	0.21	mg/Kg	☼	09/27/17 11:16	09/28/17 15:07	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	13		2.8	1.4	mg/Kg	☼	09/28/17 07:51	09/29/17 10:25	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	29.3		0.1	0.1	%			09/25/17 17:10	1

Client Sample ID: CTMW-07D-90.0-20170921

Lab Sample ID: 440-192727-7

Date Collected: 09/21/17 14:35
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 71.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.8	1.4	ug/Kg	☼		09/28/17 15:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*79 - 120*		*09/28/17 15:39*	*1*
Dibromofluoromethane (Surr)	*101*		*60 - 120*		*09/28/17 15:39*	*1*
Toluene-d8 (Surr)	*107*		*79 - 123*		*09/28/17 15:39*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	180	J	280	70	ug/Kg	☼		09/28/17 10:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*96*		*90 - 115*		*09/28/17 10:21*	*1*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	0.079		0.056	0.013	mg/Kg	☼		10/07/17 11:55	1

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.42	0.21	mg/Kg	☼	09/27/17 11:16	09/28/17 15:59	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	34		1.4	0.69	mg/Kg	☼	09/28/17 07:51	09/28/17 15:48	5

Client Sample ID: CTMW-07D-90.0-20170921

Lab Sample ID: 440-192727-7

Date Collected: 09/21/17 14:35
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 71.2

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	28.8		0.1	0.1	%			09/22/17 17:05	1

Client Sample ID: CTMW-07D-100.0-20170921

Lab Sample ID: 440-192727-8

Date Collected: 09/21/17 15:05
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 65.9

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		3.0	1.5	ug/Kg	☼		09/28/17 16:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*79 - 120*		*09/28/17 16:05*	*1*
Dibromofluoromethane (Surr)	*99*		*60 - 120*		*09/28/17 16:05*	*1*
Toluene-d8 (Surr)	*109*		*79 - 123*		*09/28/17 16:05*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	2800		1500	380	ug/Kg	☼		09/28/17 12:15	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*94*		*90 - 115*		*09/28/17 12:15*	*5*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	5.8		3.0	0.72	mg/Kg	☼		10/06/17 22:18	50

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.46	0.23	mg/Kg	☼	09/27/17 11:16	09/28/17 16:12	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	35		1.5	0.75	mg/Kg	☼	09/28/17 07:51	09/28/17 15:50	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	34.1		0.1	0.1	%			09/22/17 17:05	1

Client Sample ID: CTMW-07D-110.0-20170921

Lab Sample ID: 440-192727-9

Date Collected: 09/21/17 15:25
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 55.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		3.6	1.8	ug/Kg	☼		09/28/17 16:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*106*		*79 - 120*		*09/28/17 16:31*	*1*
Dibromofluoromethane (Surr)	*103*		*60 - 120*		*09/28/17 16:31*	*1*
Toluene-d8 (Surr)	*106*		*79 - 123*		*09/28/17 16:31*	*1*

Client Sample ID: CTMW-07D-110.0-20170921

Lab Sample ID: 440-192727-9

Date Collected: 09/21/17 15:25
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 55.3

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	6500		360	90	ug/Kg	☼		09/28/17 06:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*94*		*90 - 115*		*09/28/17 06:44*	*1*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	3.0		0.36	0.086	mg/Kg	☼		10/07/17 12:12	5

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.54	0.27	mg/Kg	☼	09/27/17 11:16	09/28/17 16:25	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	170		1.8	0.90	mg/Kg	☼	09/28/17 07:51	09/28/17 15:53	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	44.7		0.1	0.1	%			09/22/17 17:05	1

Client Sample ID: CTMW-07.D-60.0-20170921-EB

Lab Sample ID: 440-192727-10

Date Collected: 09/21/17 12:20
Matrix: Water
Date Received: 09/21/17 18:51

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.50	0.25	ug/L			10/02/17 18:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*10/02/17 18:10*	*1*
Dibromofluoromethane (Surr)	*114*		*76 - 132*		*10/02/17 18:10*	*1*
Toluene-d8 (Surr)	*109*		*80 - 128*		*10/02/17 18:10*	*1*

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	10	ug/L			09/25/17 19:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/25/17 19:34*	*1*

Method: 314.0 LL - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		1.0	0.50	ug/L			10/04/17 02:34	1

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		2.0	0.25	ug/L			09/22/17 08:38	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0050	0.0025	mg/L		09/27/17 10:22	09/27/17 21:53	1

Client Sample ID: CTMW-07D-90.0-20170921-FD
Date Collected: 09/21/17 14:35
Date Received: 09/21/17 18:51

Lab Sample ID: 440-192727-11
Matrix: Solid
Percent Solids: 71.2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.8	1.4	ug/Kg	☼		09/28/17 16:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*107*	*	*79 - 120*		*09/28/17 16:58*	*1*
Dibromofluoromethane (Surr)	*103*		*60 - 120*		*09/28/17 16:58*	*1*
Toluene-d8 (Surr)	*109*		*79 - 123*		*09/28/17 16:58*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	**180**	**J**	280	70	ug/Kg	☼		09/28/17 07:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*96*		*90 - 115*		*09/28/17 07:20*	*1*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.091**		0.056	0.013	mg/Kg	☼		10/07/17 12:46	1

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.42	0.21	mg/Kg	☼	09/27/17 11:16	09/28/17 16:38	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**34**		1.4	0.69	mg/Kg	☼	09/28/17 07:51	09/28/17 15:55	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**28.8**		0.1	0.1	%			09/22/17 17:05	1

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL IRV
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
314.0 LL	Perchlorate (IC)	EPA	TAL IRV
7199	Chromium, Hexavalent (IC)	SW846	TAL IRV
6010B	Metals (ICP)	SW846	TAL IRV
Moisture	Percent Moisture	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Client Sample ID: CTMW-07D-50.0-20170921
Lab Sample ID: 440-192727-1

Date Collected: 09/21/17 11:25
Matrix: Water
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	10 mL	10 mL	432406	10/02/17 16:41	HR	TAL IRV
Total/NA	Analysis	300.1B		10000			431047	09/26/17 02:13	YZ	TAL IRV
Total/NA	Analysis	314.0 LL		10000			432714	10/04/17 09:14	CTH	TAL IRV
Total/NA	Analysis	7199		1000			430559	09/22/17 08:13	MN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	431882	09/28/17 10:15	Q1N	TAL IRV
Total Recoverable	Analysis	6010B		5			432035	09/28/17 18:33	EN	TAL IRV

Client Sample ID: CTMW-07D-60.0-20170921
Lab Sample ID: 440-192727-2

Date Collected: 09/21/17 11:50
Matrix: Solid
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			430769	09/22/17 17:05	EC1	TAL IRV

Client Sample ID: CTMW-07D-60.0-20170921
Lab Sample ID: 440-192727-2

Date Collected: 09/21/17 11:50
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 79.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.02 g	10 mL	431823	09/28/17 14:20	WC	TAL IRV
Soluble	Leach	DI Leach			4.01 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		200			431675	09/28/17 07:57	YZ	TAL IRV
Soluble	Leach	DI Leach			4.01 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		500			433554	10/07/17 11:38	CTH	TAL IRV
Total/NA	Prep	3060A			2.50 g	100 mL	431062	09/25/17 09:22	YZ	TAL IRV
Total/NA	Analysis	7199		1			431262	09/26/17 14:29	MN	TAL IRV
Total/NA	Prep	3050B			2.01 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:34	VS	TAL IRV

Client Sample ID: CTMW-07D-70.0-20170921
Lab Sample ID: 440-192727-3

Date Collected: 09/21/17 13:15
Matrix: Water
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	10 mL	10 mL	432406	10/02/17 17:11	HR	TAL IRV
Total/NA	Analysis	300.1B		10000			431047	09/26/17 02:49	YZ	TAL IRV
Total/NA	Analysis	314.0 LL		10000			432714	10/04/17 09:32	CTH	TAL IRV
Total/NA	Analysis	7199		1			430559	09/22/17 08:26	MN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	431882	09/28/17 10:15	Q1N	TAL IRV
Total Recoverable	Analysis	6010B		10			432128	09/29/17 10:13	EN	TAL IRV

Client Sample ID: CTMW-07D-70.0-20170921 — **Lab Sample ID: 440-192727-4**
Date Collected: 09/21/17 13:20 — **Matrix: Solid**
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			430769	09/22/17 17:05	EC1	TAL IRV

Client Sample ID: CTMW-07D-70.0-20170921 — **Lab Sample ID: 440-192727-4**
Date Collected: 09/21/17 13:20 — **Matrix: Solid**
Date Received: 09/21/17 18:51 — **Percent Solids: 53.5**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.02 g	10 mL	431823	09/28/17 14:46	WC	TAL IRV
Soluble	Leach	DI Leach			3.98 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		100			431675	09/28/17 04:56	YZ	TAL IRV
Soluble	Leach	DI Leach			4.02 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		50			433554	10/06/17 21:45	CTH	TAL IRV
Total/NA	Prep	3060A			2.49 g	100 mL	431062	09/25/17 09:22	YZ	TAL IRV
Total/NA	Analysis	7199		1			431262	09/26/17 14:41	MN	TAL IRV
Total/NA	Prep	3050B			2.02 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:36	VS	TAL IRV

Client Sample ID: Trip Blank — **Lab Sample ID: 440-192727-5**
Date Collected: 09/21/17 07:00 — **Matrix: Water**
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	432406	10/02/17 17:40	HR	TAL IRV

Client Sample ID: CTMW-07D-80.0-20170921 — **Lab Sample ID: 440-192727-6**
Date Collected: 09/21/17 13:50 — **Matrix: Solid**
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			431206	09/25/17 17:10	HTL	TAL IRV

Client Sample ID: CTMW-07D-80.0-20170921 — **Lab Sample ID: 440-192727-6**
Date Collected: 09/21/17 13:50 — **Matrix: Solid**
Date Received: 09/21/17 18:51 — **Percent Solids: 70.7**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.04 g	10 mL	431823	09/28/17 10:22	WC	TAL IRV
Soluble	Leach	DI Leach			3.99 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		1			431675	09/27/17 22:20	YZ	TAL IRV
Soluble	Leach	DI Leach			3.99 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		2			433554	10/06/17 18:06	CTH	TAL IRV
Total/NA	Prep	3060A			2.47 g	100 mL	431646	09/27/17 11:16	YZ	TAL IRV

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Client Sample ID: CTMW-07D-80.0-20170921
Lab Sample ID: 440-192727-6

Date Collected: 09/21/17 13:50
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 70.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7199		3			431813	09/28/17 15:07	MN	TAL IRV
Total/NA	Prep	3050B			2.01 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		10			432137	09/29/17 10:25	VS	TAL IRV

Client Sample ID: CTMW-07D-90.0-20170921
Lab Sample ID: 440-192727-7

Date Collected: 09/21/17 14:35
Matrix: Solid
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			430769	09/22/17 17:05	EC1	TAL IRV

Client Sample ID: CTMW-07D-90.0-20170921
Lab Sample ID: 440-192727-7

Date Collected: 09/21/17 14:35
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 71.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.01 g	10 mL	431823	09/28/17 15:39	WC	TAL IRV
Soluble	Leach	DI Leach			3.99 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		1			431675	09/28/17 10:21	YZ	TAL IRV
Soluble	Leach	DI Leach			3.99 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		1			433554	10/07/17 11:55	CTH	TAL IRV
Total/NA	Prep	3060A			2.52 g	100 mL	431646	09/27/17 11:16	YZ	TAL IRV
Total/NA	Analysis	7199		3			431813	09/28/17 15:59	MN	TAL IRV
Total/NA	Prep	3050B			2.02 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:48	VS	TAL IRV

Client Sample ID: CTMW-07D-100.0-20170921
Lab Sample ID: 440-192727-8

Date Collected: 09/21/17 15:05
Matrix: Solid
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			430769	09/22/17 17:05	EC1	TAL IRV

Client Sample ID: CTMW-07D-100.0-20170921
Lab Sample ID: 440-192727-8

Date Collected: 09/21/17 15:05
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 65.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.01 g	10 mL	431823	09/28/17 16:05	WC	TAL IRV
Soluble	Leach	DI Leach			3.98 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		5			431675	09/28/17 12:15	YZ	TAL IRV
Soluble	Leach	DI Leach			4.01 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV

Client Sample ID: CTMW-07D-100.0-20170921

Lab Sample ID: 440-192727-8

Date Collected: 09/21/17 15:05
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 65.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Analysis	314.0		50			433554	10/06/17 22:18	CTH	TAL IRV
Total/NA	Prep	3060A			2.47 g	100 mL	431646	09/27/17 11:16	YZ	TAL IRV
Total/NA	Analysis	7199		3			431813	09/28/17 16:12	MN	TAL IRV
Total/NA	Prep	3050B			2.01 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:50	VS	TAL IRV

Client Sample ID: CTMW-07D-110.0-20170921

Lab Sample ID: 440-192727-9

Date Collected: 09/21/17 15:25
Matrix: Solid
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			430769	09/22/17 17:05	EC1	TAL IRV

Client Sample ID: CTMW-07D-110.0-20170921

Lab Sample ID: 440-192727-9

Date Collected: 09/21/17 15:25
Matrix: Solid
Date Received: 09/21/17 18:51
Percent Solids: 55.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.02 g	10 mL	431823	09/28/17 16:31	WC	TAL IRV
Soluble	Leach	DI Leach			4.01 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		1			431675	09/28/17 06:44	YZ	TAL IRV
Soluble	Leach	DI Leach			4.02 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		5			433554	10/07/17 12:12	CTH	TAL IRV
Total/NA	Prep	3060A			2.49 g	100 mL	431646	09/27/17 11:16	YZ	TAL IRV
Total/NA	Analysis	7199		3			431813	09/28/17 16:25	MN	TAL IRV
Total/NA	Prep	3050B			2.01 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:53	VS	TAL IRV

Client Sample ID: CTMW-07.D-60.0-20170921-EB

Lab Sample ID: 440-192727-10

Date Collected: 09/21/17 12:20
Matrix: Water
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	432406	10/02/17 18:10	HR	TAL IRV
Total/NA	Analysis	300.1B		1			431047	09/25/17 19:34	YZ	TAL IRV
Total/NA	Analysis	314.0 LL		1			432714	10/04/17 02:34	CTH	TAL IRV
Total/NA	Analysis	7199		1			430559	09/22/17 08:38	MN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	431623	09/27/17 10:22	Q1N	TAL IRV
Total Recoverable	Analysis	6010B		1			431839	09/27/17 21:53	EN	TAL IRV

Client Sample ID: CTMW-07D-90.0-20170921-FD — **Lab Sample ID: 440-192727-11**
Date Collected: 09/21/17 14:35 — **Matrix: Solid**
Date Received: 09/21/17 18:51

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			430769	09/22/17 17:05	EC1	TAL IRV

Client Sample ID: CTMW-07D-90.0-20170921-FD — **Lab Sample ID: 440-192727-11**
Date Collected: 09/21/17 14:35 — **Matrix: Solid**
Date Received: 09/21/17 18:51 — **Percent Solids: 71.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 g	10 mL	431823	09/28/17 16:58	WC	TAL IRV
Soluble	Leach	DI Leach			4.00 g	40 mL	430905	09/23/17 12:06	YZ	TAL IRV
Soluble	Analysis	300.1B		1			431675	09/28/17 07:20	YZ	TAL IRV
Soluble	Leach	DI Leach			3.99 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		1			433554	10/07/17 12:46	CTH	TAL IRV
Total/NA	Prep	3060A			2.51 g	100 mL	431646	09/27/17 11:16	YZ	TAL IRV
Total/NA	Analysis	7199		3			431813	09/28/17 16:38	MN	TAL IRV
Total/NA	Prep	3050B			2.03 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:55	VS	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-431823/3
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.0	1.0	ug/Kg			09/28/17 08:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*79 - 120*		*09/28/17 08:10*	*1*
Dibromofluoromethane (Surr)	*105*		*60 - 120*		*09/28/17 08:10*	*1*
Toluene-d8 (Surr)	*85*		*79 - 123*		*09/28/17 08:10*	*1*

Lab Sample ID: LCS 440-431823/4
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform			50.0	53.8		ug/Kg		108	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*79 - 120*
Dibromofluoromethane (Surr)	*100*		*60 - 120*
Toluene-d8 (Surr)	*103*		*79 - 123*

Lab Sample ID: 440-192727-6 MS
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform	ND		71.3	79.4		ug/Kg	☼	111	65 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*
Dibromofluoromethane (Surr)	*101*		*60 - 120*
Toluene-d8 (Surr)	*100*		*79 - 123*

Lab Sample ID: 440-192727-6 MSD
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	ND		70.6	73.2		ug/Kg	☼	104	65 - 135	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*
Dibromofluoromethane (Surr)	*101*		*60 - 120*
Toluene-d8 (Surr)	*103*		*79 - 123*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 440-432406/5
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.50	0.25	ug/L			10/02/17 09:18	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*10/02/17 09:18*	*1*
Dibromofluoromethane (Surr)	*118*		*76 - 132*		*10/02/17 09:18*	*1*
Toluene-d8 (Surr)	*108*		*80 - 128*		*10/02/17 09:18*	*1*

Lab Sample ID: LCS 440-432406/6
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform			25.0	28.3		ug/L		113	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*118*		*76 - 132*
Toluene-d8 (Surr)	*103*		*80 - 128*

Lab Sample ID: 440-193013-B-1 MS
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform	0.84		25.0	28.7		ug/L		112	70 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*
Dibromofluoromethane (Surr)	*113*		*76 - 132*
Toluene-d8 (Surr)	*104*		*80 - 128*

Lab Sample ID: 440-193013-B-1 MSD
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	0.84		25.0	29.3		ug/L		114	70 - 130	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*114*		*76 - 132*
Toluene-d8 (Surr)	*99*		*80 - 128*

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-431047/5
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	10	ug/L			09/25/17 15:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*98*		*90 - 115*		*09/25/17 15:20*	*1*

Lab Sample ID: LCS 440-431047/4
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			100	106		ug/L		106	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*98*		*90 - 115*

Lab Sample ID: MRL 440-431047/3
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			20.0	21.8		ug/L		109	50 - 150		

Surrogate	*MRL %Recovery*	*MRL Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*97*		*90 - 115*

Lab Sample ID: 440-192595-K-2 MS
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate	1200		200	1360	4	ug/L		76	75 - 125		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*96*		*90 - 115*

Lab Sample ID: 440-192595-K-2 MSD
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	1200		200	1350	4	ug/L		72	75 - 125	1	25

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*95*		*90 - 115*

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MRL 440-431675/3
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			20.0	21.1		ug/L		105	50 - 150		

Surrogate	*MRL %Recovery*	*MRL Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*95*		*90 - 115*

Lab Sample ID: MB 440-430905/2-A
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		200	50	ug/Kg			09/27/17 15:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/27/17 15:06*	*1*

Lab Sample ID: LCS 440-430905/1-A
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			1000	1070		ug/Kg		107	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*97*		*90 - 115*

Lab Sample ID: 440-192727-6 MS
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate	2700		1420	4060		ug/Kg	☼	99	75 - 125		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*95*		*90 - 115*

Lab Sample ID: 440-192727-6 MSD
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	2700		1430	4370		ug/Kg	☼	120	75 - 125	7	25

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*95*		*90 - 115*

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MRL 440-433554/7
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.08		ug/L		102	75 - 125

Lab Sample ID: MB 440-433370/1-A
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.040	0.0095	mg/Kg			10/06/17 16:57	1

Lab Sample ID: LCS 440-433370/2-A
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	0.500	0.499		mg/Kg		100	85 - 115

Lab Sample ID: 440-192727-6 MS
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1.2	F1	0.711	1.84		mg/Kg	☼	86	80 - 120

Lab Sample ID: 440-192727-6 MSD
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1.2	F1	0.710	1.70	F1	mg/Kg	☼	67	80 - 120	8	20

Method: 314.0 LL - Perchlorate (IC)

Lab Sample ID: MB 440-432714/39
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		1.0	0.50	ug/L			10/04/17 00:29	1

Lab Sample ID: LCS 440-432714/40
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.5		ug/L		98	85 - 115

Method: 314.0 LL - Perchlorate (IC) (Continued)

Lab Sample ID: MRL 440-432714/22
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate			4.00	3.76		ug/L		94	75 - 125		

Lab Sample ID: 440-192678-D-3 MS
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate	5.9		25.0	30.1		ug/L		97	80 - 120		

Lab Sample ID: 440-192678-D-3 MSD
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	5.9		25.0	29.0		ug/L		92	80 - 120	4	20

Lab Sample ID: 440-192818-B-10 MS
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perchlorate	15000		25000	39900		ug/L		100	80 - 120		

Lab Sample ID: 440-192818-B-10 MSD
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	15000		25000	40000		ug/L		100	80 - 120	0	20

Method: 7199 - Chromium, Hexavalent (IC)

Lab Sample ID: MB 440-430559/6
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		2.0	0.25	ug/L			09/22/17 07:24	1

Lab Sample ID: LCS 440-430559/5
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent			50.0	50.7		ug/L		101	90 - 110		

Method: 7199 - Chromium, Hexavalent (IC) (Continued)

Lab Sample ID: MRL 440-430559/4
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent			1.00	0.921	J	ug/L		92	50 - 150		

Lab Sample ID: 440-192727-3 MS
Matrix: Water
Analysis Batch: 430559

Client Sample ID: CTMW-07D-70.0-20170921
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent	ND		50.0	50.1		ug/L		100	85 - 115		

Lab Sample ID: 440-192727-3 MSD
Matrix: Water
Analysis Batch: 430559

Client Sample ID: CTMW-07D-70.0-20170921
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	ND		50.0	49.2		ug/L		98	85 - 115	2	20

Lab Sample ID: MB 440-431062/1-A
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431062

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.30	0.15	mg/Kg		09/25/17 09:22	09/26/17 07:15	3

Lab Sample ID: LCS 440-431062/2-A
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431062

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent			40.2	33.4		mg/Kg		83	80 - 120		

Lab Sample ID: 440-192190-E-24-O MS
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 431062

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent	0.19	J F1	46.0	35.2		mg/Kg	☼	76	55 - 110		

Lab Sample ID: 440-192190-E-24-P MSD
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 431062

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	0.19	J F1	46.6	36.2		mg/Kg	☼	77	55 - 110	3	20

Lab Sample ID: 440-192190-E-24-Q MSI
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 431062

Analyte	Sample Result	Sample Qualifier	Spike Added	MSI Result	MSI Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent	0.19	J F1	1070	551	F1	mg/Kg	☼	51	55 - 110		

Lab Sample ID: MRL 440-431262/41
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent			1.00	0.987	J	ug/L		99			

Lab Sample ID: MB 440-431646/1-A
Matrix: Solid
Analysis Batch: 431813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431646

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.30	0.15	mg/Kg		09/27/17 11:16	09/28/17 12:31	3

Lab Sample ID: LCS 440-431646/2-A
Matrix: Solid
Analysis Batch: 431813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431646

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent			40.5	38.4		mg/Kg		95	80 - 120		

Lab Sample ID: 440-192727-6 MS
Matrix: Solid
Analysis Batch: 431813

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA
Prep Batch: 431646

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent	ND		57.5	55.8		mg/Kg	☼	97	55 - 110		

Lab Sample ID: 440-192727-6 MSD
Matrix: Solid
Analysis Batch: 431813

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA
Prep Batch: 431646

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	ND		56.6	51.2		mg/Kg	☼	91	55 - 110	9	20

Lab Sample ID: 440-192727-6 MSI
Matrix: Solid
Analysis Batch: 431813

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA
Prep Batch: 431646

Analyte	Sample Result	Sample Qualifier	Spike Added	MSI Result	MSI Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium, hexavalent	ND		1350	1080		mg/Kg	☼	80	55 - 110		

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 440-431847/1-A ^5
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431847

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.99	0.50	mg/Kg		09/28/17 07:51	09/29/17 10:20	5

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 440-431847/2-A ^5
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431847

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium			49.5	51.1		mg/Kg		103	80 - 120		

Lab Sample ID: 440-192727-6 MS
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA
Prep Batch: 431847

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium	13		71.3	88.5		mg/Kg	☼	106	75 - 125		

Lab Sample ID: 440-192727-6 MSD
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA
Prep Batch: 431847

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	13		71.0	89.3		mg/Kg	☼	107	75 - 125	1	20

Lab Sample ID: MB 440-431623/1-A
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0050	0.0025	mg/L		09/27/17 10:22	09/27/17 21:15	1

Lab Sample ID: LCS 440-431623/2-A
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium			1.00	0.945		mg/L		94	80 - 120		

Lab Sample ID: 440-192518-O-1-B MS
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium	13		1.00	13.8	4	mg/L		60	75 - 125		

Lab Sample ID: 440-192518-O-1-C MSD
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	13		1.00	13.7	4	mg/L		43	75 - 125	1	20

Lab Sample ID: MB 440-431882/1-A
Matrix: Water
Analysis Batch: 432035

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 431882

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0050	0.0025	mg/L		09/28/17 10:15	09/28/17 18:29	1

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Lab Sample ID: LCS 440-431882/2-A
Matrix: Water
Analysis Batch: 432035

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 431882

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium			1.00	0.981		mg/L		98	80 - 120		

Lab Sample ID: 440-192727-1 MS
Matrix: Water
Analysis Batch: 432035

Client Sample ID: CTMW-07D-50.0-20170921
Prep Type: Total Recoverable
Prep Batch: 431882

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chromium	11		1.00	14.6	4	mg/L		339	75 - 125		

Lab Sample ID: 440-192727-1 MSD
Matrix: Water
Analysis Batch: 432035

Client Sample ID: CTMW-07D-50.0-20170921
Prep Type: Total Recoverable
Prep Batch: 431882

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	11		1.00	14.8	4	mg/L		356	75 - 125	1	20

Method: Moisture - Percent Moisture

Lab Sample ID: 440-192727-2 DU
Matrix: Solid
Analysis Batch: 430769

Client Sample ID: CTMW-07D-60.0-20170921
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	21.0			18.5		%				12	20

Lab Sample ID: 440-192727-6 DU
Matrix: Solid
Analysis Batch: 431206

Client Sample ID: CTMW-07D-80.0-20170921
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	29.3			29.9		%				2	20

GC/MS VOA

Analysis Batch: 431823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Total/NA	Solid	8260B	
440-192727-4	CTMW-07D-70.0-20170921	Total/NA	Solid	8260B	
440-192727-6	CTMW-07D-80.0-20170921	Total/NA	Solid	8260B	
440-192727-7	CTMW-07D-90.0-20170921	Total/NA	Solid	8260B	
440-192727-8	CTMW-07D-100.0-20170921	Total/NA	Solid	8260B	
440-192727-9	CTMW-07D-110.0-20170921	Total/NA	Solid	8260B	
440-192727-11	CTMW-07D-90.0-20170921-FD	Total/NA	Solid	8260B	
MB 440-431823/3	Method Blank	Total/NA	Solid	8260B	
LCS 440-431823/4	Lab Control Sample	Total/NA	Solid	8260B	
440-192727-6 MS	CTMW-07D-80.0-20170921	Total/NA	Solid	8260B	
440-192727-6 MSD	CTMW-07D-80.0-20170921	Total/NA	Solid	8260B	

Analysis Batch: 432406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1	CTMW-07D-50.0-20170921	Total/NA	Water	8260B	
440-192727-3	CTMW-07D-70.0-20170921	Total/NA	Water	8260B	
440-192727-5	Trip Blank	Total/NA	Water	8260B	
440-192727-10	CTMW-07.D-60.0-20170921-EB	Total/NA	Water	8260B	
MB 440-432406/5	Method Blank	Total/NA	Water	8260B	
LCS 440-432406/6	Lab Control Sample	Total/NA	Water	8260B	
440-193013-B-1 MS	Matrix Spike	Total/NA	Water	8260B	
440-193013-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

HPLC/IC

Analysis Batch: 430559

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1	CTMW-07D-50.0-20170921	Total/NA	Water	7199	
440-192727-3	CTMW-07D-70.0-20170921	Total/NA	Water	7199	
440-192727-10	CTMW-07.D-60.0-20170921-EB	Total/NA	Water	7199	
MB 440-430559/6	Method Blank	Total/NA	Water	7199	
LCS 440-430559/5	Lab Control Sample	Total/NA	Water	7199	
MRL 440-430559/4	Lab Control Sample	Total/NA	Water	7199	
440-192727-3 MS	CTMW-07D-70.0-20170921	Total/NA	Water	7199	
440-192727-3 MSD	CTMW-07D-70.0-20170921	Total/NA	Water	7199	

Leach Batch: 430905

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Soluble	Solid	DI Leach	
440-192727-4	CTMW-07D-70.0-20170921	Soluble	Solid	DI Leach	
440-192727-6	CTMW-07D-80.0-20170921	Soluble	Solid	DI Leach	
440-192727-7	CTMW-07D-90.0-20170921	Soluble	Solid	DI Leach	
440-192727-8	CTMW-07D-100.0-20170921	Soluble	Solid	DI Leach	
440-192727-9	CTMW-07D-110.0-20170921	Soluble	Solid	DI Leach	
440-192727-11	CTMW-07D-90.0-20170921-FD	Soluble	Solid	DI Leach	
MB 440-430905/2-A	Method Blank	Soluble	Solid	DI Leach	
LCS 440-430905/1-A	Lab Control Sample	Soluble	Solid	DI Leach	
440-192727-6 MS	CTMW-07D-80.0-20170921	Soluble	Solid	DI Leach	
440-192727-6 MSD	CTMW-07D-80.0-20170921	Soluble	Solid	DI Leach	

HPLC/IC (Continued)

Analysis Batch: 431047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1	CTMW-07D-50.0-20170921	Total/NA	Water	300.1B	
440-192727-3	CTMW-07D-70.0-20170921	Total/NA	Water	300.1B	
440-192727-10	CTMW-07.D-60.0-20170921-EB	Total/NA	Water	300.1B	
MB 440-431047/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-431047/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-431047/3	Lab Control Sample	Total/NA	Water	300.1B	
440-192595-K-2 MS	Matrix Spike	Total/NA	Water	300.1B	
440-192595-K-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Prep Batch: 431062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Total/NA	Solid	3060A	
440-192727-4	CTMW-07D-70.0-20170921	Total/NA	Solid	3060A	
MB 440-431062/1-A	Method Blank	Total/NA	Solid	3060A	
LCS 440-431062/2-A	Lab Control Sample	Total/NA	Solid	3060A	
440-192190-E-24-O MS	Matrix Spike	Total/NA	Solid	3060A	
440-192190-E-24-P MSD	Matrix Spike Duplicate	Total/NA	Solid	3060A	
440-192190-E-24-Q MSI	Matrix Spike	Total/NA	Solid	3060A	

Analysis Batch: 431262

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Total/NA	Solid	7199	431062
440-192727-4	CTMW-07D-70.0-20170921	Total/NA	Solid	7199	431062
MB 440-431062/1-A	Method Blank	Total/NA	Solid	7199	431062
LCS 440-431062/2-A	Lab Control Sample	Total/NA	Solid	7199	431062
MRL 440-431262/41	Lab Control Sample	Total/NA	Solid	7199	
440-192190-E-24-O MS	Matrix Spike	Total/NA	Solid	7199	431062
440-192190-E-24-P MSD	Matrix Spike Duplicate	Total/NA	Solid	7199	431062
440-192190-E-24-Q MSI	Matrix Spike	Total/NA	Solid	7199	431062

Prep Batch: 431646

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-6	CTMW-07D-80.0-20170921	Total/NA	Solid	3060A	
440-192727-7	CTMW-07D-90.0-20170921	Total/NA	Solid	3060A	
440-192727-8	CTMW-07D-100.0-20170921	Total/NA	Solid	3060A	
440-192727-9	CTMW-07D-110.0-20170921	Total/NA	Solid	3060A	
440-192727-11	CTMW-07D-90.0-20170921-FD	Total/NA	Solid	3060A	
MB 440-431646/1-A	Method Blank	Total/NA	Solid	3060A	
LCS 440-431646/2-A	Lab Control Sample	Total/NA	Solid	3060A	
440-192727-6 MS	CTMW-07D-80.0-20170921	Total/NA	Solid	3060A	
440-192727-6 MSD	CTMW-07D-80.0-20170921	Total/NA	Solid	3060A	
440-192727-6 MSI	CTMW-07D-80.0-20170921	Total/NA	Solid	3060A	

Analysis Batch: 431675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Soluble	Solid	300.1B	430905
440-192727-4	CTMW-07D-70.0-20170921	Soluble	Solid	300.1B	430905
440-192727-6	CTMW-07D-80.0-20170921	Soluble	Solid	300.1B	430905
440-192727-7	CTMW-07D-90.0-20170921	Soluble	Solid	300.1B	430905
440-192727-8	CTMW-07D-100.0-20170921	Soluble	Solid	300.1B	430905
440-192727-9	CTMW-07D-110.0-20170921	Soluble	Solid	300.1B	430905

HPLC/IC (Continued)

Analysis Batch: 431675 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-11	CTMW-07D-90.0-20170921-FD	Soluble	Solid	300.1B	430905
MB 440-430905/2-A	Method Blank	Soluble	Solid	300.1B	430905
LCS 440-430905/1-A	Lab Control Sample	Soluble	Solid	300.1B	430905
MRL 440-431675/3	Lab Control Sample	Total/NA	Solid	300.1B	
440-192727-6 MS	CTMW-07D-80.0-20170921	Soluble	Solid	300.1B	430905
440-192727-6 MSD	CTMW-07D-80.0-20170921	Soluble	Solid	300.1B	430905

Analysis Batch: 431813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-6	CTMW-07D-80.0-20170921	Total/NA	Solid	7199	431646
440-192727-7	CTMW-07D-90.0-20170921	Total/NA	Solid	7199	431646
440-192727-8	CTMW-07D-100.0-20170921	Total/NA	Solid	7199	431646
440-192727-9	CTMW-07D-110.0-20170921	Total/NA	Solid	7199	431646
440-192727-11	CTMW-07D-90.0-20170921-FD	Total/NA	Solid	7199	431646
MB 440-431646/1-A	Method Blank	Total/NA	Solid	7199	431646
LCS 440-431646/2-A	Lab Control Sample	Total/NA	Solid	7199	431646
440-192727-6 MS	CTMW-07D-80.0-20170921	Total/NA	Solid	7199	431646
440-192727-6 MSD	CTMW-07D-80.0-20170921	Total/NA	Solid	7199	431646
440-192727-6 MSI	CTMW-07D-80.0-20170921	Total/NA	Solid	7199	431646

Analysis Batch: 432714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1	CTMW-07D-50.0-20170921	Total/NA	Water	314.0 LL	
440-192727-3	CTMW-07D-70.0-20170921	Total/NA	Water	314.0 LL	
440-192727-10	CTMW-07.D-60.0-20170921-EB	Total/NA	Water	314.0 LL	
MB 440-432714/39	Method Blank	Total/NA	Water	314.0 LL	
LCS 440-432714/40	Lab Control Sample	Total/NA	Water	314.0 LL	
MRL 440-432714/22	Lab Control Sample	Total/NA	Water	314.0 LL	
440-192678-D-3 MS	Matrix Spike	Total/NA	Water	314.0 LL	
440-192678-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0 LL	
440-192818-B-10 MS	Matrix Spike	Total/NA	Water	314.0 LL	
440-192818-B-10 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0 LL	

Leach Batch: 433370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Soluble	Solid	DI Leach	
440-192727-4	CTMW-07D-70.0-20170921	Soluble	Solid	DI Leach	
440-192727-6	CTMW-07D-80.0-20170921	Soluble	Solid	DI Leach	
440-192727-7	CTMW-07D-90.0-20170921	Soluble	Solid	DI Leach	
440-192727-8	CTMW-07D-100.0-20170921	Soluble	Solid	DI Leach	
440-192727-9	CTMW-07D-110.0-20170921	Soluble	Solid	DI Leach	
440-192727-11	CTMW-07D-90.0-20170921-FD	Soluble	Solid	DI Leach	
MB 440-433370/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 440-433370/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
440-192727-6 MS	CTMW-07D-80.0-20170921	Soluble	Solid	DI Leach	
440-192727-6 MSD	CTMW-07D-80.0-20170921	Soluble	Solid	DI Leach	

Analysis Batch: 433554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Soluble	Solid	314.0	433370
440-192727-4	CTMW-07D-70.0-20170921	Soluble	Solid	314.0	433370

HPLC/IC (Continued)

Analysis Batch: 433554 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-6	CTMW-07D-80.0-20170921	Soluble	Solid	314.0	433370
440-192727-7	CTMW-07D-90.0-20170921	Soluble	Solid	314.0	433370
440-192727-8	CTMW-07D-100.0-20170921	Soluble	Solid	314.0	433370
440-192727-9	CTMW-07D-110.0-20170921	Soluble	Solid	314.0	433370
440-192727-11	CTMW-07D-90.0-20170921-FD	Soluble	Solid	314.0	433370
MB 440-433370/1-A	Method Blank	Soluble	Solid	314.0	433370
LCS 440-433370/2-A	Lab Control Sample	Soluble	Solid	314.0	433370
MRL 440-433554/7	Lab Control Sample	Total/NA	Solid	314.0	
440-192727-6 MS	CTMW-07D-80.0-20170921	Soluble	Solid	314.0	433370
440-192727-6 MSD	CTMW-07D-80.0-20170921	Soluble	Solid	314.0	433370

Metals

Prep Batch: 431623

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-10	CTMW-07.D-60.0-20170921-EB	Total Recoverable	Water	3005A	
MB 440-431623/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-431623/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-192518-O-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
440-192518-O-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 431839

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-10	CTMW-07.D-60.0-20170921-EB	Total Recoverable	Water	6010B	431623
MB 440-431623/1-A	Method Blank	Total Recoverable	Water	6010B	431623
LCS 440-431623/2-A	Lab Control Sample	Total Recoverable	Water	6010B	431623
440-192518-O-1-B MS	Matrix Spike	Total Recoverable	Water	6010B	431623
440-192518-O-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010B	431623

Prep Batch: 431847

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Total/NA	Solid	3050B	
440-192727-4	CTMW-07D-70.0-20170921	Total/NA	Solid	3050B	
440-192727-6	CTMW-07D-80.0-20170921	Total/NA	Solid	3050B	
440-192727-7	CTMW-07D-90.0-20170921	Total/NA	Solid	3050B	
440-192727-8	CTMW-07D-100.0-20170921	Total/NA	Solid	3050B	
440-192727-9	CTMW-07D-110.0-20170921	Total/NA	Solid	3050B	
440-192727-11	CTMW-07D-90.0-20170921-FD	Total/NA	Solid	3050B	
MB 440-431847/1-A ^5	Method Blank	Total/NA	Solid	3050B	
LCS 440-431847/2-A ^5	Lab Control Sample	Total/NA	Solid	3050B	
440-192727-6 MS	CTMW-07D-80.0-20170921	Total/NA	Solid	3050B	
440-192727-6 MSD	CTMW-07D-80.0-20170921	Total/NA	Solid	3050B	

Prep Batch: 431882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1	CTMW-07D-50.0-20170921	Total Recoverable	Water	3005A	
440-192727-3	CTMW-07D-70.0-20170921	Total Recoverable	Water	3005A	
MB 440-431882/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-431882/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-192727-1 MS	CTMW-07D-50.0-20170921	Total Recoverable	Water	3005A	

Metals (Continued)

Prep Batch: 431882 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1 MSD	CTMW-07D-50.0-20170921	Total Recoverable	Water	3005A	

Analysis Batch: 432003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Total/NA	Solid	6010B	431847
440-192727-4	CTMW-07D-70.0-20170921	Total/NA	Solid	6010B	431847
440-192727-7	CTMW-07D-90.0-20170921	Total/NA	Solid	6010B	431847
440-192727-8	CTMW-07D-100.0-20170921	Total/NA	Solid	6010B	431847
440-192727-9	CTMW-07D-110.0-20170921	Total/NA	Solid	6010B	431847
440-192727-11	CTMW-07D-90.0-20170921-FD	Total/NA	Solid	6010B	431847

Analysis Batch: 432035

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-1	CTMW-07D-50.0-20170921	Total Recoverable	Water	6010B	431882
MB 440-431882/1-A	Method Blank	Total Recoverable	Water	6010B	431882
LCS 440-431882/2-A	Lab Control Sample	Total Recoverable	Water	6010B	431882
440-192727-1 MS	CTMW-07D-50.0-20170921	Total Recoverable	Water	6010B	431882
440-192727-1 MSD	CTMW-07D-50.0-20170921	Total Recoverable	Water	6010B	431882

Analysis Batch: 432128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-3	CTMW-07D-70.0-20170921	Total Recoverable	Water	6010B	431882

Analysis Batch: 432137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-6	CTMW-07D-80.0-20170921	Total/NA	Solid	6010B	431847
MB 440-431847/1-A ^5	Method Blank	Total/NA	Solid	6010B	431847
LCS 440-431847/2-A ^5	Lab Control Sample	Total/NA	Solid	6010B	431847
440-192727-6 MS	CTMW-07D-80.0-20170921	Total/NA	Solid	6010B	431847
440-192727-6 MSD	CTMW-07D-80.0-20170921	Total/NA	Solid	6010B	431847

General Chemistry

Analysis Batch: 430769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-2	CTMW-07D-60.0-20170921	Total/NA	Solid	Moisture	
440-192727-4	CTMW-07D-70.0-20170921	Total/NA	Solid	Moisture	
440-192727-7	CTMW-07D-90.0-20170921	Total/NA	Solid	Moisture	
440-192727-8	CTMW-07D-100.0-20170921	Total/NA	Solid	Moisture	
440-192727-9	CTMW-07D-110.0-20170921	Total/NA	Solid	Moisture	
440-192727-11	CTMW-07D-90.0-20170921-FD	Total/NA	Solid	Moisture	
440-192727-2 DU	CTMW-07D-60.0-20170921	Total/NA	Solid	Moisture	

Analysis Batch: 431206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192727-6	CTMW-07D-80.0-20170921	Total/NA	Solid	Moisture	
440-192727-6 MS	CTMW-07D-80.0-20170921	Total/NA	Solid	Moisture	
440-192727-6 MSD	CTMW-07D-80.0-20170921	Total/NA	Solid	Moisture	
440-192727-6 DU	CTMW-07D-80.0-20170921	Total/NA	Solid	Moisture	

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	ISTD response or retention time outside acceptable limits

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192727-1

Laboratory: TestAmerica Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	CA01531	06-30-18
Arizona	State Program	9	AZ0671	10-14-17 *
California	LA Cty Sanitation Districts	9	10256	06-30-18
California	State Program	9	CA ELAP 2706	06-30-18
Guam	State Program	9	Cert. No. 17-003R	01-23-18
Hawaii	State Program	9	N/A	01-29-18
Kansas	NELAP Secondary AB	7	E-10420	07-31-18
Nevada	State Program	9	CA015312018-1	07-31-18
New Mexico	State Program	6	N/A	01-29-18 *
Northern Mariana Islands	State Program	9	MP0002	01-29-17 *
Oregon	NELAP	10	4028	01-29-18
USDA	Federal		P330-15-00184	07-08-18
Washington	State Program	10	C900	09-03-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Irvine
17461 Deriar Suite 100
Irvine, CA 92614-5817
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

TestAmerica

Client Information	Sampler: Jeff Richeson	Lab PM: Patty Mata	Carrier Tracking No(s):	COC No:
Client Contact: Mike Crews	Phone: (805) 660-1774	E-Mail: patty.mata@testamericainc.com		Page:
Company: Tetra Tech				Job #:
Address: 17885 Von Karman Ave., Suite 500	Due Date Requested:			
City: Irvine	TAT Requested (days):			
State, Zip: CA 92614				
Phone: (949)-809-5033	PO #: M12-CWP-01-WA2			
Email: mike.crews@tetratech.com	WO #:			
Project Name: NERT In-Situ Cr Treatability Study	Project #: 44017166			
Site: Henderson, NV	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.1B_14D, 300.1B_28D (Chlorate)	RSK_175 - Diss Methane	351.2, 365.3, 5220D	2320B, 2540C_Calcd, 300_ORGFM_28D, 300_ORGFMS, 365.3_Ortho, 7199_ORGFM (Hex Chromium)	2340C, 6010B - Total Chromium	6020 - Lab to Filter 19 Diss Metals	SM5310B - TOC	8260B_LL - Volatiles - Chloroform	SM4500_S2_D - Sulfide, Total	VFA_IC - VFA Compounds	314.0_LL - Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				L	A	S	N	D	N	A	A	CB	N	N		
CTMW-07D-50.0-20170921	9/21/17	1125	G	H2O			X			X	X			X			X	6	
CTMW-07D-60.0-20170921		1150		Soil			X			X	X			X			X	[illegible]	
CTMW-07D-70.0-20170921		1315		H2O			X			X	X			X			X	6	
CTMW-07D-70.0-20170921		1320		Soil			X			X	X			X			X	[illegible]	
Trip Blank		0700		H2O										X				3	
CTMW-07D-80.0-20170921		1350		Soil		X	X			X	X			X			X	2	
CTMW-07D-90.0-20170921		1435		Soil			X			X	X			X			X	1	
CTMW-07D-100.0-20170921		1505		Soil			X			X	X			X			X	1	
CTMW-07D-110.0-20170921		1525		Soil			X			X	X			X			X	1	
CTMW-07D-60.0-20170921-EB		1220		H2O			X			X	X			X			X	6	
CTMW-07D-90.0-20170921-FD	↓	1435	↓	Soil			X			X	X			X			X	1	

440-192727 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: Level 3 QC Required (CS) JR66

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment: Fed.	
Relinquished by: [signature]	Date/Time: 9/21/17	Company: TT	Received by: [signature]	Date/Time: 9-21-17 1540	Company: TA
Relinquished by: [signature]	Date/Time: 9/21/17 1700	Company: TA	Received by: [signature]	Date/Time: 9/21/17 1700	Company: TA
Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 9/22/17 9:25	Company: TAI
Custody Seals Intact: △ Yes △ No	Custody Seal No.: SW 520 00004 04102		Cooler Temperature(s) °C and Other Remarks: TALV 18.9	1.2/1.5 IR 8SU	

Fed. 7762 9258 0991 3.3/4.0 IR 6G (CS)

9/22/17 LB

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 440-192727-1

Login Number: 192727

List Source: TestAmerica Irvine

List Number: 1

Creator: Escalante, Maria I

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

TestAmerica Job ID: 440-192817-1
Client Project/Site: NERT In-Situ Cr Treatability, M12

For:
Tetra Tech, Inc.
17885 Von Karman Ave, Ste 500
Irvine, California 92614

Attn: Mike Crews

Authorized for release by:
10/9/2017 3:39:53 PM

Patty Mata, Senior Project Manager
(949)261-1022
patty.mata@testamericainc.com

Table of Contents

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192817-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-192817-1	CTMW-07D-120.0-20170922	Solid	09/22/17 07:15	09/22/17 21:20
440-192817-2	CTMW-07D-130.0-20170922-EB	Water	09/22/17 08:30	09/22/17 21:20
440-192817-3	Trip Blank	Water	09/22/17 07:00	09/22/17 21:20

Job ID: 440-192817-1

Laboratory: TestAmerica Irvine

Narrative

Job Narrative
440-192817-1

Comments
No additional comments.

Receipt
The samples were received on 9/22/2017 9:20 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.9º C and 4.1º C.

Receipt Exceptions
The following sample was received at the laboratory without a sample collection time documented on the chain of custody: CTMW-07D-130.0-20170922-EB (440-192817-2). The time was taken from the container labels (08:30).

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

HPLC/IC
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: CTMW-07D-120.0-20170922

Lab Sample ID: 440-192817-1

Date Collected: 09/22/17 07:15
Matrix: Solid
Date Received: 09/22/17 21:20
Percent Solids: 56.9

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		3.5	1.7	ug/Kg	☼		09/28/17 13:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*110*		*79 - 120*		*09/28/17 13:27*	*1*
Dibromofluoromethane (Surr)	*102*		*60 - 120*		*09/28/17 13:27*	*1*
Toluene-d8 (Surr)	*108*		*79 - 123*		*09/28/17 13:27*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	**670**		350	87	ug/Kg	☼		09/28/17 20:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*99*		*90 - 115*		*09/28/17 20:06*	*1*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.36**		0.070	0.017	mg/Kg	☼		10/07/17 10:48	1

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.53	0.27	mg/Kg	☼	09/25/17 09:22	09/26/17 11:54	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**58**		1.7	0.87	mg/Kg	☼	09/28/17 07:51	09/28/17 15:57	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**43.1**		0.1	0.1	%			09/25/17 17:10	1

Client Sample ID: CTMW-07D-130.0-20170922-EB

Lab Sample ID: 440-192817-2

Date Collected: 09/22/17 08:30
Matrix: Water
Date Received: 09/22/17 21:20

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.50	0.25	ug/L			10/02/17 18:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*10/02/17 18:39*	*1*
Dibromofluoromethane (Surr)	*112*		*76 - 132*		*10/02/17 18:39*	*1*
Toluene-d8 (Surr)	*109*		*80 - 128*		*10/02/17 18:39*	*1*

Method: 300.1B - Disinfection By-Products, (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	10	ug/L			09/25/17 18:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*98*		*90 - 115*		*09/25/17 18:58*	*1*

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192817-1

Client Sample ID: CTMW-07D-130.0-20170922-EB

Lab Sample ID: 440-192817-2

Date Collected: 09/22/17 08:30
Matrix: Water
Date Received: 09/22/17 21:20

Method: 314.0 LL - Perchlorate (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		1.0	0.50	ug/L			10/04/17 02:16	1

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	**0.39**	**J**	2.0	0.25	ug/L			09/23/17 01:00	1

Method: 6010B - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0050	0.0025	mg/L		09/27/17 10:22	09/27/17 21:55	1

Client Sample ID: Trip Blank

Lab Sample ID: 440-192817-3

Date Collected: 09/22/17 07:00
Matrix: Water
Date Received: 09/22/17 21:20

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.50	0.25	ug/L			10/02/17 19:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*10/02/17 19:09*	*1*
Dibromofluoromethane (Surr)	*118*		*76 - 132*		*10/02/17 19:09*	*1*
Toluene-d8 (Surr)	*107*		*80 - 128*		*10/02/17 19:09*	*1*

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192817-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL IRV
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
314.0 LL	Perchlorate (IC)	EPA	TAL IRV
7199	Chromium, Hexavalent (IC)	SW846	TAL IRV
6010B	Metals (ICP)	SW846	TAL IRV
Moisture	Percent Moisture	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192817-1

Client Sample ID: CTMW-07D-120.0-20170922
Lab Sample ID: 440-192817-1

Date Collected: 09/22/17 07:15
Matrix: Solid
Date Received: 09/22/17 21:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			431206	09/25/17 17:10	HTL	TAL IRV

Client Sample ID: CTMW-07D-120.0-20170922
Lab Sample ID: 440-192817-1

Date Collected: 09/22/17 07:15
Matrix: Solid
Date Received: 09/22/17 21:20
Percent Solids: 56.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.04 g	10 mL	431823	09/28/17 13:27	WC	TAL IRV
Soluble	Leach	DI Leach			4.02 g	40 mL	431843	09/28/17 07:35	YZ	TAL IRV
Soluble	Analysis	300.1B		1			431675	09/28/17 20:06	YZ	TAL IRV
Soluble	Leach	DI Leach			4.02 g	40 mL	433370	10/05/17 18:05	CTH	TAL IRV
Soluble	Analysis	314.0		1			433554	10/07/17 10:48	CTH	TAL IRV
Total/NA	Prep	3060A			2.48 g	100 mL	431062	09/25/17 09:22	YZ	TAL IRV
Total/NA	Analysis	7199		3			431262	09/26/17 11:54	MN	TAL IRV
Total/NA	Prep	3050B			2.03 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		5			432003	09/28/17 15:57	VS	TAL IRV

Client Sample ID: CTMW-07D-130.0-20170922-EB
Lab Sample ID: 440-192817-2

Date Collected: 09/22/17 08:30
Matrix: Water
Date Received: 09/22/17 21:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	432406	10/02/17 18:39	HR	TAL IRV
Total/NA	Analysis	300.1B		1			431047	09/25/17 18:58	YZ	TAL IRV
Total/NA	Analysis	314.0 LL		1			432714	10/04/17 02:16	CTH	TAL IRV
Total/NA	Analysis	7199		1			430559	09/23/17 01:00	MN	TAL IRV
Total Recoverable	Prep	3005A			25 mL	25 mL	431623	09/27/17 10:22	Q1N	TAL IRV
Total Recoverable	Analysis	6010B		1			431839	09/27/17 21:55	EN	TAL IRV

Client Sample ID: Trip Blank
Lab Sample ID: 440-192817-3

Date Collected: 09/22/17 07:00
Matrix: Water
Date Received: 09/22/17 21:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	10 mL	10 mL	432406	10/02/17 19:09	HR	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-431823/3
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.0	1.0	ug/Kg			09/28/17 08:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*79 - 120*		*09/28/17 08:10*	*1*
Dibromofluoromethane (Surr)	*105*		*60 - 120*		*09/28/17 08:10*	*1*
Toluene-d8 (Surr)	*85*		*79 - 123*		*09/28/17 08:10*	*1*

Lab Sample ID: LCS 440-431823/4
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform			50.0	53.8		ug/Kg		108	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*79 - 120*
Dibromofluoromethane (Surr)	*100*		*60 - 120*
Toluene-d8 (Surr)	*103*		*79 - 123*

Lab Sample ID: 440-192727-A-6 MS
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform	ND		71.3	79.4		ug/Kg	☼	111	65 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*
Dibromofluoromethane (Surr)	*101*		*60 - 120*
Toluene-d8 (Surr)	*100*		*79 - 123*

Lab Sample ID: 440-192727-A-6 MSD
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	ND		70.6	73.2		ug/Kg	☼	104	65 - 135	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*
Dibromofluoromethane (Surr)	*101*		*60 - 120*
Toluene-d8 (Surr)	*103*		*79 - 123*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 440-432406/5
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		0.50	0.25	ug/L			10/02/17 09:18	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*10/02/17 09:18*	*1*
Dibromofluoromethane (Surr)	*118*		*76 - 132*		*10/02/17 09:18*	*1*
Toluene-d8 (Surr)	*108*		*80 - 128*		*10/02/17 09:18*	*1*

Lab Sample ID: LCS 440-432406/6
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform			25.0	28.3		ug/L		113	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*118*		*76 - 132*
Toluene-d8 (Surr)	*103*		*80 - 128*

Lab Sample ID: 440-193013-B-1 MS
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloroform	0.84		25.0	28.7		ug/L		112	70 - 130		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*
Dibromofluoromethane (Surr)	*113*		*76 - 132*
Toluene-d8 (Surr)	*104*		*80 - 128*

Lab Sample ID: 440-193013-B-1 MSD
Matrix: Water
Analysis Batch: 432406

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	0.84		25.0	29.3		ug/L		114	70 - 130	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*114*		*76 - 132*
Toluene-d8 (Surr)	*99*		*80 - 128*

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MB 440-431047/5
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		20	10	ug/L			09/25/17 15:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*98*		*90 - 115*		*09/25/17 15:20*	*1*

Lab Sample ID: LCS 440-431047/4
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			100	106		ug/L		106	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*98*		*90 - 115*

Lab Sample ID: MRL 440-431047/3
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			20.0	21.8		ug/L		109	50 - 150		

Surrogate	*MRL %Recovery*	*MRL Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*97*		*90 - 115*

Lab Sample ID: 440-192595-K-2 MS
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate	1200		200	1360	4	ug/L		76	75 - 125		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*96*		*90 - 115*

Lab Sample ID: 440-192595-K-2 MSD
Matrix: Water
Analysis Batch: 431047

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	1200		200	1350	4	ug/L		72	75 - 125	1	25

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*95*		*90 - 115*

Method: 300.1B - Disinfection By-Products, (IC) (Continued)

Lab Sample ID: MRL 440-431675/49
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			20.0	19.1	J	ug/L		96	50 - 150		

Surrogate	*MRL %Recovery*	*MRL Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*98*		*90 - 115*

Lab Sample ID: MB 440-431843/2-A
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		200	50	ug/Kg			09/28/17 19:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/28/17 19:30*	*1*

Lab Sample ID: LCS 440-431843/1-A
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			998	1030		ug/Kg		103	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*99*		*90 - 115*

Lab Sample ID: 440-192835-A-1-C MS
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate	940		1490	2120		ug/Kg	☼	80	75 - 125		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*98*		*90 - 115*

Lab Sample ID: 440-192835-A-1-D MSD
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	940		1480	2250		ug/Kg	☼	89	75 - 125	6	25

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*96*		*90 - 115*

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MRL 440-433554/7
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.08		ug/L		102	75 - 125

Lab Sample ID: MB 440-433370/1-A
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.040	0.0095	mg/Kg			10/06/17 16:57	1

Lab Sample ID: LCS 440-433370/2-A
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	0.500	0.499		mg/Kg		100	85 - 115

Lab Sample ID: 440-192727-A-6-O MS
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1.2	F1	0.711	1.84		mg/Kg	☼	86	80 - 120

Lab Sample ID: 440-192727-A-6-P MSD
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1.2	F1	0.710	1.70	F1	mg/Kg	☼	67	80 - 120	8	20

Method: 314.0 LL - Perchlorate (IC)

Lab Sample ID: MB 440-432714/39
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		1.0	0.50	ug/L			10/04/17 00:29	1

Lab Sample ID: LCS 440-432714/40
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	25.0	24.5		ug/L		98	85 - 115

Method: 314.0 LL - Perchlorate (IC) (Continued)

Lab Sample ID: MRL 440-432714/22
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	3.76		ug/L		94	75 - 125

Lab Sample ID: 440-192678-D-3 MS
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	5.9		25.0	30.1		ug/L		97	80 - 120

Lab Sample ID: 440-192678-D-3 MSD
Matrix: Water
Analysis Batch: 432714

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	5.9		25.0	29.0		ug/L		92	80 - 120	4	20

Method: 7199 - Chromium, Hexavalent (IC)

Lab Sample ID: MB 440-430559/6
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		2.0	0.25	ug/L			09/22/17 07:24	1

Lab Sample ID: LCS 440-430559/5
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	50.0	50.7		ug/L		101	90 - 110

Lab Sample ID: MRL 440-430559/4
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	1.00	0.921	J	ug/L		92	50 - 150

Lab Sample ID: 440-192727-D-3 MS
Matrix: Water
Analysis Batch: 430559

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	ND		50.0	50.1		ug/L		100	85 - 115

Method: 7199 - Chromium, Hexavalent (IC) (Continued)

Lab Sample ID: 440-192727-D-3 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 430559

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	ND		50.0	49.2		ug/L		98	85 - 115	2	20

Lab Sample ID: 440-192772-D-1 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 430559

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chromium, hexavalent	ND		ND		ug/L		NC	20

Lab Sample ID: MB 440-431062/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.30	0.15	mg/Kg		09/25/17 09:22	09/26/17 07:15	3

Lab Sample ID: LCS 440-431062/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	40.2	33.4		mg/Kg		83	80 - 120

Lab Sample ID: 440-192190-E-24-O MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.19	J F1	46.0	35.2		mg/Kg	☼	76	55 - 110

Lab Sample ID: 440-192190-E-24-P MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	0.19	J F1	46.6	36.2		mg/Kg	☼	77	55 - 110	3	20

Lab Sample ID: 440-192190-E-24-Q MSI — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSI Result	MSI Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.19	J F1	1070	551	F1	mg/Kg	☼	51	55 - 110

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 440-431847/1-A ^5
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431847

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.99	0.50	mg/Kg		09/28/17 07:51	09/29/17 10:20	5

Lab Sample ID: LCS 440-431847/2-A ^5
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431847

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	49.5	51.1		mg/Kg		103	80 - 120

Lab Sample ID: 440-192727-A-6-M MS ^10
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 431847

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	13		71.3	88.5		mg/Kg	☼	106	75 - 125

Lab Sample ID: 440-192727-A-6-N MSD ^10
Matrix: Solid
Analysis Batch: 432137

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 431847

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	13		71.0	89.3		mg/Kg	☼	107	75 - 125	1	20

Lab Sample ID: MB 440-431623/1-A
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.0050	0.0025	mg/L		09/27/17 10:22	09/27/17 21:15	1

Lab Sample ID: LCS 440-431623/2-A
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	1.00	0.945		mg/L		94	80 - 120

Lab Sample ID: 440-192518-O-1-B MS
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	13		1.00	13.8	4	mg/L		60	75 - 125

Lab Sample ID: 440-192518-O-1-C MSD
Matrix: Water
Analysis Batch: 431839

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total Recoverable
Prep Batch: 431623

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	13		1.00	13.7	4	mg/L		43	75 - 125	1	20

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192817-1

Method: Moisture - Percent Moisture

Lab Sample ID: 440-192727-B-6 DU
Matrix: Solid
Analysis Batch: 431206

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	29.3			29.9		%				2	20

GC/MS VOA

Analysis Batch: 431823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Total/NA	Solid	8260B	
MB 440-431823/3	Method Blank	Total/NA	Solid	8260B	
LCS 440-431823/4	Lab Control Sample	Total/NA	Solid	8260B	
440-192727-A-6 MS	Matrix Spike	Total/NA	Solid	8260B	
440-192727-A-6 MSD	Matrix Spike Duplicate	Total/NA	Solid	8260B	

Analysis Batch: 432406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-2	CTMW-07D-130.0-20170922-EB	Total/NA	Water	8260B	
440-192817-3	Trip Blank	Total/NA	Water	8260B	
MB 440-432406/5	Method Blank	Total/NA	Water	8260B	
LCS 440-432406/6	Lab Control Sample	Total/NA	Water	8260B	
440-193013-B-1 MS	Matrix Spike	Total/NA	Water	8260B	
440-193013-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

HPLC/IC

Analysis Batch: 430559

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-2	CTMW-07D-130.0-20170922-EB	Total/NA	Water	7199	
MB 440-430559/6	Method Blank	Total/NA	Water	7199	
LCS 440-430559/5	Lab Control Sample	Total/NA	Water	7199	
MRL 440-430559/4	Lab Control Sample	Total/NA	Water	7199	
440-192727-D-3 MS	Matrix Spike	Total/NA	Water	7199	
440-192727-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	7199	
440-192772-D-1 DU	Duplicate	Total/NA	Water	7199	

Analysis Batch: 431047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-2	CTMW-07D-130.0-20170922-EB	Total/NA	Water	300.1B	
MB 440-431047/5	Method Blank	Total/NA	Water	300.1B	
LCS 440-431047/4	Lab Control Sample	Total/NA	Water	300.1B	
MRL 440-431047/3	Lab Control Sample	Total/NA	Water	300.1B	
440-192595-K-2 MS	Matrix Spike	Total/NA	Water	300.1B	
440-192595-K-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.1B	

Prep Batch: 431062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Total/NA	Solid	3060A	
MB 440-431062/1-A	Method Blank	Total/NA	Solid	3060A	
LCS 440-431062/2-A	Lab Control Sample	Total/NA	Solid	3060A	
440-192190-E-24-O MS	Matrix Spike	Total/NA	Solid	3060A	
440-192190-E-24-P MSD	Matrix Spike Duplicate	Total/NA	Solid	3060A	
440-192190-E-24-Q MSI	Matrix Spike	Total/NA	Solid	3060A	

Analysis Batch: 431262

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Total/NA	Solid	7199	431062
MB 440-431062/1-A	Method Blank	Total/NA	Solid	7199	431062
LCS 440-431062/2-A	Lab Control Sample	Total/NA	Solid	7199	431062

HPLC/IC (Continued)

Analysis Batch: 431262 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192190-E-24-O MS	Matrix Spike	Total/NA	Solid	7199	431062
440-192190-E-24-P MSD	Matrix Spike Duplicate	Total/NA	Solid	7199	431062
440-192190-E-24-Q MSI	Matrix Spike	Total/NA	Solid	7199	431062

Analysis Batch: 431675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Soluble	Solid	300.1B	431843
MB 440-431843/2-A	Method Blank	Soluble	Solid	300.1B	431843
LCS 440-431843/1-A	Lab Control Sample	Soluble	Solid	300.1B	431843
MRL 440-431675/49	Lab Control Sample	Total/NA	Solid	300.1B	
440-192835-A-1-C MS	Matrix Spike	Soluble	Solid	300.1B	431843
440-192835-A-1-D MSD	Matrix Spike Duplicate	Soluble	Solid	300.1B	431843

Leach Batch: 431843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Soluble	Solid	DI Leach	
MB 440-431843/2-A	Method Blank	Soluble	Solid	DI Leach	
LCS 440-431843/1-A	Lab Control Sample	Soluble	Solid	DI Leach	
440-192835-A-1-C MS	Matrix Spike	Soluble	Solid	DI Leach	
440-192835-A-1-D MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 432714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-2	CTMW-07D-130.0-20170922-EB	Total/NA	Water	314.0 LL	
MB 440-432714/39	Method Blank	Total/NA	Water	314.0 LL	
LCS 440-432714/40	Lab Control Sample	Total/NA	Water	314.0 LL	
MRL 440-432714/22	Lab Control Sample	Total/NA	Water	314.0 LL	
440-192678-D-3 MS	Matrix Spike	Total/NA	Water	314.0 LL	
440-192678-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	314.0 LL	

Leach Batch: 433370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Soluble	Solid	DI Leach	
MB 440-433370/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 440-433370/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
440-192727-A-6-O MS	Matrix Spike	Soluble	Solid	DI Leach	
440-192727-A-6-P MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

Analysis Batch: 433554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Soluble	Solid	314.0	433370
MB 440-433370/1-A	Method Blank	Soluble	Solid	314.0	433370
LCS 440-433370/2-A	Lab Control Sample	Soluble	Solid	314.0	433370
MRL 440-433554/7	Lab Control Sample	Total/NA	Solid	314.0	
440-192727-A-6-O MS	Matrix Spike	Soluble	Solid	314.0	433370
440-192727-A-6-P MSD	Matrix Spike Duplicate	Soluble	Solid	314.0	433370

Metals

Prep Batch: 431623

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-2	CTMW-07D-130.0-20170922-EB	Total Recoverable	Water	3005A	
MB 440-431623/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 440-431623/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
440-192518-O-1-B MS	Matrix Spike	Total Recoverable	Water	3005A	
440-192518-O-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	

Analysis Batch: 431839

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-2	CTMW-07D-130.0-20170922-EB	Total Recoverable	Water	6010B	431623
MB 440-431623/1-A	Method Blank	Total Recoverable	Water	6010B	431623
LCS 440-431623/2-A	Lab Control Sample	Total Recoverable	Water	6010B	431623
440-192518-O-1-B MS	Matrix Spike	Total Recoverable	Water	6010B	431623
440-192518-O-1-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6010B	431623

Prep Batch: 431847

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Total/NA	Solid	3050B	
MB 440-431847/1-A ^5	Method Blank	Total/NA	Solid	3050B	
LCS 440-431847/2-A ^5	Lab Control Sample	Total/NA	Solid	3050B	
440-192727-A-6-M MS ^10	Matrix Spike	Total/NA	Solid	3050B	
440-192727-A-6-N MSD ^10	Matrix Spike Duplicate	Total/NA	Solid	3050B	

Analysis Batch: 432003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Total/NA	Solid	6010B	431847

Analysis Batch: 432137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 440-431847/1-A ^5	Method Blank	Total/NA	Solid	6010B	431847
LCS 440-431847/2-A ^5	Lab Control Sample	Total/NA	Solid	6010B	431847
440-192727-A-6-M MS ^10	Matrix Spike	Total/NA	Solid	6010B	431847
440-192727-A-6-N MSD ^10	Matrix Spike Duplicate	Total/NA	Solid	6010B	431847

General Chemistry

Analysis Batch: 431206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192817-1	CTMW-07D-120.0-20170922	Total/NA	Solid	Moisture	
440-192727-B-6 MS	Matrix Spike	Total/NA	Solid	Moisture	
440-192727-B-6 MSD	Matrix Spike Duplicate	Total/NA	Solid	Moisture	
440-192727-B-6 DU	Duplicate	Total/NA	Solid	Moisture	

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192817-1

Laboratory: TestAmerica Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	CA01531	06-30-18
Arizona	State Program	9	AZ0671	10-14-17 *
California	LA Cty Sanitation Districts	9	10256	06-30-18
California	State Program	9	CA ELAP 2706	06-30-18
Guam	State Program	9	Cert. No. 17-003R	01-23-18
Hawaii	State Program	9	N/A	01-29-18
Kansas	NELAP Secondary AB	7	E-10420	07-31-18
Nevada	State Program	9	CA015312018-1	07-31-18
New Mexico	State Program	6	N/A	01-29-18 *
Northern Mariana Islands	State Program	9	MP0002	01-29-17 *
Oregon	NELAP	10	4028	01-29-18
USDA	Federal		P330-15-00184	07-08-18
Washington	State Program	10	C900	09-03-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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Chain of Custody Record

TestAmerica

Client Information	Sampler: Jeff Richeson	Lab PM: Patty Mata	Carrier Tracking No(s):	COC No:
Client Contact: Mike Crews	Phone: (805) 660-1774	E-Mail: patty.mata@testamericainc.com		Page:
Company: Tetra Tech		Analysis Requested		Job #:
Address: 17885 Von Karman Ave., Suite 500	Due Date Requested:			Preservation Codes:
City: Irvine	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
State, Zip: CA 92614				
Phone: (949)-809-5033	PO #: M12-CWP-01-WA2			Other:
Email: mike.crews@tetratech.com	WO #:			
Project Name: NERT In-Situ Cr Treatability Study	Project #: 44017166			
Site: Henderson, NV	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.1B_14D_28D Chlorate	RSK_175 - Diss Methane	351.2, 365.3, 5220D	2320B, 2540C_Calcd, 300_ORGFM_28D, 300_ORGFMS, 365.3_Ortho_7199_ORGFM Hex. Chromium. Chromium.	2340C, 6010B	6020 - Lab to Filter 19 Diss Metals	SM5310B - TOC	8260B_LL - Volatiles Chloroform	SM4500_S2_D - Sulfide, Total	VFA_IC - VFA Compounds	314.0_LL - Perchlorate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				L	A	S	N	D	N	A	A	CB	N	N		
CTMW-07D-120.0-20170922	9/22/17	0715	6	Soil			X			X	X			X			X	1	
CTMW-07D-130.0-20170922-EB	9/22/17		6	H2O			X			X	X			X			X	6	
Trip Blank	9/22/17	0700	6	H2O										X				3	

440-192817 Chain of Custody

LB 9/23/17

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: Level 3 QC Required

Empty Kit Relinquished by: - Date: Time: Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1		9/22/17	TT		9-22-17 1445	TA
2		9-22-17 1630	TA		Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 9/22/17 21:20	Company

Custody Seals Intact: X Yes Δ No | Custody Seal No.: FWA: 526 6064 045

Cooler Temperature(s) °C and Other Remarks: TALV 16.1 1.6 1.984

7462 9258 1163 -SATURDAY VG 09/23/17@1450

10/9/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 440-192817-1

Login Number: 192817

List Source: TestAmerica Irvine

List Number: 1

Creator: Garcia, Veronica G

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	False	Refer to Job Narrative for details.
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

TestAmerica Job ID: 440-192835-1
Client Project/Site: NERT In-Situ Cr Treatability, M12

For:
Tetra Tech, Inc.
17885 Von Karman Ave, Ste 500
Irvine, California 92614

Attn: Mike Crews

Authorized for release by:
10/9/2017 3:43:57 PM

Patty Mata, Senior Project Manager
(949)261-1022
patty.mata@testamericainc.com

Table of Contents

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-192835-1	CTMW-07D-130.0-20170922	Solid	09/22/17 08:00	09/22/17 21:20

Case Narrative

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Job ID: 440-192835-1

Laboratory: TestAmerica Irvine

Narrative

Job Narrative
440-192835-1

Comments
No additional comments.

Receipt
The short hold time sample bottles were received on 9/22/2017 9:20 PM; the remaining sample bottles were received on 9/23/2017 10:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.9º C and 4.1º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

HPLC/IC
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Client Sample ID: CTMW-07D-130.0-20170922
Date Collected: 09/22/17 08:00
Date Received: 09/22/17 21:20

Lab Sample ID: 440-192835-1
Matrix: Solid
Percent Solids: 67.4

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.9	1.5	ug/Kg	☼		09/28/17 13:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*79 - 120*		*09/28/17 13:53*	*1*
Dibromofluoromethane (Surr)	*98*		*60 - 120*		*09/28/17 13:53*	*1*
Toluene-d8 (Surr)	*107*		*79 - 123*		*09/28/17 13:53*	*1*

Method: 300.1B - Disinfection By-Products, (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	**940**		300	75	ug/Kg	☼		09/28/17 20:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/28/17 20:42*	*1*

Method: 314.0 - Perchlorate (IC) - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	**0.40**		0.059	0.014	mg/Kg	☼		10/07/17 10:31	1

Method: 7199 - Chromium, Hexavalent (IC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.44	0.22	mg/Kg	☼	09/25/17 09:22	09/26/17 12:06	3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**28**		3.0	1.5	mg/Kg	☼	09/28/17 07:51	09/28/17 16:16	10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**32.6**		0.1	0.1	%			09/25/17 17:10	1

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL IRV
300.1B	Disinfection By-Products, (IC)	EPA	TAL IRV
314.0	Perchlorate (IC)	EPA	TAL IRV
7199	Chromium, Hexavalent (IC)	SW846	TAL IRV
6010B	Metals (ICP)	SW846	TAL IRV
Moisture	Percent Moisture	EPA	TAL IRV

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Client Sample ID: CTMW-07D-130.0-20170922 — **Lab Sample ID: 440-192835-1**
Date Collected: 09/22/17 08:00 — **Matrix: Solid**
Date Received: 09/22/17 21:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			431206	09/25/17 17:10	HTL	TAL IRV

Client Sample ID: CTMW-07D-130.0-20170922 — **Lab Sample ID: 440-192835-1**
Date Collected: 09/22/17 08:00 — **Matrix: Solid**
Date Received: 09/22/17 21:20 — **Percent Solids: 67.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5.04 g	10 mL	431823	09/28/17 13:53	WC	TAL IRV
Soluble	Leach	DI Leach			3.98 g	40 mL	431843	09/28/17 07:35	YZ	TAL IRV
Soluble	Analysis	300.1B		1			431675	09/28/17 20:42	YZ	TAL IRV
Soluble	Leach	DI Leach			4.01 g	40 mL	433370	10/05/17 18:07	CTH	TAL IRV
Soluble	Analysis	314.0		1			433554	10/07/17 10:31	CTH	TAL IRV
Total/NA	Prep	3060A			2.51 g	100 mL	431062	09/25/17 09:22	YZ	TAL IRV
Total/NA	Analysis	7199		3			431262	09/26/17 12:06	MN	TAL IRV
Total/NA	Prep	3050B			2.01 g	50 mL	431847	09/28/17 07:51	DT	TAL IRV
Total/NA	Analysis	6010B		10			432003	09/28/17 16:16	VS	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-431823/3
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroform	ND		2.0	1.0	ug/Kg			09/28/17 08:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*79 - 120*		*09/28/17 08:10*	*1*
Dibromofluoromethane (Surr)	*105*		*60 - 120*		*09/28/17 08:10*	*1*
Toluene-d8 (Surr)	*85*		*79 - 123*		*09/28/17 08:10*	*1*

Lab Sample ID: LCS 440-431823/4
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroform	50.0	53.8		ug/Kg		108	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*79 - 120*
Dibromofluoromethane (Surr)	*100*		*60 - 120*
Toluene-d8 (Surr)	*103*		*79 - 123*

Lab Sample ID: 440-192727-A-6 MS
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroform	ND		71.3	79.4		ug/Kg	☼	111	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*
Dibromofluoromethane (Surr)	*101*		*60 - 120*
Toluene-d8 (Surr)	*100*		*79 - 123*

Lab Sample ID: 440-192727-A-6 MSD
Matrix: Solid
Analysis Batch: 431823

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	ND		70.6	73.2		ug/Kg	☼	104	65 - 135	8	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*79 - 120*
Dibromofluoromethane (Surr)	*101*		*60 - 120*
Toluene-d8 (Surr)	*103*		*79 - 123*

Method: 300.1B - Disinfection By-Products, (IC)

Lab Sample ID: MRL 440-431675/49
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			20.0	19.1	J	ug/L		96	50 - 150		

Surrogate	*MRL %Recovery*	*MRL Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*98*		*90 - 115*

Lab Sample ID: MB 440-431843/2-A
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlorate	ND		200	50	ug/Kg			09/28/17 19:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dichloroacetic acid(Surr)	*97*		*90 - 115*		*09/28/17 19:30*	*1*

Lab Sample ID: LCS 440-431843/1-A
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate			998	1030		ug/Kg		103	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*99*		*90 - 115*

Lab Sample ID: 440-192835-1 MS
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: CTMW-07D-130.0-20170922
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chlorate	940		1490	2120		ug/Kg	☼	80	75 - 125		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*98*		*90 - 115*

Lab Sample ID: 440-192835-1 MSD
Matrix: Solid
Analysis Batch: 431675

Client Sample ID: CTMW-07D-130.0-20170922
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chlorate	940		1480	2250		ug/Kg	☼	89	75 - 125	6	25

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Dichloroacetic acid(Surr)	*96*		*90 - 115*

Method: 314.0 - Perchlorate (IC)

Lab Sample ID: MRL 440-433554/7
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	4.00	4.08		ug/L		102	75 - 125

Lab Sample ID: MB 440-433370/1-A
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perchlorate	ND		0.040	0.0095	mg/Kg			10/06/17 16:57	1

Lab Sample ID: LCS 440-433370/2-A
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	0.500	0.499		mg/Kg		100	85 - 115

Lab Sample ID: 440-192727-A-6-O MS
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Matrix Spike
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Perchlorate	1.2	F1	0.711	1.84		mg/Kg	☼	86	80 - 120

Lab Sample ID: 440-192727-A-6-P MSD
Matrix: Solid
Analysis Batch: 433554

Client Sample ID: Matrix Spike Duplicate
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perchlorate	1.2	F1	0.710	1.70	F1	mg/Kg	☼	67	80 - 120	8	20

Method: 7199 - Chromium, Hexavalent (IC)

Lab Sample ID: MB 440-431062/1-A
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 431062

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium, hexavalent	ND		0.30	0.15	mg/Kg		09/25/17 09:22	09/26/17 07:15	3

Lab Sample ID: LCS 440-431062/2-A
Matrix: Solid
Analysis Batch: 431262

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 431062

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	40.2	33.4		mg/Kg		83	80 - 120

Method: 7199 - Chromium, Hexavalent (IC) (Continued)

Lab Sample ID: 440-192190-E-24-O MS — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.19	J F1	46.0	35.2		mg/Kg	☼	76	55 - 110

Lab Sample ID: 440-192190-E-24-P MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium, hexavalent	0.19	J F1	46.6	36.2		mg/Kg	☼	77	55 - 110	3	20

Lab Sample ID: 440-192190-E-24-Q MSI — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 431262 — **Prep Batch: 431062**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSI Result	MSI Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium, hexavalent	0.19	J F1	1070	551	F1	mg/Kg	☼	51	55 - 110

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 440-431847/1-A ^5 — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 432137 — **Prep Batch: 431847**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	ND		0.99	0.50	mg/Kg		09/28/17 07:51	09/29/17 10:20	5

Lab Sample ID: LCS 440-431847/2-A ^5 — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 432137 — **Prep Batch: 431847**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	49.5	51.1		mg/Kg		103	80 - 120

Lab Sample ID: 440-192727-A-6-M MS ^10 — **Client Sample ID: Matrix Spike**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 432137 — **Prep Batch: 431847**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chromium	13		71.3	88.5		mg/Kg	☼	106	75 - 125

Lab Sample ID: 440-192727-A-6-N MSD ^10 — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 432137 — **Prep Batch: 431847**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chromium	13		71.0	89.3		mg/Kg	☼	107	75 - 125	1	20

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Method: Moisture - Percent Moisture

Lab Sample ID: 440-192727-B-6 DU
Matrix: Solid
Analysis Batch: 431206

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	29.3			29.9		%				2	20

GC/MS VOA

Analysis Batch: 431823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Total/NA	Solid	8260B	
MB 440-431823/3	Method Blank	Total/NA	Solid	8260B	
LCS 440-431823/4	Lab Control Sample	Total/NA	Solid	8260B	
440-192727-A-6 MS	Matrix Spike	Total/NA	Solid	8260B	
440-192727-A-6 MSD	Matrix Spike Duplicate	Total/NA	Solid	8260B	

HPLC/IC

Prep Batch: 431062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Total/NA	Solid	3060A	
MB 440-431062/1-A	Method Blank	Total/NA	Solid	3060A	
LCS 440-431062/2-A	Lab Control Sample	Total/NA	Solid	3060A	
440-192190-E-24-O MS	Matrix Spike	Total/NA	Solid	3060A	
440-192190-E-24-P MSD	Matrix Spike Duplicate	Total/NA	Solid	3060A	
440-192190-E-24-Q MSI	Matrix Spike	Total/NA	Solid	3060A	

Analysis Batch: 431262

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Total/NA	Solid	7199	431062
MB 440-431062/1-A	Method Blank	Total/NA	Solid	7199	431062
LCS 440-431062/2-A	Lab Control Sample	Total/NA	Solid	7199	431062
440-192190-E-24-O MS	Matrix Spike	Total/NA	Solid	7199	431062
440-192190-E-24-P MSD	Matrix Spike Duplicate	Total/NA	Solid	7199	431062
440-192190-E-24-Q MSI	Matrix Spike	Total/NA	Solid	7199	431062

Analysis Batch: 431675

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Soluble	Solid	300.1B	431843
MB 440-431843/2-A	Method Blank	Soluble	Solid	300.1B	431843
LCS 440-431843/1-A	Lab Control Sample	Soluble	Solid	300.1B	431843
MRL 440-431675/49	Lab Control Sample	Total/NA	Solid	300.1B	
440-192835-1 MS	CTMW-07D-130.0-20170922	Soluble	Solid	300.1B	431843
440-192835-1 MSD	CTMW-07D-130.0-20170922	Soluble	Solid	300.1B	431843

Leach Batch: 431843

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Soluble	Solid	DI Leach	
MB 440-431843/2-A	Method Blank	Soluble	Solid	DI Leach	
LCS 440-431843/1-A	Lab Control Sample	Soluble	Solid	DI Leach	
440-192835-1 MS	CTMW-07D-130.0-20170922	Soluble	Solid	DI Leach	
440-192835-1 MSD	CTMW-07D-130.0-20170922	Soluble	Solid	DI Leach	

Leach Batch: 433370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Soluble	Solid	DI Leach	
MB 440-433370/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 440-433370/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
440-192727-A-6-O MS	Matrix Spike	Soluble	Solid	DI Leach	
440-192727-A-6-P MSD	Matrix Spike Duplicate	Soluble	Solid	DI Leach	

HPLC/IC (Continued)

Analysis Batch: 433554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Soluble	Solid	314.0	433370
MB 440-433370/1-A	Method Blank	Soluble	Solid	314.0	433370
LCS 440-433370/2-A	Lab Control Sample	Soluble	Solid	314.0	433370
MRL 440-433554/7	Lab Control Sample	Total/NA	Solid	314.0	
440-192727-A-6-O MS	Matrix Spike	Soluble	Solid	314.0	433370
440-192727-A-6-P MSD	Matrix Spike Duplicate	Soluble	Solid	314.0	433370

Metals

Prep Batch: 431847

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Total/NA	Solid	3050B	
MB 440-431847/1-A ^5	Method Blank	Total/NA	Solid	3050B	
LCS 440-431847/2-A ^5	Lab Control Sample	Total/NA	Solid	3050B	
440-192727-A-6-M MS ^10	Matrix Spike	Total/NA	Solid	3050B	
440-192727-A-6-N MSD ^10	Matrix Spike Duplicate	Total/NA	Solid	3050B	

Analysis Batch: 432003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Total/NA	Solid	6010B	431847

Analysis Batch: 432137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 440-431847/1-A ^5	Method Blank	Total/NA	Solid	6010B	431847
LCS 440-431847/2-A ^5	Lab Control Sample	Total/NA	Solid	6010B	431847
440-192727-A-6-M MS ^10	Matrix Spike	Total/NA	Solid	6010B	431847
440-192727-A-6-N MSD ^10	Matrix Spike Duplicate	Total/NA	Solid	6010B	431847

General Chemistry

Analysis Batch: 431206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-192835-1	CTMW-07D-130.0-20170922	Total/NA	Solid	Moisture	
440-192727-B-6 MS	Matrix Spike	Total/NA	Solid	Moisture	
440-192727-B-6 MSD	Matrix Spike Duplicate	Total/NA	Solid	Moisture	
440-192727-B-6 DU	Duplicate	Total/NA	Solid	Moisture	

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: NERT In-Situ Cr Treatability, M12

TestAmerica Job ID: 440-192835-1

Laboratory: TestAmerica Irvine

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	CA01531	06-30-18
Arizona	State Program	9	AZ0671	10-14-17 *
California	LA Cty Sanitation Districts	9	10256	06-30-18
California	State Program	9	CA ELAP 2706	06-30-18
Guam	State Program	9	Cert. No. 17-003R	01-23-18
Hawaii	State Program	9	N/A	01-29-18
Kansas	NELAP Secondary AB	7	E-10420	07-31-18
Nevada	State Program	9	CA015312018-1	07-31-18
New Mexico	State Program	6	N/A	01-29-18 *
Northern Mariana Islands	State Program	9	MP0002	01-29-17 *
Oregon	NELAP	10	4028	01-29-18
USDA	Federal		P330-15-00184	07-08-18
Washington	State Program	10	C900	09-03-18

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Irvine
17461 Derian Suite 100
Irvine, CA 92614-5817
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jeff Richeson	Lab PM: Patty Mata	Carrier Tracking No(s):	COC No:
Client Contact: Mike Crews	Phone: (805) 660-1774	E-Mail: patty.mata@testamericainc.com		Page:
Company: Tetra Tech				Job #:
Address: 17885 Von Karman Ave., Suite 500	Due Date Requested:			
City: Irvine	TAT Requested (days):			
State, Zip: CA 92614				
Phone: (949)-809-5033	PO #: M12-CWP-01-WA2			
Email: mike.crews@tetratech.com	WO #:			
Project Name: NERT In-Situ Cr Treatability Study	Project #: 44017166			
Site: Henderson, NV	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.1B_14D_300.1B_28D Chlorate	RSK_175 - Diss Methane	351.2, 365.3, 5220D	2320B, 2540C_Calcd, 300_ORGFM_28D 300_ORGFMS, 365.3_Ortho, 7199_ORGFM Hex Chrom	2340C, 6010B Chromium	6020 - Lab to Filter 19 Diss Metals	SM5310B - TOC	8260B_LL - Volatiles Chloroform	SM4500_S2_D - Sulfide, Total	VFA_IC - VFA Compounds	314.0_LL - Percholate	Total Number of containers	Special Instructions/Note:
			Preservation Code:				L	A	S	N	D	N	A	A	CB	N	N		
CTMW-07D-130.0-20170922	9/22/17	0800	G	Soil			X			X	X			X			X	1	

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

440-192835 Chain of Custody

LB 9/23/17

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: Level 4 QC Required

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		9/22/17	TT		9-22-17 1445	TA
2		9/22/17 1630	TA			
3					9/22/17 21:20	TA

Custody Seals Intact: ☒ Yes ☐ No | Custody Seal No.: SWA: 326 6064045

Cooler Temperature(s) °C and Other Remarks: TAK 16.1 1.6 1.9-84

#746292558 1152 1/6 9/23/17 1150

10/9/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 440-192835-1

Login Number: 192835

List Source: TestAmerica Irvine

List Number: 1

Creator: Garcia, Veronica G

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Attachment C
Physical Parameter Laboratory Report

5730 Centralcrest St. • Houston, TX 77092
Telephone (713) 316-1800 • Fax (877) 225-9953

January 5, 2018

Mike Crews
Project Manager
Tetra Tech, Inc.
17855 Von Karman Avenue, Suite 500
Irvine, CA 92614

Re: PTS File No: 47446
Project Name: NERT VER Treatability Study
Project Number: 44017166

Dear Mr Crews:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your NERT project. All analyses were performed by applicable ASTM, EPA, or API methodologies. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please contact myself or Emeka Anazodo at (713) 316-1800.

Sincerely,
PTS Laboratories, Inc.

Rick Schweizer

Rick Schweizer
Laboratory Supervisor

Encl.

PTS Laboratories

Project Name: NERT VER Treatability Study
Project Number: 44017166

PTS File No: 47446
Client: Tetra Tech, Inc.

TEST PROGRAM - 20171212

CORE ID	Depth ft.	Core Recovery ft.	Hydraulic Conductivity Pkg.					Comments
		Plugs:	Vert. 1.5"					
Date Received: 20171031								
CTMW-07S-22.0-20170923	**22**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
CTMW-07D-108.0-20170921	**108**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
VMW-01I-62.0-20170928	**62**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
VMW-01D-100.0-20170928	**100**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
VMW-02I-62.0-20171018	**62**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
VMW-02D-100.0-20171018	**100**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
VER-01I-62.0-20171019	**62**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
VER-01D-100.0-20171020	**100**		**X**					2½" X 6" acetate sleeve or 2½" X 6" ss tube
TOTALS:		**0.0**	**8**					**8**

Laboratory Test Program Notes
Contaminant identification: _____

Standard TAT for basic analysis is 10-15 business days.

Hydraulic Conductivity Package – Saturated Zone: Native-state permeability to water, total and air-filled porosity, grain and bulk density, moisture content, total pore fluid (water only) saturation.

Horizontal sample orientation is +$20/sample. Requires cores >2" diameter.

PTS File No: 47446
Client: Tetra Tech, Inc.
Report Date: 01/05/18

PTS Laboratories

PHYSICAL PROPERTIES DATA - HYDRAULIC CONDUCTIVITY PACKAGE

Project Name: NERT VER Treatability Study
Project No: 44017166

		METHODS:	API RP 40 / ASTM D2216	API RP 40		API RP 40		API RP 40	API RP 40; EPA 9100	
									25 PSI CONFINING STRESS	
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	MOISTURE CONTENT, % weight	DENSITY		POROSITY, %Vb (2)		TOTAL PORE FLUID SATURATIONS (3), % Pv	EFFECTIVE (4,5) PERMEABILITY TO WATER, millidarcy	HYDRAULIC CONDUCTIVITY (4,5), cm/s
				DRY BULK, g/cc	GRAIN, g/cc	TOTAL	AIR-FILLED			
CTMW-07S-22.0-20170923	22.0-22.2	V	27.4	1.48	2.66	44.5	4.1	90.9	10.1	9.23E-06
CTMW-07D-108.0-20170921	108.0-108.2	V	85.0	0.78	2.65	70.7	4.8	93.2	1.25	1.15E-06
VMW-01I-62.0-20170928	62.0-62.17	V	42.9	1.19	2.58	54.0	3.0	94.5	9.56	8.86E-06
VMW-01D-100.0-20170928	100.0-100.2	V	23.8	1.58	2.69	41.4	3.9	90.5	0.228	2.13E-07
VMW-02I-62.0-20171018	62.0-62.17	V	95.5	0.71	2.67	73.3	5.2	92.8	0.356	3.43E-07
VMW-02D-100.0-20171018	100.0-100.2	V	23.9	1.56	2.69	42.2	4.9	88.4	0.085	8.32E-08
VER-01I-62.0-20171019	62.0-62.17	V	16.0	1.86	2.72	31.4	1.7	94.5	88.1	8.25E-05
VER-01D-100.0-20171020	100.0-100.17	V	37.0	1.30	2.69	51.7	3.7	92.9	0.182	1.71E-07

(1) Sample Orientation: H = horizontal; V = vertical; R = remold
(2) Total Porosity = all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids.
(3) Fluid density used to calculate pore fluid saturations: Water = 0.9996 g/cc.
(4) Effective (Native) = With as-received pore fluids in place.
(5) Permeability to water and hydraulic conductivity measured at saturated conditions.
Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected
Water = filtered Laboratory Fresh (tap) or Site water.

TestAmerica Irvine
17461 Deria Suite 100
Irvine, CA 92614-5817
Phone (949) 261-1022 Fax (949) 260-3297

Chain of Custody Record

PTS 47446

TestAmerica THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Jeff Richeson	Lab PM: Patty Mata	Carrier Tracking No(s):	COC No:
Client Contact: Mike Crews	Phone: (805) 660-1774	E-Mail: patty.mata@testamericainc.com		Page:
Company: Tetra Tech				Job #:
Address: 17885 Von Karman Ave., Suite 500	Due Date Requested:			
City: Irvine	TAT Requested (days):			
State, Zip: CA 92614				
Phone: (949)-809-5033	PO #: [redacted]			
Email: mike.crews@tetratech.com	WO #:			
Project Name: NERT[redacted] VER Treatability Study	Project #: 44017166			
Site: Henderson, NV	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.1B_14D, 300.1B_28D	RSK_175 - Diss Methane	351.2, 365.3, 5220D	2320B, 2540C_Calcd, 300_ORGFM_28D, 300_ORGFMS, 365.3_Ortho, 7199_ORGFM	2340C, 6010B	6020 - Lab to Filter 19 Diss Metals	SM5310B - TOC	8260B_LL - Volatiles	SM4500_S2_D - Sulfide, Total	VFA_IC - VFA Compounds	314.0_LL - Percholate	Vertical//Horizontal/Conductivity package		Total Number of containers	Special Instructions/Note:
			Preservation Code:				L	A	S	N	D	N	A	A	CB	N	N				
CTMW-07S-[redacted]-20170923	9/23/17	0940	G	Soil														X		1	
CTMW-07D-108.0-20170921	9/21/17	1520	G	Soil														X		1	
VMW-01I-62.0-20170928	9/28/17	1015	G	Soil														X		1	
VMW-01D-100.0-20170928	9/28/17	1300	G	Soil														X		1	
VMW-02I-62.0-20171018	10/18/17	1045	G	Soil														X		1	
VMW-02D-100.0-20171018	10/18/17	1255	G	Soil														X		1	
VER-01I-62.0-20171019	10/19/17	1100	G	Soil														X		1	
VER-01D-100.0-20171020	10/20/17	1225	G	Soil														X		1	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements: [redacted]

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	10/30/17 1400	Tetra Tech	[signature] 68°F	10/31/17 12:15	PTS LABS WC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Appendix D
Summary of Groundwater Analytical Results – Biological Reduction Study

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Perchlorate by USEPA Method 314.0 (mg/L)	Hexavalent Chromium by USEPA Method 7199 (mg/L)	Total Metals by USEPA Method 6010B (mg/L)			USEPA Method 300.1B (mg/L)		Anions by USEPA Method 300.0 (mg/L)		
						Total Chromium	Total Iron	Total Manganese	Chlorate	Chlorite	Chloride	Nitrate as N	Sulfate
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	**390**	**13**	**14**	--	**0.011 J**	**3,100**	<10	**870**	**36**	**1,500**
CTIW-01D	CTIW-01D-20170406	04/06/17	Baseline	**650**	**18**	**20**	--	**0.028**	**3,800**	<10	**1,100**	**14**	**1,500**
CTIW-02S	CTIW-02S-20170403	04/03/17	Baseline	**400**	**12**	**11**	--	**0.026**	**2,400**	<10	**690**	**120**	**1,400**
CTIW-02D	CTIW-02D-20170404	04/04/17	Baseline	**900**	**20**	**20**	--	**0.056 J**	**4,100**	<1	**1,300**	**25**	**1,600**
CTIW-03S	CTIW-03S-20170404	04/04/17	Baseline	**380**	**11**	**11**	--	**0.040**	**2,300**	<1	**720**	**470**	**1,300**
CTIW-03D	CTIW-03D-20170404	04/04/17	Baseline	**1,100**	**21**	**23**	--	<0.050	**4,600**	<1	**1,300**	**58**	**1,400**
CTMW-01S	CTMW-01S-20170404	04/04/17	Baseline	**410**	**11**	**11**	--	**0.030**	**2,500**	<1	**790**	**120**	**1,400**
	CTMW-01S-20170503	05/03/17	PME1	**340**	**0.026**	**1.7**	--	**0.55**	**870**	<10	**950**	**210**	**1,400**
	CTMW-01S-20170516	05/16/17	PME2	**280**	<0.00025	**0.49**	--	**0.55**	**730**	<10	**940**	**55**	**1,200**
	CTMW-01S-20170531	05/31/17	PME3	**140**	<0.00025	**0.18**	**1.4**	**0.99**	**650**	<10	**1,500**	**2.6**	**1,100**
	CTMW-01S-20170619	06/19/17	PME4	**39**	<0.00025 UJ	**1.9**	**17**	**3.3**	**64**	<20	**1,300**	**9.5**	**740**
	CTMW-01S-20170720	07/20/17	PME5	**4**	<0.00025	**0.49**	**25**	**5.5**	**72**	<5	**1,500**	<0.55	**140**
	CTMW-01S-20170824	08/24/17	PME6	**32**	**0.0026**	**2.2**	**18**	**3.3**	**13**	<10	**1,300**	**4.8 J**	**1,000**
	CTMW-01S-20170920	09/20/17	PME7	**0.32**	**0.00037 J**	**0.086**	**11**	**3.6**	<1	<10	**970**	<1.1	<130
	CTMW-01S-20171003	10/03/17	PME8	**0.15 J+**	<0.00025	**0.084**	**21**	**2.8**	**0.61 J**	<10	**1,100**	<0.55	**76**
	CTMW-01S-20180305	03/05/18	PME9	<0.0025	<0.00025	**0.061**	**3.9**	**0.29**	<0.5	<1	**780**	<1.1	<5.0
	CTMW-01S-20180621	06/21/18	PME10	**0.15**	**0.0088**	**0.085**	**6.9**	**0.24**	**1.2**	<10	**1,100**	<1.1	**97**
CTMW-01D	CTMW-01D-20170403	04/03/17	Baseline	**1,400**	**24**	**23**	--	**0.042**	**4,900**	<10	**1,900**	**20**	**1,900**
	CTMW-01D-20170503	05/03/17	PME1	**1,400**	**22**	**24**	--	**0.20**	**4,900**	<10	**1,900**	**21**	**1,800**
	CTMW-01D-20170516	05/16/17	PME2	**1,400**	**21**	**24**	--	**0.037 J**	**4,500**	<10	**1,700**	**22**	**1,700**
	CTMW-01D-20170531	05/31/17	PME3	**1,300**	**22**	**23**	**0.15 J**	**0.027 J**	**4,800**	<10	**1,700**	**20**	**1,600**
	CTMW-01D-20170619	06/19/17	PME4	**1,400**	**20 J-**	**22**	<0.25	<0.075	**4,300**	<10 R	**1,700**	**17**	**1,700**
	CTMW-01D-20170720	07/20/17	PME5	**1,400**	**16**	**16**	<0.10	**0.070**	**4,100**	<10 R	**2,000**	**14**	**1,700**
	CTMW-01D-20170720-FD	07/20/17	PME5	**1,300**	**16**	**15**	<0.050	**0.063**	**4,100**	<10	**2,000**	**14**	**1,700**
	CTMW-01D-20170824	08/24/17	PME6	**1,400**	**13**	**14**	**0.17 J**	**0.20**	**3,700**	<10	**2,300**	**9.9**	**1,700**
	CTMW-01D-20170920	09/20/17	PME7	**1,500**	**12**	**13**	**0.71**	**0.21**	**3,800**	<10	**2,100**	**12**	**1,600**
	CTMW-01D-20171003	10/03/17	PME8	**1,300**	**12**	**11**	**0.13**	**0.21**	**3,500**	<10	**2,000**	**11**	**1,600**
	CTMW-01D-20180305	03/05/18	PME9	**910**	**7.5**	**7.4**	<0.050	**0.66**	**2,200**	<10	**1,800**	**6.0**	**990**
	CTMW-01D-20180305-FD	03/05/18	PME9	**900**	**7.5**	**7.3**	<0.050	**0.65**	**2,300**	<10	**1,900**	**5.0 J**	**990**
	CTMW-01D-20180621	06/21/18	PME10	**1,200**	**6.6**	**7.8**	**0.12 J**	**1.2**	**2,100**	<10	**2,700**	**5.2 J**	**1,200**
	CTMW-01D-20180621-FD	06/21/18	PME10	**1,300**	**7.5**	**8.5**	**0.10 J**	**1.1**	**2,100**	<10	**2,700**	**5.0 J**	**1,200**
CTMW-02S	CTMW-02S-20170405	04/05/17	Baseline	**410**	**11**	**11**	--	**0.030**	**2,500**	<10	**780**	**160**	**1,500**
	CTMW-02S-20170504	05/04/17	PME1	**460**	**1.3**	**2.5**	--	**0.36**	**860**	<10	**1,300**	**540**	**1,500**
	CTMW-02S-20170516	05/16/17	PME2	**380**	**0.11**	**0.74**	--	**0.35**	**550**	<10	**1,200**	**530**	**1,400**
	CTMW-02S-20170601	06/01/17	PME3	**440**	**0.76**	**0.68**	**0.11**	**0.23**	**750**	<10	**1,300**	**320**	**1,500**
	CTMW-02S-20170620	06/20/17	PME4	**110**	<0.00025	**0.16**	**2.1**	**1.3**	<0.5	<0.5	**1,500**	<1.1	**890**
	CTMW-02S-20170719	07/19/17	PME5	**26**	<0.00025	**0.084**	**13**	**2.7**	<0.5	<10	**1,400**	**0.63 J**	**29**
	Not Analyzed	08/24/17	PME6	**Well Dry; Unable to sample**									
	CTMW-02S-20170920	09/20/17	PME7	**13**	<0.00025	**0.097**	**13**	**1.4**	<1	<10	**1,600**	<0.28	**17**
	CTMW-02S-20171003	10/03/17	PME8	**0.29**	<0.00025	**0.13**	**7.9**	**1.1**	<0.5	<10	**1,600**	<1.1	**6.5 J**
	CTMW-02S-20180306	03/06/18	PME9	**0.034**	<0.00025	**0.049**	**4.2**	**0.51**	<0.05	<0.05	**1,600**	<1.1	**6.7 J**
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**									
CTMW-02D	CTMW-02D-20170404	04/04/17	Baseline	**960**	**20**	**23**	--	**0.090 J**	**4,800**	<1	**1,300**	**34**	**1,700**
	CTMW-02D-20170404-FD	04/04/17	Baseline	**930**	**20**	**21**	--	**0.076 J**	**4,600**	<1	**1,200**	**31**	**1,600**
	CTMW-02D-20170503	05/03/17	PME1	**1,100 J**	**15**	**19**	--	**0.10**	**4,200**	<10	**1,500**	**30**	**1,700**
	CTMW-02D-20170503-FD	05/03/17	PME1	**1,800 J**	**15**	**19**	--	**0.11**	**4,200**	<10	**1,600**	**29**	**1,700**
	CTMW-02D-20170517	05/17/17	PME2	**1,100**	**19**	**18**	--	**0.13**	**40,000**	<10	**1,500**	**26**	**1,500**
	CTMW-02D-20170601	06/01/17	PME3	**1,300**	**19**	**19**	**0.11**	**0.090**	**3,300**	<10	**1,500**	**25**	**1,600**
	CTMW-02D-20170601-FD	06/01/17	PME3	**1,200**	**18**	**18**	**0.051 J**	**0.10**	**3,400**	<10	**1,500**	**25**	**1,500**
	CTMW-02D-20170619	06/19/17	PME4	**1,100**	**16**	**19**	<0.25	**0.13**	**2,000**	<10	**1,500**	**22**	**1,600**
	CTMW-02D-20170619-FD	06/19/17	PME4	**1,200**	**18**	**20**	<0.25	**0.13**	**1,900**	<10	**1,600**	**22**	**1,600**
	CTMW-02D-20170719	07/19/17	PME5	**950**	**13**	**12**	<0.050	**0.26**	**4,400**	<10	**1,800**	**5.8**	**1,300**
	CTMW-02D-20170824	08/24/17	PME6	**1,200**	**14**	**16**	**0.17 J**	**0.40**	**3,500**	<10 R	**2,000**	**18**	**1,600**
	CTMW-02D-20170920	09/20/17	PME7	**2,500**	**13**	**13**	**6.1**	**0.49**	**3,700**	<10	**2,000**	**14**	**1,400**
	CTMW-02D-20171003	10/03/17	PME8	**1,200**	**15**	**14**	**0.27**	**0.28**	**3,600**	<10	**1,900**	**17**	**1,500**
	CTMW-02D-20180305	03/05/18	PME9	**1,100**	**14**	**14**	<0.25	**0.48**	**3,900**	<10	**1,800**	**18**	**1,600**
	CTMW-02D-20180621	06/21/18	PME10	**1,200**	**13**	**16**	**0.81 J**	**0.54 J+**	**3,800**	<10	**1,800**	**17**	**1,600**

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Perchlorate by USEPA Method 314.0 (mg/L)	Hexavalent Chromium by USEPA Method 7199 (mg/L)	Total Metals by USEPA Method 6010B (mg/L)			USEPA Method 300.1B (mg/L)		Anions by USEPA Method 300.0 (mg/L)		
						Total Chromium	Total Iron	Total Manganese	Chlorate	Chlorite	Chloride	Nitrate as N	Sulfate
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	470	13	14	--	<0.050	2,900	<10	940	55	1,500
	CTMW-03S-20170505	05/05/17	PME1	460	13	15	--	0.060	3,200	<10	1,000	27	1,600
	CTMW-03S-20170517	05/17/17	PME2	490	14	15	--	0.058	3,200	<10	960	31	1,500
	CTMW-03S-20170601	06/01/17	PME3	610	14	13	<0.050	0.060	4,000	<10	1,000	38	1,500
	CTMW-03S-20170620	06/20/17	PME4	670	4.4	5.7	0.23	0.33	1,600	<1	1,700	34	1,600
	CTMW-03S-20170718	07/18/17	PME5	540	14	14	0.055 J	0.33	3,100	<10	1,100	30	1,600
	CTMW-03S-20170823	08/23/17	PME6	600	4.8	5.7	0.15	0.60	1,600	<10	1,800	17	1,400
	CTMW-03S-20170921	09/21/17	PME7	540	14	16	<0.050	0.38	3,400	<10	1,100	26	1,500
	CTMW-03S-20171003	10/03/17	PME8	560	16	16	<0.050	0.36	3,400	<10	1,100	26	1,500
CTMW-03D	CTMW-03D-20170406	04/06/17	Baseline	530	17	16	--	0.031	3,700	<10	1,100	47	1,600
	CTMW-03D-20170505	05/05/17	PME1	490	16	16	--	0.027	3,500	<10	1,100	48	1,600
	CTMW-03D-20170517	05/17/17	PME2	520	16	15	--	<0.020	3,400	<10 R	960	41	1,500
	CTMW-03D-20170601	06/01/17	PME3	570	15	15	<0.050	0.019 J	3,500	<10 R	1,000	34	1,500
	CTMW-03D-20170620	06/20/17	PME4	520	15	18	<0.25	<0.075	3,400	<1	1,200	33	1,600
	CTMW-03D-20170719	07/19/17	PME5	580	14	14	<0.050	0.018 J	3,400	<10	1,100	27	1,500
	CTMW-03D-20170823	08/23/17	PME6	610	14	15	<0.050	0.022	3,200	<10	1,100	23	1,500
	CTMW-03D-20170921	09/21/17	PME7	540	14	16	0.24	0.051	3,400	<10	1,100	23	1,500
	CTMW-03D-20171003	10/03/17	PME8	540	15	16	0.095 J	0.030	3,500	<10	1,100	24	1,500
CTMW-04S	CTMW-04S-20170405	04/05/17	Baseline	420	9.9	10	--	0.033	2,500	<10	780	150	1,500
	CTMW-04S-20170504	05/04/17	PME1	420	5.4	19	--	0.11	1,800	<10	1,100	120	1,500
	CTMW-04S-20170517	05/17/17	PME2	570	0.15	0.82	--	0.30	910	<10	1,500	93	1,400
	CTMW-04S-20170602	06/02/17	PME3	650	0.47	1.1	0.19	0.33	1,100	<10	1,500	51	1,400
	CTMW-04S-20170620	06/20/17	PME4	560	<0.00025	0.78	2.9	0.41	290	<1	1,800	18	1,500
	CTMW-04S-20170718	07/18/17	PME5	180	0.00034 J	0.51	2.6	1.1	20	<5	1,900	<1.1	1,100
	CTMW-04S-20170823	08/23/17	PME6	140	<0.00025	0.23	8.7	2.1	16	<10	2,000	<1.1	190
	CTMW-04S-20170921	09/21/17	PME7	510	<0.00025	0.12	14	2.6	5.1	<10	2,200	<1.1	390 J+
	CTMW-04S-20171003	10/03/17	PME8	120	<0.00025	0.083	15	2.0	320	<10	2,300	5.3 J	920
	CTMW-04S-20180307	03/07/18	PME9	840	2.5 J	2.2	1.0	1.1	2,600	<10	1,400	130	1,500
	CTMW-04S-20180621	06/21/18	PME10	870	5.9	6.1	0.087 J	1.5	3,500	<1	1,300	90	1,400
CTMW-04D	CTMW-04D-20170405	04/05/17	Baseline	980	19	20	--	0.013 J	4,300	<10	1,600	26	1,700
	CTMW-04D-20170504	05/04/17	PME1	950	16	6.2	--	0.16	4,200	<10	1,400	33	1,700
	CTMW-04D-20170517	05/17/17	PME2	870	19	22	--	<0.020	4,000	<10	1,200	32	1,500
	CTMW-04D-20170517-FD	05/17/17	PME2	890	20	21	--	<0.020	4,000	<10	1,200	33	1,500
	CTMW-04D-20170602	06/02/17	PME3	860	19	19	0.084 J	<0.010	4,700	<10	1,500	31	1,600
	CTMW-04D-20170621	06/21/17	PME4	990	19	21	<0.050	<0.015	3,700	<10	1,400	33	1,700
	CTMW-04D-20170718	07/18/17	PME5	950	19	19	0.37	0.13	4,600	<10	1,900	34	2,200
	CTMW-04D-20170823	08/23/17	PME6	780	18	19	0.82	0.035	4,100	<10	1,400	36	1,600
	CTMW-04D-20170823-FD	08/23/17	PME6	810	18	18	1.1	0.038	4,100	<10	1,400	36	1,600
	CTMW-04D-20170920	09/20/17	PME7	820	17	19	0.34	<0.015	3,500	<10	1,300	36	1,600
	CTMW-04D-20171003	10/03/17	PME8	740	18	18	0.13	<0.015	3,900	<10	1,200	38	1,500
	CTMW-04D-20180307	03/07/18	PME9	660	15	17	<0.25	<0.075	3,700	<10	1,200	27	1,400
	CTMW-04D-20180621	06/21/18	PME10	740	14	17	0.59 J-	0.12	3,900	<1	1,200	27	1,400

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Perchlorate by USEPA Method 314.0 (mg/L)	Hexavalent Chromium by USEPA Method 7199 (mg/L)	Total Metals by USEPA Method 6010B (mg/L)			USEPA Method 300.1B (mg/L)		Anions by USEPA Method 300.0 (mg/L)		
						Total Chromium	Total Iron	Total Manganese	Chlorate	Chlorite	Chloride	Nitrate as N	Sulfate
CTMW-05S	CTMW-05S-20170621	06/21/17	PME4	**560**	**4.9**	**5.5**	**0.088 J**	**0.21**	**2,100**	<10	**1,300**	**60**	**1,400**
	CTMW-05S-20170717	07/17/17	PME5	**570**	**2.5**	**2.8**	<0.050	**0.24**	**1,700**	<10	**1,600**	**24**	**1,400**
	CTMW-05S-20170822	08/22/17	PME6	**610**	**3.4**	**3.7**	**5.6**	**0.40**	**2,000**	<10	**1,600**	**32**	**1,400**
	CTMW-05S-20170919	09/19/17	PME7	**570**	**2.3**	**2.2**	<0.050	**0.21**	**1,900**	<10	**1,700**	**14**	**1,300**
	CTMW-05S-20171004	10/04/17	PME8	**570**	**5.9**	**5.7**	<0.050	**0.21**	**2,700**	<10	**1,400**	**28**	**1,400**
CTMW-05D	CTMW-05D-20170621	06/21/17	PME4	**660**	**16**	**16**	<0.050	<0.015	**3,400**	<10	**1,000**	**73**	**1,400**
	CTMW-05D-20170621-FD	06/21/17	PME4	**590**	**16**	**18**	<0.050	**0.015 J**	**3,500**	<10	**1,100**	**73**	**1,500**
	CTMW-05D-20170718	07/18/17	PME5	**510**	**15 J-**	**15**	<0.050	**0.10**	**3,400**	<10 R	**1,100**	**64 J+**	**1,500**
	CTMW-05D-20170822	08/22/17	PME6	**550**	**15**	**16**	**0.055 J**	<0.015	**3,500**	<10	**1,100**	**52**	**1,500**
	CTMW-05D-20170919	09/19/17	PME7	**550**	**15**	**14**	**0.25**	**0.016 J**	**3,300**	<10	**1,100**	**52**	**1,500**
	CTMW-05D-20171004	10/04/17	PME8	**650**	**14**	**16**	**0.78 J+**	**0.028**	**3,400**	<10 R	**1,100**	**48**	**1,500**
CTMW-06S	CTMW-06S-20170621	06/21/17	PME4	**460**	<0.00025	**0.31**	**2.5**	**2.0**	**20**	<10	**1,700**	<1.1	**950**
	CTMW-06S-20170717	07/17/17	PME5	**18 J-**	<0.00025	**0.29**	**5.2**	**4.3**	**19**	<10	**1,600**	**1.2 J**	**230**
	CTMW-06S-20170822	08/22/17	PME6	**13**	<0.00025	**0.13**	**42**	**5.7**	**0.29**	<10	**1,700**	<1.1	**14**
	CTMW-06S-20170919	09/19/17	PME7	<0.01	<0.00025	**0.061**	**68**	**5.7**	<0.5	<10	**1,700**	<1.1	<5.0
	CTMW-06S-20171004	10/04/17	PME8	<0.025	<0.00025	**0.062**	**49**	**7.1**	<1	<10	**1,600**	<2.8	<13
	CTMW-06S-20180306	03/06/18	PME9	**0.13**	<0.00025	**0.028**	**7.9**	**1.4**	**0.1**	<0.05	**1,200**	<1.1	**6.4 J**
	CTMW-06S-20180622	06/22/18	PME10	**0.066**	<0.00025	**0.042 J+**	**3.8**	**0.63**	**0.16**	<1	**1,400**	<0.55	**24**
CTMW-06D	CTMW-06D-20170622	06/22/17	PME4	**1,000**	**15**	**17**	<0.050	**0.042**	**4,000**	<10	**1,300**	**97**	**1,500**
	CTMW-06D-20170717	07/17/17	PME5	**920**	**17**	**18**	<0.050	**0.035**	**3,900**	<10	**1,400**	**84**	**1,500**
	CTMW-06D-20170717-FD	07/17/17	PME5	**830**	**17**	**17**	**0.067 J**	**0.034**	**4,200**	<10	**1,500**	**84**	**1,500**
	CTMW-06D-20170822	08/22/17	PME6	**950**	**15**	**15**	**0.63**	**0.10**	**3,700**	<10	**1,400**	**52**	**1,400**
	CTMW-06D-20170919	09/19/17	PME7	**800**	**14**	**13**	**0.85**	**0.15**	**2,700**	<10	**1,700**	**48**	**1,500**
	CTMW-06D-20170919-FD	09/19/17	PME7	**810**	**13**	**13**	**0.79**	**0.15**	**2,600**	<10	**1,600**	**48**	**1,500**
	CTMW-06D-20171004	10/04/17	PME8	**970**	**12**	**13**	**0.83**	**0.19**	**3,100**	<10	**1,700**	**41**	**1,400**
	CTMW-06D-20171004-FD	10/04/17	PME8	**990**	**13**	**13**	**0.71**	**0.18**	**3,100**	<10	**1,700**	**39**	**1,400**
	CTMW-06D-20180307	03/07/18	PME9	**610**	**5.6**	**6.4**	**2.0**	**0.35**	**2,000**	<10	**1,800**	**18**	**1,100**
	CTMW-06D-20180622	06/22/18	PME10	**240**	**2.3**	**3.3 J+**	**2.1**	**0.35**	**800**	<1	**2,000**	**19**	**860**
CTMW-07S	Not Analyzed	10/09/17	PME8	**Well Dry; Unable to sample**									
	CMTW-07S-20180306	03/06/18	PME9	**510 J-**	**13**	**14**	**0.41 J**	**0.092 J**	**3,200**	<10	**990**	**66**	**1,400**
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**									
CTMW-07D	CTMW-07D-20171009	10/09/17	PME8	**14**	**0.025**	**0.097**	**14**	**0.27**	**48**	<0.1	**140**	**2.0**	**230**
	CTMW-07D-20180306	03/06/18	PME9	**6.1**	**0.024**	**0.026**	**0.35 J+**	**0.11**	**16**	<0.1	**85**	**0.099 J**	**140**
	CTMW-07D-20180622	06/22/18	PME10	**1.9**	**0.012**	**0.018 J+**	**0.075 J**	**0.015 J**	**6.2**	<1	**91**	**1.3**	**180**

Notes:

USEPA	United States Environmental Protection Agency
mg/L	Milligram per liter
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
–	Not Analyzed

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	General Water Quality Parameters							
				pH	Temp (°C)	Specific Conductivity (mS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Sulfide (mg/L)	Ferrous Iron (mg/L)
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	**7.30**	**25**	**9.5**	**170**	**1.2**	**0.0**	**0.00**	**0.02**
CTIW-01D	CTIW-01D-20170406	04/06/17	Baseline	**7.50**	**26**	**12**	**1120**	**1.3**	**1.2**	**0.01**	**0.00**
CTIW-02S	CTIW-02S-20170403	04/03/17	Baseline	**6.70**	**24.00**	**9.10**	**150**	**0.34**	**0.2**	**0.00**	**0.07**
CTIW-02D	CTIW-02D-20170404	04/04/17	Baseline	**7.20**	**23**	**12**	**210**	**1.9**	**38**	**0.00**	**0.03**
CTIW-03S	CTIW-03S-20170404	04/04/17	Baseline	**7.10**	**24.00**	**11**	**200**	**2.2**	**2.7**	**0.01**	**0.02**
CTIW-03D	CTIW-03D-20170404	04/04/17	Baseline	**7.70**	**25.00**	**13**	**160**	**2.4**	**33**	**0.02**	**0.07**
CTMW-01S	CTMW-01S-20170404	04/04/17	Baseline	**7.40**	**26**	**9.1**	**170**	**1.7**	**0.0**	**0.00**	**0.02**
	CTMW-01S-20170503	05/03/17	PME1	**6.00**	**29**	**14**	**-170**	**1.9**	**16**	**0.00**	**0.00**
	CTMW-01S-20170516	05/16/17	PME2	**6.70**	**24**	**11**	**-300**	**1.2**	**59**	**0.11**	**0.22**
	CTMW-01S-20170531	05/31/17	PME3	**6.10**	**29**	**11**	**-160**	**1.1**	**9.2**	**0.05**	**0.04**
	CTMW-01S-20170619	06/19/17	PME4	**6.20**	**31**	**14**	**-130**	**0.56**	**460**	**0.08**	**0.30**
	CTMW-01S-20170720	07/20/17	PME5	**5.90**	**29**	**14**	**-40**	**0.77**	**75**	**0.25**	**0.19**
	CTMW-01S-20170824	08/24/17	PME6	**6.50**	**30**	**14**	**-71**	**2.1**	**300**	**0.62**	**3.3**
	CTMW-01S-20170920	09/20/17	PME7	**6.40**	**31**	**12**	**-72**	**0.15**	**35**	**0.49**	--
	CTMW-01S-20171003	10/03/17	PME8	**7.80**	**26**	**12**	**-82**	**1.1**	**30**	**0.08**	**10**
	CTMW-01S-20180305	03/05/18	PME9	**7.38**	**26.20**	**8.75**	**-135**	**1.04**	**352**	**0.20**	**2.3**
	CTMW-01S-20180621	06/21/18	PME10	**7.94**	**31.85**	**8.03**	**39**	**6.82**	**534**	**0.52**	**1.19**
CTMW-01D	CTMW-01D-20170403	04/03/17	Baseline	**7.00**	**26**	**15**	**100**	**1.6**	**85**	**0.03**	**0.07**
	CTMW-01D-20170503	05/03/17	PME1	**6.50**	**27**	**17**	**79**	**1.4**	**81**	**0.01**	**0.05**
	CTMW-01D-20170516	05/16/17	PME2	**7.50**	**27**	**14**	**-23**	**1.1**	**4.8**	**0.00**	**0.15**
	CTMW-01D-20170531	05/31/17	PME3	**7.00**	**27**	**15**	**-14**	**0.83**	**0.6**	**0.00**	**0.05**
	CTMW-01D-20170619	06/19/17	PME4	**7.00**	**29**	**14**	**-130**	**0.49**	**4.2**	**0.00**	**0.00**
	CTMW-01D-20170720	07/20/17	PME5	**6.50**	**27**	**15**	**-120**	**0.36**	**7.9**	**0.03**	**0.03**
	CTMW-01D-20170720-FD	07/20/17	PME5	--	--	--	--	--	--	--	--
	CTMW-01D-20170824	08/24/17	PME6	**6.40**	**27**	**16**	**-160**	**0.73**	**27**	**0.06**	**0.07**
	CTMW-01D-20170920	09/20/17	PME7	**6.50**	**26**	**15**	**-100**	**0.21**	**12**	**0.06**	--
	CTMW-01D-20171003	10/03/17	PME8	**7.30**	**27**	**14**	**-19**	**0.28**	**0.00**	**0.09**	**0.06**
	CTMW-01D-20180305	03/05/18	PME9	**7.10**	**26.92**	**9.31**	**137**	**1.39**	**7.0**	**0.00**	**0.00**
	CTMW-01D-20180305-FD	03/05/18	PME9	--	--	--	--	--	--	--	--
	CTMW-01D-20180621	06/21/18	PME10	**6.52**	**27.44**	**14.2**	**109**	**0.38**	**3.6**	**0.00**	**0.00**
	CTMW-01D-20180621-FD	06/21/18	PME10	--	--	--	--	--	--	--	--
CTMW-02S	CTMW-02S-20170405	04/05/17	Baseline	**7.45**	**27.19**	**9.23**	**161**	**1.56**	**0.0**	**0.00**	**0.09**
	CTMW-02S-20170504	05/04/17	PME1	**5.05**	**33.65**	**13.3**	**190**	**7.53**	**62.9**	**0.00**	**0.01**
	CTMW-02S-20170516	05/16/17	PME2	**6.75**	**31.31**	**11.1**	**-43**	**1.68**	**0.00**	**0.11**	**0.16**
	CTMW-02S-20170601	06/01/17	PME3	**6.70**	**29.55**	**11.2**	**150**	**1.82**	**6.6**	**0.06**	**0.10**
	CTMW-02S-20170620	06/20/17	PME4	**6.76**	**27.70**	**10.5**	**-145**	**0.56**	**239**	**0.10**	**0.30**
	CTMW-02S-20170719	07/19/17	PME5	**6.6**	**30.00**	**11.5**	**-31**	**0.77**	**98.1**	**0.13**	**0.17**
	Not Analyzed	08/24/17	PME6	**Well Dry; Unable to sample**							
	CTMW-02S-20170920	09/20/17	PME7	**Hand bailed due to insufficient water column/slow recharge**							
	CTMW-02S-20171003	10/03/17	PME8	**7.30**	**26.14**	**9.15**	**-107**	**0.26**	**45.4**	**0.07**	**3.23**
	CTMW-02S-20180306	03/06/18	PME9	**7.33**	**20.71**	**8.39**	**-61**	**1.17**	**83.2**	**0.10**	**4.0**
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**							
CTMW-02D	CTMW-02D-20170404	04/04/17	Baseline	**7.60**	**28**	**13**	**120**	**1.2**	**29**	**0.06**	**0.11**
	CTMW-02D-20170404-FD	04/04/17	Baseline	--	--	--	--	--	--	--	--
	CTMW-02D-20170503	05/03/17	PME1	**6.00**	**29**	**15**	**130**	**1.2**	**5.2**	**0.03**	**0.14**
	CTMW-02D-20170503-FD	05/03/17	PME1	--	--	--	--	--	--	--	--
	CTMW-02D-20170517	05/17/17	PME2	**7.10**	**23**	**13**	**33**	**3.4**	**130**	**0.03**	**0.00**
	CTMW-02D-20170601	06/01/17	PME3	**6.70**	**27**	**13**	**160**	**0.52**	**6.6**	**0.04**	**0.05**
	CTMW-02D-20170601-FD	06/01/17	PME3	--	--	--	--	--	--	--	--
	CTMW-02D-20170619	06/19/17	PME4	**7.00**	**27**	**13**	**-160**	**0.41**	**7.2**	**0.00**	**0.00**
	CTMW-02D-20170619-FD	06/19/17	PME4	--	--	--	--	--	--	--	--
	CTMW-02D-20170719	07/19/17	PME5	**6.70**	**26**	**13**	**39**	**0.68**	**27**	**0.03**	**0.02**
	CTMW-02D-20170824	08/24/17	PME6	**6.60**	**26**	**15**	**-160**	**0.75**	**31**	**0.04**	**0.09**
	CTMW-02D-20170920	09/20/17	PME7	**6.80**	**25**	**13**	**53**	**0.12**	**39**	**0.02**	--
	CTMW-02D-20171003	10/03/17	PME8	**6.70**	**28**	**14**	**-14**	**0.13**	**20**	**0.00**	**0.00**
	CTMW-02D-20180305	03/05/18	PME9	**6.99**	**27.32**	**12.6**	**152**	**0.69**	**1.3**	**0.00**	**0.00**
	CTMW-02D-20180621	06/21/18	PME10	**6.91**	**27.57**	**12.9**	**145**	**0.86**	**4.3**	**0.00**	**0.00**

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	General Water Quality Parameters							
				pH	Temp (°C)	Specific Conductivity (mS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Sulfide (mg/L)	Ferrous Iron (mg/L)
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	7.30	28	9.4	160	1.9	0.0	0.00	0.00
	CTMW-03S-20170505	05/05/17	PME1	6.30	25	9.4	-3.0	1.4	0.50	0.00	0.00
	CTMW-03S-20170517	05/17/17	PME2	7.40	21	10	150	4.8	1.00	0.08	0.00
	CTMW-03S-20170601	06/01/17	PME3	6.90	28	11	170	1.1	0.0	0.00	0.00
	CTMW-03S-20170620	06/20/17	PME4	6.50	26	11	33	0.26	84	0.00	0.00
	CTMW-03S-20170718	07/18/17	PME5	6.70	28	11	120	0.87	16	0.00	0.00
	CTMW-03S-20170823	08/23/17	PME6	6.40	28	12	14	1.50	100	0.16	0.16
	CTMW-03S-20170921	09/21/17	PME7	6.90	25	11	67	0.16	2.10	0.12	--
	CTMW-03S-20171003	10/03/17	PME8	7.30	29	8.8	120	0.84	0.0	0.00	0.05
CTMW-03D	CTMW-03D-20170406	04/06/17	Baseline	7.40	23	11	210	3.4	2.1	0.00	0.00
	CTMW-03D-20170505	05/05/17	PME1	6.50	26	12	180	2.1	0.5	0.00	0.00
	CTMW-03D-20170517	05/17/17	PME2	8.70	23	11	170	4.3	0.8	0.01	0.00
	CTMW-03D-20170601	06/01/17	PME3	7.20	28	11	210	0.58	0.0	0.00	0.00
	CTMW-03D-20170620	06/20/17	PME4	7.70	27	10	-190	1.2	4.6	0.00	0.00
	CTMW-03D-20170719	07/19/17	PME5	7.20	26	11	110	0.78	3.0	0.00	0.00
	CTMW-03D-20170823	08/23/17	PME6	7.30	27	11	-28	0.74	55	0.09	0.13
	CTMW-03D-20170921	09/21/17	PME7	7.60	24	9.9	71	0.12	1.0	0.03	--
	CTMW-03D-20171003	10/03/17	PME8	7.98	26.17	9.26	77	1.57	0.0	0.00	0.15
CTMW-04S	CTMW-04S-20170405	04/05/17	Baseline	7.30	23	9.2	140	1.4	0.00	0.00	0.02
	CTMW-04S-20170504	05/04/17	PME1	5.80	27	12	120	1.4	6.0	0.00	0.02
	CTMW-04S-20170517	05/17/17	PME2	6.70	26	11	-12	1.2	47	0.17	0.17
	CTMW-04S-20170602	06/02/17	PME3	6.50	27	11	190	1.5	39	0.02	0.03
	CTMW-04S-20170620	06/20/17	PME4	6.90	31	10	-70	0.36	79	0.09	0.25
	CTMW-04S-20170718	07/18/17	PME5	6.70	30	11	-1	1.4	60	0.07	0.1
	CTMW-04S-20170823	08/23/17	PME6	6.60	31	12	-240	1.5	70	0.17	2.1
	CTMW-04S-20170921	09/21/17	PME7	6.70	26	11	-120	0.16	19	0.11	--
	CTMW-04S-20171003	10/03/17	PME8	6.60	30	11	-240	0.18	32	0.00	2.0
	CTMW-04S-20180307	03/07/18	PME9	6.75	26.40	12.5	157	0.56	3.2	0.00	0.00
	CTMW-04S-20180621	06/21/18	PME10	6.70	34.29	10.4	174	0.92	0.0	0.00	0.00
CTMW-04D	CTMW-04D-20170405	04/05/17	Baseline	7.20	25	13	140	1.1	4.7	0.01	0.00
	CTMW-04D-20170504	05/04/17	PME1	6.20	28	15	200	3.7	12	0.00	0.00
	CTMW-04D-20170517	05/17/17	PME2	8.70	23	12	190	0.89	14	0.01	0.07
	CTMW-04D-20170517-FD	05/17/17	PME2	--	--	--	--	--	--	--	--
	CTMW-04D-20170602	06/02/17	PME3	7.10	27	12	180	0.34	6.4	0.00	0.00
	CTMW-04D-20170621	06/21/17	PME4	7.50	25	12	-66	0.5	6.1	0.00	0.00
	CTMW-04D-20170718	07/18/17	PME5	7.30	26	13	-36	0.71	19	0.01	0.02
	CTMW-04D-20170823	08/23/17	PME6	7.20	25	13	-69	0.78	120	0.21	0.26
	CTMW-04D-20170823-FD	08/23/17	PME6	--	--	--	--	--	--	--	--
	CTMW-04D-20170920	09/20/17	PME7	7.40	26	12	-96	0.16	4.7	0.18	--
	CTMW-04D-20171003	10/03/17	PME8	7.90	26	10	-130	0.16	0.0	0.00	0.00
	CTMW-04D-20180307	03/07/18	PME9	7.46	25.32	11.6	157	0.52	8.3	0.00	0.00
	CTMW-04D-20180621	06/21/18	PME10	7.30	29.10	10.6	120	0.66	3.2	0.00	0.00

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	General Water Quality Parameters							
				pH	Temp (°C)	Specific Conductivity (mS/cm)	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Sulfide (mg/L)	Ferrous Iron (mg/L)
CTMW-05S	CTMW-05S-20170621	06/21/17	PME4	7.00	27	11	110	1.1	19	0.02	0.00
	CTMW-05S-20170717	07/17/17	PME5	6.60	32	12	120	0.82	11	0.03	0.04
	CTMW-05S-20170822	08/22/17	PME6	6.80	28	12	150	0.87	7.6	0.00	0.02
	CTMW-05S-20170919	09/19/17	PME7	6.60	29	11	160	0.17	4.9	0.01	--
	CTMW-05S-20171004	10/04/17	PME8	6.40	25	10	150	0.66	0.0	0.01	0.08
CTMW-05D	CTMW-05D-20170621	06/21/17	PME4	7.60	27	10	140	1.6	8.8	0.00	0.00
	CTMW-05D-20170621-FD	06/21/17	PME4	--	--	--	--	--	--	--	--
	CTMW-05D-20170718	07/18/17	PME5	7.20	26	11	140	0.8	3.4	0.00	0.00
	CTMW-05D-20170822	08/22/17	PME6	7.50	26	12	88	0.72	9.6	0.03	0.00
	CTMW-05D-20170919	09/19/17	PME7	7.30	28	11	110	0.22	8.2	0.02	--
	CTMW-05D-20171004	10/04/17	PME8	6.90	25	9.9	140	2.5	15	0.01	0.19
CTMW-06S	CTMW-06S-20170621	06/21/17	PME4	6.70	35	10	-130	0.66	250	0.02	0.40
	CTMW-06S-20170717	07/17/17	PME5	6.60	34	12	-120	0.61	160	0.09	0.05
	CTMW-06S-20170822	08/22/17	PME6	6.80	33	13	-92	6.5	120	0.33	2.20
	CTMW-06S-20170919	09/19/17	PME7	6.60	30	12	-110	0.18	120	0.08	--
	CTMW-06S-20171004	10/04/17	PME8	6.50	28	12	-100	0.17	16	0.01	2.70
	CTMW-06S-20180306	03/06/18	PME9	7.17	25.89	5.6	-130	0.83	13.2	0.07	2.80
	CTMW-06S-20180622	06/22/18	PME10	7.09	28.35	6.68	-127	2.22	57.8	0.41	0.60
CTMW-06D	CTMW-06D-20170622	06/22/17	PME4	7.20	25	11	85	0.15	9.7	0.00	0.00
	CTMW-06D-20170717	07/17/17	PME5	7.00	31	13	87	0.63	7.1	0.00	0.00
	CTMW-06D-20170717-FD	07/17/17	PME5	--	--	--	--	--	--	--	--
	CTMW-06D-20170822	08/22/17	PME6	6.90	26	13	11	0.9	47	0.10	0.00
	CTMW-06D-20170919	09/19/17	PME7	6.80	25	13	170	0.49	28	0.10	--
	CTMW-06D-20170919-FD	09/19/17	PME7	--	--	--	--	--	--	--	--
	CTMW-06D-20171004	10/04/17	PME8	6.60	27	12	180	0.55	91	0.24	0.27
	CTMW-06D-20171004-FD	10/04/17	PME8	--	--	--	--	--	--	--	--
	CTMW-06D-20180307	03/07/18	PME9	7.02	24.30	12.20	115	0.61	28.30	0.00	0.00
	CTMW-06D-20180622	06/22/18	PME10	6.93	28.17	10.30	92	0.35	8.00	0.00	0.00
CTMW-07S	Not Analyzed	10/09/17	PME8	Well Dry; Unable to sample							
	CMTW-07S-20180306	03/06/18	PME9	7.38	24.97	9.60	163	2.96	8.9	0.00	0.00
	Not Analyzed	06/22/18	PME10	Well Dry; Unable to sample							
CTMW-07D	CTMW-07D-20171009	10/09/17	PME8	5.81	23.59	1.26	231	5.10	78.80	0.00	0.00
	CTMW-07D-20180306	03/06/18	PME9	9.68	23.99	1.44	-56	0.73	8.50	0.00	0.00
	CTMW-07D-20180622	06/22/18	PME10	7.78	27.30	0.90	103	0.60	8.90	0.00	0.00

Notes:

USEPA	United States Environmental Protection Agency
°C	Celcius
mg/L	Milligram per liter
mV	Millivolt
mS/cm	Millisiesmens per centimeter
NTU	Nephelometric Units
>3.00	Denotes concentration was greater than the test method upper limit indicated.
–	Not Analyzed

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	General Chemistry (mg/L)										
				Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Chemical Oxygen Demand	Total Organic Carbon	Total Sulfide	Total Kjeldahl Nitrogen (TKN)	Total Phosphorus	Total Dissolved Solids	Hardness as CaCO3	Orthophosphate as P	Orthophosphorus as PO4
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	**150**	**150**	--	**1.7**	<0.020	**0.12 J**	<0.025	**8,900**	**1,700**	**0.075**	**0.23**
CTIW-01D	CTIW-01D-20170406	04/06/17	Baseline	**120**	**120**	--	**4.1**	<0.020	<0.10	<0.025	**11,000**	**2,000**	**0.050 J-**	**0.15 J-**
CTIW-02S	CTIW-02S-20170403	04/03/17	Baseline	**170**	**170**	--	**1.8**	<0.020	<0.10	<0.025	**8,200**	**1,700**	**0.049 J**	**0.15 J-**
CTIW-02D	CTIW-02D-20170404	04/04/17	Baseline	**130**	**130**	--	**3.7**	**0.028 J**	<0.10	**0.041 J**	**11,000**	**2,600**	**0.073 J-**	**0.22 J-**
CTIW-03S	CTIW-03S-20170404	04/04/17	Baseline	**170**	**170**	--	**2.2**	<0.020	<0.10	<0.025	**9,800**	**2,300**	**0.041 J**	**0.13 J**
CTIW-03D	CTIW-03D-20170404	04/04/17	Baseline	**88**	**88**	--	**2.5**	**0.028 J**	<0.10	**0.035 J**	**12,000**	**2,500**	**0.051 J-**	**0.16 J-**
CTMW-01S	CTMW-01S-20170404	04/04/17	Baseline	**200**	**200**	--	**2.4**	**0.024 J**	<0.10	**0.026 J**	**8,200**	**1,700**	**0.067 J-**	**0.21 J-**
	CTMW-01S-20170503	05/03/17	PME1	**2,000**	**2,000**	**7,100**	**2,300**	<0.020	<2.5	**0.52**	**12,000**	**3,700**	**0.34**	**1.0**
	CTMW-01S-20170516	05/16/17	PME2	**2,600**	**2,600**	**12,000**	**3,000**	<0.020	**0.76**	**0.37**	**11,000**	**3,300**	**0.72**	**2.2**
	CTMW-01S-20170531	05/31/17	PME3	**2,300**	**2,300**	**7,200**	**2,000**	**3.9**	**0.20**	**0.49 J-**	**10,000**	**3,100**	**1.2 J-**	**3.7 J-**
	CTMW-01S-20170619	06/19/17	PME4	**5,300**	**5,300**	**22,000**	**6,600**	**0.36 J-**	**190 J-**	**24 J-**	**18,000**	**5,700**	**18 J-**	**54 J-**
	CTMW-01S-20170720	07/20/17	PME5	**6,300**	**6,300**	**26,000**	**9,000**	**1.2**	**47**	**3.4**	**20,000**	**11,000**	**0.65**	**2.0**
	CTMW-01S-20170824	08/24/17	PME6	**3,700**	**3,700**	**17,000 J-**	**6,700**	<0.027	**9,500 J-**	**5.5**	**17,000**	**3,900**	**5.6 J-**	**17 J-**
	CTMW-01S-20170920	09/20/17	PME7	**5,200**	**5,200**	**19,000**	**6,200**	**0.035 J**	**240**	**0.79 J**	**17,000**	**4,800**	**0.76**	**2.3**
	CTMW-01S-20171003	10/03/17	PME8	**2,700**	**2,700**	**17,000**	**6,300 J-**	**0.47**	**210**	**5.2**	**16,000**	**4,300**	**0.47**	**1.4**
	CTMW-01S-20180305	03/05/18	PME9	**3,700**	**3,700**	--	**1,200 J**	**0.031 J**	**140**	**1.3**	**7,300**	**2,700**	**0.27**	**0.83**
	CTMW-01S-20180621	06/21/18	PME10	**3,000**	**3,000**	**490**	**91**	**0.041 J**	**180**	**5.0**	**4,800**	**1,300**	**2.0**	**6.2**
CTMW-01D	CTMW-01D-20170403	04/03/17	Baseline	**140**	**140**	--	**25**	**0.044 J**	<0.10	**0.054**	**14,000**	**3,400**	**0.17**	**0.52**
	CTMW-01D-20170503	05/03/17	PME1	**130**	**130**	<20	**8.0**	**0.030 J**	<0.10	**0.11**	**14,000**	**3,600**	**0.082**	**0.25**
	CTMW-01D-20170516	05/16/17	PME2	**140**	**140**	<20	**9.8**	<0.020	<0.10	<0.025	**15,000**	**3,500**	**0.082**	**0.25**
	CTMW-01D-20170531	05/31/17	PME3	**160**	**160**	<50	**16**	<0.30	<0.10	**0.035 J**	**15,000**	**3,600**	**0.051 J-**	**0.16 J-**
	CTMW-01D-20170619	06/19/17	PME4	**290**	**290**	<50 R	**11**	<0.27 R	<0.10 R	**0.028 J**	**14,000**	**3,400**	**0.085 J-**	**0.26 J-**
	CTMW-01D-20170720	07/20/17	PME5	**400**	**400**	<50	**66**	<0.14	<0.10	**0.029 J**	**12,000**	**3,700**	**0.080 J-**	**0.24 J-**
	CTMW-01D-20170720-FD	07/20/17	PME5	**380**	**380**	<50	**66**	<0.27	<0.10	**0.030 J**	**12,000**	**3,600**	**0.10 J-**	**0.31 J-**
	CTMW-01D-20170824	08/24/17	PME6	**740**	**740**	**480 J-**	**350**	<0.027	<0.10 R	**0.22**	**13,000**	**4,000**	**0.10 J-**	**0.31 J-**
	CTMW-01D-20170920	09/20/17	PME7	**640**	**640**	**410**	**430**	<0.027	<0.10	**0.16**	**14,000**	**4,000**	**0.20**	**0.61**
	CTMW-01D-20171003	10/03/17	PME8	**920**	**920**	**630**	**440 J-**	<0.027	<0.50	**0.099**	**13,000**	**4,000**	**0.20**	**0.62**
	CTMW-01D-20180305	03/05/18	PME9	**890**	**890**	--	**340**	<0.027	<0.10	**0.090**	**10,000**	**3,100**	**0.072 J**	**0.22 J**
	CTMW-01D-20180305-FD	03/05/18	PME9	**890**	**890**	--	**340**	<0.027	<0.10	**0.083**	**10,000**	**3,100**	**0.17 J**	**0.51 J**
	CTMW-01D-20180621	06/21/18	PME10	**1,400**	**1,400**	**870 J**	**330**	<0.027	<0.10	**0.17 J**	**11,000**	**4,100**	**0.21**	**0.65 J**
	CTMW-01D-20180621-FD	06/21/18	PME10	**1,400**	**1,400**	**650 J**	**320**	<0.027	<0.10	**0.062**	**11,000**	**4,100**	**0.16**	**0.48 J**
CTMW-02S	CTMW-02S-20170405	04/05/17	Baseline	**160**	**160**	--	**2.0**	<0.020	<0.10	<0.025	**8,400**	**1,500**	**0.057**	**0.18**
	CTMW-02S-20170504	05/04/17	PME1	**940**	**940**	**58**	**53**	<0.080	<0.10	**0.26**	**10,000**	**2,500**	**0.15 J-**	**0.46 J-**
	CTMW-02S-20170516	05/16/17	PME2	**1,200**	**1,200**	**37 J**	**14**	<0.020	<0.10	**0.39**	**10,000**	**2,400**	**0.19**	**0.59**
	CTMW-02S-20170601	06/01/17	PME3	**1,200**	**1,200**	**140**	**15**	<0.14	<0.10 R	**0.26 J-**	**8,700**	**1,900**	**0.27 J-**	**0.81 J-**
	CTMW-02S-20170620	06/20/17	PME4	**3,300**	**3,300**	**5,200**	**1,500**	**0.090**	**16**	**2.1**	**9,900**	**2,400**	**1.2**	**3.7**
	CTMW-02S-20170719	07/19/17	PME5	**3,800**	**3,800**	**5,400**	**2,300**	**0.16**	**23**	**2.6**	**11,000**	**2,700**	**0.56 J-**	**1.7 J-**
	Not Analyzed	08/24/17	PME6	**Well Dry; Unable to sample**										
	CTMW-02S-20170920	09/20/17	PME7	**5,900**	**5,900**	**5,400**	**2,000**	<0.027	**65**	**1.8**	**11,000**	**2,500**	**0.39**	**1.2**
	CTMW-02S-20171003	10/03/17	PME8	**2,400**	**2,400**	**5,700**	**1,900 J-**	**0.29**	**68**	**1.1**	**10,000**	**2,400**	**0.54**	**1.7**
	CTMW-02S-20180306	03/06/18	PME9	**2,000**	**2,000**	--	**35 J**	**0.078**	**53**	**1.9**	**4,600**	**850**	**0.53**	**1.6**
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**										
CTMW-02D	CTMW-02D-20170404	04/04/17	Baseline	**190**	**190**	--	**18**	**0.052**	<0.10	**0.045 J**	**11,000**	**2,500**	**0.074 J-**	**0.23 J-**
	CTMW-02D-20170404-FD	04/04/17	Baseline	**190**	**190**	--	**18**	**0.025 J**	<0.10	**0.051**	**12,000**	**2,400**	**0.081 J-**	**0.25 J-**
	CTMW-02D-20170503	05/03/17	PME1	**270**	**270**	<20	**12**	<0.20	<0.10	<0.025	**13,000**	**2,900**	**0.052**	**0.16**
	CTMW-02D-20170503-FD	05/03/17	PME1	**270**	**270**	<20	**12**	<0.020	<0.10	**0.025 J**	**12,000**	**2,900**	**0.052**	**0.16**
	CTMW-02D-20170517	05/17/17	PME2	**340**	**340**	<20	**11**	<0.50	<0.10 R	**0.030 J**	**13,000**	**3,200**	**0.064 J-**	**0.19 J-**
	CTMW-02D-20170601	06/01/17	PME3	**290**	**290**	<50	**6.2**	<0.27	<0.10 R	**0.029 J**	**13,000**	**3,200**	**0.065 J-**	**0.20 J-**
	CTMW-02D-20170601-FD	06/01/17	PME3	**320**	**320**	<50	**7.5**	<0.38	<0.10 R	**0.029 J**	**13,000**	**3,100**	**0.065 J-**	**0.20 J-**
	CTMW-02D-20170619	06/19/17	PME4	**450**	**450**	<50 R	**90**	<0.27 R	<0.10 R	<0.025 R	**12,000**	**3,100**	**0.033 J**	**0.10 J**
	CTMW-02D-20170619-FD	06/19/17	PME4	**420**	**420**	<50 R	**88**	<0.27 R	<0.10 R	<0.025 R	**12,000**	**3,100**	**0.035 J**	**0.11 J**
	CTMW-02D-20170719	07/19/17	PME5	**890**	**890**	<50	**150**	<0.054	<0.10	**0.027 J**	**12,000**	**3,100**	**0.12 J-**	**0.35 J-**
	CTMW-02D-20170824	08/24/17	PME6	**540**	**540**	<50 R	**17**	<0.027	<0.10 R	**0.11**	**13,000**	**3,300**	**0.10 J-**	**0.32 J-**
	CTMW-02D-20170920	09/20/17	PME7	**510**	**510**	<50	**8.6**	<0.027	<0.10	**0.095**	**12,000**	**3,300**	**0.21 J**	**0.65 J**
	CTMW-02D-20171003	10/03/17	PME8	**590**	**590**	<20	**7.8**	<0.027	<0.50	<0.025	**12,000**	**3,300**	**0.11**	**0.34**
	CTMW-02D-20180305	03/05/18	PME9	**410**	**410**	--	**6.5**	<0.027	<0.10	<0.025	**12,000**	**3,100**	**0.081**	**0.25**
	CTMW-02D-20180621	06/21/18	PME10	**410**	**410**	<50	**6.0**	<0.027	<0.10	**0.036 J**	**11,000**	**3,000**	**0.093**	**0.28**

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	General Chemistry (mg/L)										
				Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Chemical Oxygen Demand	Total Organic Carbon	Total Sulfide	Total Kjeldahl Nitrogen (TKN)	Total Phosphorus	Total Dissolved Solids	Hardness as CaCO3	Orthophosphate as P	Orthophosphorus as PO4
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	140	140	--	1.8	<0.020	<0.10	<0.025	8,700	1,700	0.036 J	0.11 J
	CTMW-03S-20170505	05/05/17	PME1	200	200	<20	2.4	<0.020	<0.10	<0.025	9,600	1,900	0.081 J-	0.25 J-
	CTMW-03S-20170517	05/17/17	PME2	190	190	<20	2.5	<0.50	<0.10 R	<0.025 R	9,500	1,900	0.053 J-	0.16 J-
	CTMW-03S-20170601	06/01/17	PME3	200	200	<50	2.1	<0.27	<0.10 R	0.028 J	9,800	1,900	0.059 J-	0.18 J-
	CTMW-03S-20170620	06/20/17	PME4	1,200	1,200	850	250	<0.14	<0.10	0.88	10,000	2,400	0.44	1.4
	CTMW-03S-20170718	07/18/17	PME5	320	320	<50 R	5.4	0.077 J-	<0.10 R	0.046 J	9,400	2,000	0.17 J-	0.51 J-
	CTMW-03S-20170823	08/23/17	PME6	880	880	<20	39	<0.027	<0.10	0.18	9,600	2,200	0.10	0.31
	CTMW-03S-20170921	09/21/17	PME7	300	300	<50	2.8	<0.027	<0.10	0.094	10,000	2,000	0.18 J-	0.54 J-
	CTMW-03S-20171003	10/03/17	PME8	370	370	<20	2.6	<0.027	<0.50	0.049 J	10,000	2,000	0.16	0.48
CTMW-03D	CTMW-03D-20170406	04/06/17	Baseline	130	130	--	2.7	<0.020	<0.10	<0.025	9,600	1,800	0.038 J	0.12 J
	CTMW-03D-20170505	05/05/17	PME1	150	150	<20	3.0	<0.020	<0.10	<0.025	11,000	1,700	0.044 J	0.14 J
	CTMW-03D-20170517	05/17/17	PME2	150	150	<20 R	2.5	<0.50	<0.10 R	<0.025 R	9,800	1,700	0.033 J	0.10 J
	CTMW-03D-20170601	06/01/17	PME3	160	160	<50 UJ	2.0	<0.27	<0.10 R	<0.025 UJ	9,900	1,700	0.031 J	0.094 J
	CTMW-03D-20170620	06/20/17	PME4	170	170	<20	2.2	<0.081	<0.10	<0.025	9,700	1,700	0.022 J	0.068 J
	CTMW-03D-20170719	07/19/17	PME5	180	180	<20	2.0	<0.054	<0.10	<0.025	10,000	1,800	0.064 J-	0.20 J-
	CTMW-03D-20170823	08/23/17	PME6	170	170	<20	2.0	<0.027	<0.10	0.040 J	9,900	1,700	0.042 J	0.13 J
	CTMW-03D-20170921	09/21/17	PME7	150	150	<50	1.9	<0.027	<0.10	<0.025	9,800	1,700	0.055 J-	0.17 J-
	CTMW-03D-20171003	10/03/17	PME8	180	180	<20	2.8	<0.027	<0.50	<0.025	9,700	1,700	0.058	0.18
CTMW-04S	CTMW-04S-20170405	04/05/17	Baseline	180	180	--	2.0	<0.020	<0.10	0.037 J	8,200	1,700	0.078	0.24
	CTMW-04S-20170504	05/04/17	PME1	730	730	<20	56	<0.020	<0.10	0.095	8,700	2,000	0.049 J	0.15 J-
	CTMW-04S-20170517	05/17/17	PME2	1,600	1,600	1,100	250	<0.50	<0.10 R	0.32 J-	8,800	2,600	0.54 J-	1.6 J-
	CTMW-04S-20170602	06/02/17	PME3	1,400	1,400	360	58	<0.11	<0.10	0.41 J-	9,600	2,500	0.067 J-	0.21 J-
	CTMW-04S-20170620	06/20/17	PME4	1,600	1,600	820	170	<0.054	<0.10	0.43	8,300	2,300	0.23	0.69
	CTMW-04S-20170718	07/18/17	PME5	1,900	1,900	980	320	0.073 J-	<0.10 R	0.38 J-	7,600	2,400	0.51 J-	1.6 J-
	CTMW-04S-20170823	08/23/17	PME6	2,900	2,900	3,000	1,800	0.41	<0.10	0.97	9,300	2,700	1.0	3.1
	CTMW-04S-20170921	09/21/17	PME7	1,600	1,600	1,400	820	<0.027	1.8	1.3	8,000	2,400	0.036 J	0.11 J
	CTMW-04S-20171003	10/03/17	PME8	2,100	2,100	440	140 J-	0.47	<0.50	1.0	8,000	2,300	0.43	1.3
	CTMW-04S-20180307	03/07/18	PME9	640	640	--	4.9	<0.027	<0.10	0.026 J	10,000	2,400	0.082	0.25
	CTMW-04S-20180621	06/21/18	PME10	500	500	<20	3.1	<0.027	<0.10	<0.025	10,000	2,100	0.061	0.19
CTMW-04D	CTMW-04D-20170405	04/05/17	Baseline	120	120	--	5.7	0.020 J	<0.10	<0.025	12,000	2,500	0.029 J	0.089 J
	CTMW-04D-20170504	05/04/17	PME1	140	140	<20	2.9	<0.040	<0.10	0.041 J	12,000	2,400	0.037 J	0.11 J
	CTMW-04D-20170517	05/17/17	PME2	140	140	<20	3.4	<0.50	<0.10 R	<0.025 R	12,000	2,400	0.044 J	0.14 J
	CTMW-04D-20170517-FD	05/17/17	PME2	140	140	<20	3.6	<0.50	<0.10 R	<0.025 R	12,000	2,400	0.058 J-	0.18 J-
	CTMW-04D-20170602	06/02/17	PME3	140	140	<50	3.0	<0.14	<0.10	<0.025	12,000	2,500	0.055	0.17
	CTMW-04D-20170621	06/21/17	PME4	140	140	<50	2.6	<0.054	<0.10	<0.025	11,000	2,500	0.044 J	0.14 J
	CTMW-04D-20170718	07/18/17	PME5	140	140	<50	2.4	<0.027 UJ	<0.10 R	<0.025 R	12,000	2,400	0.052 J-	0.16 J-
	CTMW-04D-20170823	08/23/17	PME6	130	130	<20	2.8	<0.027	<0.10	0.032 J	12,000	2,400	0.051	0.16
	CTMW-04D-20170823-FD	08/23/17	PME6	120	120	<20	2.6	<0.027	<0.17	<0.025	12,000	2,400	0.061	0.19
	CTMW-04D-20170920	09/20/17	PME7	130	130	<50	3.3	<0.027	<0.10	<0.025	11,000	2,100	0.12	0.36
	CTMW-04D-20171003	10/03/17	PME8	160	160	<20	3.7	<0.027	<0.50	<0.025	11,000	2,100	0.056	0.17
	CTMW-04D-20180307	03/07/18	PME9	180	180	--	2.8	<0.027	<0.10	<0.025	10,000	2,000	0.042 J	0.13 J
	CTMW-04D-20180621	06/21/18	PME10	180	180	<20 R	2.5	<0.027 R	<0.10 R	<0.025 R	10,000	1,900	0.051 J-	0.16 J-

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	General Chemistry (mg/L)										
				Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Chemical Oxygen Demand	Total Organic Carbon	Total Sulfide	Total Kjeldahl Nitrogen (TKN)	Total Phosphorus	Total Dissolved Solids	Hardness as CaCO3	Orthophosphate as P	Orthophosphorus as PO4
CTMW-05S	CTMW-05S-20170621	06/21/17	PME4	**760**	**760**	<50	**8.6**	<0.081	<0.10	**0.033 J**	**9,300**	**2,300**	**0.099**	**0.30**
	CTMW-05S-20170717	07/17/17	PME5	**1,100**	**1,100**	<50	**7.1**	**0.028 J**	<0.10	**0.027 J**	**9,600**	**2,300**	**0.13**	**0.40**
	CTMW-05S-20170822	08/22/17	PME6	**820**	**820**	<20	**11**	<0.027	<0.10	**0.19**	**9,300**	**2,400**	**0.039 J**	**0.12 J**
	CTMW-05S-20170919	09/19/17	PME7	**750**	**750**	<20	**7.1**	<0.027	<0.10	**0.037 J**	**9,600**	**2,300**	**0.82**	**2.5**
	CTMW-05S-20171004	10/04/17	PME8	**800**	**800**	<20	**3.5**	<0.027	<0.10	<0.025	**10,000**	**2,200**	**0.31**	**0.94**
CTMW-05D	CTMW-05D-20170621	06/21/17	PME4	**160**	**160**	<50	**3.5**	<0.054	<0.10	<0.025	**9,900**	**1,900**	**0.078**	**0.24**
	CTMW-05D-20170621-FD	06/21/17	PME4	**160**	**160**	<50	**3.1**	<0.054	<0.10	<0.025	**9,900**	**1,900**	**0.054**	**0.17**
	CTMW-05D-20170718	07/18/17	PME5	**160**	**160**	<50 R	**2.3**	<0.027 UJ	<0.10 R	<0.025 R	**9,700**	**1,900**	**0.053 J-**	**0.16 J-**
	CTMW-05D-20170822	08/22/17	PME6	**160**	**160**	<20	**2.6**	<0.027	<0.17	<0.025	**10,000**	**1,800**	**0.024 J**	**0.073 J**
	CTMW-05D-20170919	09/19/17	PME7	**140**	**140**	<20	**2.3**	<0.027	<0.10	<0.025	**11,000**	**2,000**	**0.42**	**1.3**
	CTMW-05D-20171004	10/04/17	PME8	**180**	**180**	<20 R	**2.3**	<0.027 UJ	<0.10 R	<0.025 UJ	**10,000**	**1,800**	**0.077 J-**	**0.24 J-**
CTMW-06S	CTMW-06S-20170621	06/21/17	PME4	**2,400**	**2,400**	**3,300**	**730**	**0.58**	**0.48**	**0.40**	**7,300**	**2,600**	**0.084**	**0.26**
	CTMW-06S-20170717	07/17/17	PME5	**3,800**	**3,800**	**9,800**	**3,100**	**7.3**	**15**	**0.93**	**11,000**	**3,700**	**0.67**	**2.0**
	CTMW-06S-20170822	08/22/17	PME6	**4,400**	**4,400**	**6,700**	**3,200**	<0.027	**30**	**2.0**	**11,000**	**3,600**	**0.30**	**0.93**
	CTMW-06S-20170919	09/19/17	PME7	**2,300**	**2,300**	**7,100**	**2,700**	<0.027	**44**	**1.6**	**12,000**	**3,700**	**2.7**	**8.2**
	CTMW-06S-20171004	10/04/17	PME8	**2,600**	**2,600**	**10,000**	**3,000 J-**	**0.20**	**54**	**2.7**	**12,000**	**3,700**	**2.2**	**6.7**
	CTMW-06S-20180306	03/06/18	PME9	**1,800**	**1,800**	--	**17**	**0.15**	**22**	**0.86**	**3,500**	**910**	**0.23**	**0.69**
	CTMW-06S-20180622	06/22/18	PME10	**1,700**	**1,700**	<50	**13**	**0.14**	**18**	**0.61**	**4,400**	**1,000**	**0.45**	**1.4**
CTMW-06D	CTMW-06D-20170622	06/22/17	PME4	**240**	**240**	<50	**3.5**	<0.11	<0.10	<0.025	**12,000**	**2,600**	**0.054**	**0.17**
	CTMW-06D-20170717	07/17/17	PME5	**210**	**210**	<50	**4.9**	**0.030 J**	<0.10	<0.025	**11,000**	**2,600**	**0.064**	**0.20**
	CTMW-06D-20170717-FD	07/17/17	PME5	**210**	**210**	<50	**5.8**	**0.029 J**	<0.10	<0.025	**12,000**	**2,700**	**0.057**	**0.18**
	CTMW-06D-20170822	08/22/17	PME6	**340**	**340**	<50	**25**	<0.027	<0.10	**0.13**	**12,000**	**2,700**	**0.084**	**0.26**
	CTMW-06D-20170919	09/19/17	PME7	**390**	**390**	<20	**85**	<0.027 R	<0.10	**0.034 J**	**11,000**	**2,600**	**0.58**	**1.8 J**
	CTMW-06D-20170919-FD	09/19/17	PME7	**400**	**400**	<20	**82**	<0.027 R	<0.10	**0.040 J**	**11,000**	**2,600**	**0.44**	**1.3 J**
	CTMW-06D-20171004	10/04/17	PME8	**590**	**590**	<50	**120**	<0.027	<0.10	<0.025	**11,000**	**2,800**	**0.15**	**0.46**
	CTMW-06D-20171004-FD	10/04/17	PME8	**590**	**590**	<20	**110**	<0.027	<0.10	**0.029 J**	**11,000**	**2,700**	**0.12**	**0.36**
	CTMW-06D-20180307	03/07/18	PME9	**1,300**	**1,300**	--	**52**	<0.027	<0.10	**0.032 J**	**10,000**	**2,500**	**0.11**	**0.33**
	CTMW-06D-20180622	06/22/18	PME10	**1,400**	**1,400**	<50	**20**	<0.027	<0.10	<0.025	**8,000**	**1,900**	**0.11**	**0.33**
CTMW-07S	Not Analyzed	10/09/17	PME8	**Well Dry; Unable to sample**										
	CMTW-07S-20180306	03/06/18	PME9	**210**	**210**	--	**1.9**	<0.027 R	<0.10 R	<0.025 R	**9,000**	**1,600**	**0.049 J**	**0.15 J-**
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**										
CTMW-07D	CTMW-07D-20171009	10/09/17	PME8	**100**	**100**	**55**	**1.7**	<0.027	**0.21**	**0.54**	**770**	**380**	**0.16**	**0.48**
	CTMW-07D-20180306	03/06/18	PME9	**170**	<4.0	--	**2.3**	<0.027	**0.93**	**0.045 J**	**570**	**36**	**0.031 J**	**0.096 J**
	CTMW-07D-20180622	06/22/18	PME10	**120**	**120**	<10	**4.4**	<0.027	<0.10	**0.25**	**600**	**150**	**0.54**	**1.7**

Notes:

USEPA	United States Environmental Protection Agency
mg/L	Milligram per liter
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
–	Not Analyzed

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Dissolved Methane (mg/L)	Volatile Fatty Acids (mg/L)					
					Acetic Acid	Formic-acid	Lactic Acid	n-Butyric Acid	Propionic Acid	Pyruvic Acid
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
CTIW-01D	CTIW-01D-20170406	04/06/17	Baseline	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
CTIW-02S	CTIW-02S-20170403	04/03/17	Baseline	**0.00034 J**	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
CTIW-02D	CTIW-02D-20170404	04/04/17	Baseline	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
CTIW-03S	CTIW-03S-20170404	04/04/17	Baseline	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4 UJ
CTIW-03D	CTIW-03D-20170404	04/04/17	Baseline	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
CTMW-01S	CTMW-01S-20170404	04/04/17	Baseline	<0.00025	<0.29	**3.0**	<0.31	<0.26	<0.35	<7.4
	CTMW-01S-20170503	05/03/17	PME1	<0.00025	**820**	**400**	**660**	**990**	**200**	<7.4
	CTMW-01S-20170516	05/16/17	PME2	<0.00025	**540**	**180**	<31	**1,600**	**300**	<37
	CTMW-01S-20170531	05/31/17	PME3	<0.00025	**880**	<13	<16	<13	**380**	<19
	CTMW-01S-20170619	06/19/17	PME4	<0.00025	**3,000**	<26	<31	**4,100**	**2,000**	<37
	CTMW-01S-20170720	07/20/17	PME5	**0.16**	<15	<13	<16	<13	<18	<19
	CTMW-01S-20170824	08/24/17	PME6	**0.15**	**3,900**	<5.2	<6.2	**2,400**	**1,800**	<7.4
	CTMW-01S-20170920	09/20/17	PME7	**0.95**	**4,400**	<2.6	<3.1	**2,600**	**2,000**	<3.7
	CTMW-01S-20171003	10/03/17	PME8	**1.8 J-**	**4,200**	<5.2	--	**2,500**	**1,900**	<7.4
	CTMW-01S-20180305	03/05/18	PME9	**2.9 J-**	**560**	**3.6 J**	--	**8.5 J**	**2,000**	<3.7
	CTMW-01S-20180621	06/21/18	PME10	**0.87 J**	<2.9	<2.6	--	<2.6	<3.5	<3.7 UJ
CTMW-01D	CTMW-01D-20170403	04/03/17	Baseline	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-01D-20170503	05/03/17	PME1	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-01D-20170516	05/16/17	PME2	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-01D-20170531	05/31/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-01D-20170619	06/19/17	PME4	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-01D-20170720	07/20/17	PME5	**0.00040 J**	**50**	<5.2	**22**	<5.2	<7.0	<7.4 UJ
	CTMW-01D-20170720-FD	07/20/17	PME5	<0.00025	**38**	<5.2	**18 J**	<5.2	<7.0	<7.4
	CTMW-01D-20170824	08/24/17	PME6	**0.014**	**170**	<5.2	**80**	**220**	**7.0 J**	<7.4
	CTMW-01D-20170920	09/20/17	PME7	**0.29**	**160**	<2.6	**54**	**350**	<3.5	<3.7 UJ
	CTMW-01D-20171003	10/03/17	PME8	**0.038**	**160**	<5.2	--	**350**	**33 J+**	<7.4 UJ
	CTMW-01D-20180305	03/05/18	PME9	**0.039**	**260**	<2.6	--	**110**	**71**	<3.7
	CTMW-01D-20180305-FD	03/05/18	PME9	**0.050**	**260**	<2.6	--	**120**	**66**	<3.7
	CTMW-01D-20180621	06/21/18	PME10	**0.098**	**490**	<2.6	--	**29**	**120**	<3.7
	CTMW-01D-20180621-FD	06/21/18	PME10	**0.11**	**480**	<2.6	--	**30**	**120**	<3.7
CTMW-02S	CTMW-02S-20170405	04/05/17	Baseline	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-02S-20170504	05/04/17	PME1	<0.00025	**11**	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-02S-20170516	05/16/17	PME2	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-02S-20170601	06/01/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-02S-20170620	06/20/17	PME4	**0.027**	**1,500**	<13	<16	**490**	**490**	<19
	CTMW-02S-20170719	07/19/17	PME5	**0.15**	**4,000**	<5.2	<6.2	**430**	**660**	<74
	Not Analyzed	08/24/17	PME6	**Well Dry; Unable to sample**						
	CTMW-02S-20170920	09/20/17	PME7	**1.9**	**3,300**	<2.6	**20**	**480**	**340**	<3.7
	CTMW-02S-20171003	10/03/17	PME8	**2.3 J-**	**3,200**	<5.2	<6.2	**560**	**280**	<7.4
	CTMW-02S-20180306	03/06/18	PME9	**3.9 J-**	**4.6 J**	**3.6 J**	<3.1	<2.6	<3.5	<3.7
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**						
CTMW-02D	CTMW-02D-20170404	04/04/17	Baseline	<0.00025	<0.29	<0.26 UJ	<0.31 UJ	<0.26 UJ	<0.35	<7.4
	CTMW-02D-20170404-FD	04/04/17	Baseline	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-02D-20170503	05/03/17	PME1	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-02D-20170503-FD	05/03/17	PME1	<0.00025	<0.29 UJ	<0.26	<0.31 UJ	<0.26 UJ	<0.35 UJ	<7.4
	CTMW-02D-20170517	05/17/17	PME2	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-02D-20170601	06/01/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-02D-20170601-FD	06/01/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-02D-20170619	06/19/17	PME4	**0.00041 J**	**49 J**	<13	<16	**40 J**	**27 J**	<19
	CTMW-02D-20170619-FD	06/19/17	PME4	**0.00054 J**	**50**	<13	<16	**42 J**	**31 J**	<19
	CTMW-02D-20170719	07/19/17	PME5	**0.00038 J**	**220**	<1.3	<1.6	<1.3	<1.8	<19
	CTMW-02D-20170824	08/24/17	PME6	**0.079**	**7.0 J**	<5.2	<6.2	<5.2	<7.0	<7.4 UJ
	CTMW-02D-20170920	09/20/17	PME7	**0.11**	<2.9	<2.6	<3.1	<2.6	<3.5	<3.7
	CTMW-02D-20171003	10/03/17	PME8	**0.058**	<2.9	<2.6	--	<2.6	<3.5	<3.7
	CTMW-02D-20180305	03/05/18	PME9	**0.090**	<2.9	**3.6 J**	--	<2.6	<3.5	<3.7
	CTMW-02D-20180621	06/21/18	PME10	**0.29**	<2.9	<2.6	--	<2.6	<3.5	<3.7

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Dissolved Methane (mg/L)	Volatile Fatty Acids (mg/L)					
					Acetic Acid	Formic-acid	Lactic Acid	n-Butyric Acid	Propionic Acid	Pyruvic Acid
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	<0.00025	<1.5	<1.3 UJ	<1.6 UJ	<1.3	<1.8	<1.9 UJ
	CTMW-03S-20170505	05/05/17	PME1	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-03S-20170517	05/17/17	PME2	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-03S-20170601	06/01/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-03S-20170620	06/20/17	PME4	<0.00025	**120**	<13	<16	**140**	**72**	<19
	CTMW-03S-20170718	07/18/17	PME5	**0.0033**	<1.5	<1.3	<1.6	<1.3	<1.8	<19
	CTMW-03S-20170823	08/23/17	PME6	**0.025**	**66**	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-03S-20170921	09/21/17	PME7	**0.014**	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-03S-20171003	10/03/17	PME8	**0.41**	<2.9	<2.6	--	<2.6	<3.5	<3.7
CTMW-03D	CTMW-03D-20170406	04/06/17	Baseline	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-03D-20170505	05/05/17	PME1	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-03D-20170517	05/17/17	PME2	<0.00025	<15	<13	<16 UJ	<13	<18	<19
	CTMW-03D-20170601	06/01/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-03D-20170620	06/20/17	PME4	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-03D-20170719	07/19/17	PME5	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<19
	CTMW-03D-20170823	08/23/17	PME6	**0.030**	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-03D-20170921	09/21/17	PME7	**0.0084**	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-03D-20171003	10/03/17	PME8	**0.0096**	<2.9	<2.6	--	<2.6	<3.5	<3.7
CTMW-04S	CTMW-04S-20170405	04/05/17	Baseline	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-04S-20170504	05/04/17	PME1	<0.00025	**55**	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-04S-20170517	05/17/17	PME2	<0.00025	**70**	<13	<16	**54**	<18	<19
	CTMW-04S-20170602	06/02/17	PME3	<0.00025	<29	<26	<31	<26	<35	<37
	CTMW-04S-20170620	06/20/17	PME4	<0.00025	**85**	<13	<16	**30 J**	**83**	<19
	CTMW-04S-20170718	07/18/17	PME5	**0.0037**	**570**	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-04S-20170823	08/23/17	PME6	**0.0052**	**2,800**	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-04S-20170921	09/21/17	PME7	<0.00025	**1,800**	<2.6	<3.1	<2.6	<3.5	<3.7
	CTMW-04S-20171003	10/03/17	PME8	**0.094 J-**	**300**	<13	--	<13	<18	<19
	CTMW-04S-20180307	03/07/18	PME9	**3.6**	<2.9	<2.6	--	<2.6	<3.5	<3.7
	CTMW-04S-20180621	06/21/18	PME10	**2.2**	<2.9	<2.6	--	<2.6	<3.5	<3.7
CTMW-04D	CTMW-04D-20170405	04/05/17	Baseline	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-04D-20170504	05/04/17	PME1	<0.00025	<0.29	<0.26	<0.31	<0.26	<0.35	<7.4
	CTMW-04D-20170517	05/17/17	PME2	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-04D-20170517-FD	05/17/17	PME2	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-04D-20170602	06/02/17	PME3	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-04D-20170621	06/21/17	PME4	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-04D-20170718	07/18/17	PME5	<0.00025	<1.5	<1.3	<1.6	<1.3	<1.8	<19
	CTMW-04D-20170823	08/23/17	PME6	**0.014**	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-04D-20170823-FD	08/23/17	PME6	**0.015**	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-04D-20170920	09/20/17	PME7	**0.032**	<1.5	<1.3	<1.6	<1.3	<1.8	<1.9
	CTMW-04D-20171003	10/03/17	PME8	**0.029**	<2.9	<2.6	--	<2.6	<3.5	<3.7
	CTMW-04D-20180307	03/07/18	PME9	**0.13**	<2.9	<2.6	--	<2.6	<3.5	<3.7
	CTMW-04D-20180621	06/21/18	PME10	**0.071 J**	<2.9	<2.6	--	<2.6	<3.5	<3.7 UJ

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Dissolved Methane (mg/L)	Volatile Fatty Acids (mg/L)					
					Acetic Acid	Formic-acid	Lactic Acid	n-Butyric Acid	Propionic Acid	Pyruvic Acid
CTMW-05S	CTMW-05S-20170621	06/21/17	PME4	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-05S-20170717	07/17/17	PME5	<0.00025	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-05S-20170822	08/22/17	PME6	**0.0037**	**9.5 J**	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-05S-20170919	09/19/17	PME7	<0.00025	<1.5	<1.3	--	<1.3	<1.8	<1.9
	CTMW-05S-20171004	10/04/17	PME8	**0.11**	<2.9	<2.6	<3.1	<2.6	<3.5	<19
CTMW-05D	CTMW-05D-20170621	06/21/17	PME4	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-05D-20170621-FD	06/21/17	PME4	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-05D-20170718	07/18/17	PME5	<0.00025	<1.5 UJ	<1.3 UJ	<1.6 UJ	<1.3	<1.8 UJ	<19 UJ
	CTMW-05D-20170822	08/22/17	PME6	<0.00025	<15	<13	<16	<13	<18	<19
	CTMW-05D-20170919	09/19/17	PME7	<0.00025	<1.5	<1.3	--	<1.3	<1.8	<1.9
	CTMW-05D-20171004	10/04/17	PME8	**0.00044 J**	<2.9	<2.6	<3.1 UJ	<2.6	<3.5 UJ	<19 UJ
CTMW-06S	CTMW-06S-20170621	06/21/17	PME4	<0.00025	**430**	<13	<16	**240**	**100**	<19
	CTMW-06S-20170717	07/17/17	PME5	**0.0084**	**2,800**	<13	<16	**710**	**550**	<19
	CTMW-06S-20170822	08/22/17	PME6	**0.049**	**3,200**	<13	<16	**690**	**550**	<19
	CTMW-06S-20170919	09/19/17	PME7	**0.078 J-**	**3,600**	<5.2	<6.2	**970**	**440**	<7.4
	CTMW-06S-20171004	10/04/17	PME8	**0.27 J-**	**3,700**	<13	<16	**1,200**	**750**	<19
	CTMW-06S-20180306	03/06/18	PME9	**6.0 J-**	**3.1 J**	**3.5 J**	<3.1	<2.6	<3.5	<3.7
	CTMW-06S-20180622	06/22/18	PME10	**2.1**	<2.9	<2.6	<3.1	<2.6	<3.5	<3.7
CTMW-06D	CTMW-06D-20170622	06/22/17	PME4	<0.00025	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-06D-20170717	07/17/17	PME5	<0.00025	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-06D-20170717-FD	07/17/17	PME5	<0.00025	<5.8	<5.2	<6.2	<5.2	<7.0	<7.4
	CTMW-06D-20170822	08/22/17	PME6	**0.00071 J**	<29	<26	<31	<26	<35	<37
	CTMW-06D-20170919	09/19/17	PME7	**0.00034 J**	**96**	<1.3	<1.6	**26**	<1.8	<1.9
	CTMW-06D-20170919-FD	09/19/17	PME7	**0.00033 J**	**97**	<1.3	<1.6	**26**	<1.8	<1.9
	CTMW-06D-20171004	10/04/17	PME8	**0.0029**	**140**	<2.6	<3.1	**16**	<3.5 UJ	<19
	CTMW-06D-20171004-FD	10/04/17	PME8	**0.0024**	**130**	<2.6	**11**	<2.6	**26 J**	<19
	CTMW-06D-20180307	03/07/18	PME9	**1.3**	**32 J**	<13	<16	<13	<18	<19
	CTMW-06D-20180622	06/22/18	PME10	**1.7**	<2.9	<2.6	<3.1	<2.6	<3.5	<3.7
CTMW-07S	Not Analyzed	10/09/17	PME8	**Well Dry; Unable to sample**						
	CMTW-07S-20180306	03/06/18	PME9	**1.0**	<2.9	**3.6 J**	<3.1	<2.6	<3.5	<3.7 UJ
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**						
CTMW-07D	CTMW-07D-20171009	10/09/17	PME8	**0.00050 J**	<2.9	<2.6	<3.1	<2.6	<3.5	<3.7
	CTMW-07D-20180306	03/06/18	PME9	**0.073**	<2.9	**3.8 J**	<3.1	<2.6	<3.5	<3.7
	CTMW-07D-20180622	06/22/18	PME10	**0.19**	<2.9	<2.6	<3.1	<2.6	<3.5	<3.7

Notes:

USEPA	United States Environmental Protection Agency
mg/L	Milligram per liter
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
–	Not Analyzed

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Dissolved Metals by USEPA Method 6020 (ug/L)																		
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	<50	<5.0	**120**	**28**	<2.5	<2.5	**13**	<5.0	<5.0	<800	<5.0	**15**	<5.0	<5.0	<5.0	<5.0	**29**	<100	<25
CTIW-01D	CTIW-01D-20170406	04/06/17	Baseline	<50	<5.0	**60**	**32**	<2.5	<2.5	**15**	<5.0	<5.0	<80	<5.0	**31**	**5.0 J**	<5.0	<5.0	<5.0	**26**	<100	**74 J**
CTIW-02S	CTIW-02S-20170403	04/03/17	Baseline	<50	<5.0	**98**	**32**	<2.5	<2.5	**11**	<5.0	<5.0	<320	<5.0	**32**	<5.0	<5.0	<5.0	<5.0	**43**	<40	<25
CTIW-02D	CTIW-02D-20170404	04/04/17	Baseline	<50	<5.0	**35**	**37**	<2.5	<2.5	**18**	<5.0	<5.0	<80	<5.0	**42**	**5.3 J**	<5.0	<5.0	<5.0	**20**	<100	**74 J**
CTIW-03S	CTIW-03S-20170404	04/04/17	Baseline	**76**	**74**	**170**	**120**	**67**	**67**	**9.6**	**81**	**63**	**580**	**67**	**110**	**68**	**61**	**72**	**70**	**130**	<100	**62**
CTIW-03D	CTIW-03D-20170404	04/04/17	Baseline	**22**	<0.50	**35**	**38**	<0.25	<0.25	**19**	**0.64 J**	**1.6 J**	<80	<0.50	**14**	**3.2**	**3.7**	<0.50	<0.50	**7.1**	<100	**4.7 J**
CTMW-01S	CTMW-01S-20170404	04/04/17	Baseline	<50	<5.0	**85**	**41**	<2.5	<2.5	**10**	<5.0	<5.0	<80	<5.0	**32**	**5.5 J**	<5.0	<5.0	<5.0	**38**	<50	<25
	CTMW-01S-20170503	05/03/17	PME1	**49**	**8.8**	**200**	**62**	<0.25	<0.25	**1.1**	**5.0**	**10**	**660**	<0.50	**510**	**51**	**2.5**	<0.50	<0.50	**200**	**3.5**	**9.3 J**
	CTMW-01S-20170516	05/16/17	PME2	**26**	**0.53 J**	**210**	**58**	<0.25	<0.25	**0.36**	**3.4**	**4.6**	**32**	**0.62 J**	**480**	**7.6**	**2.3**	<0.50	<0.50	**210**	**19**	**10 J**
	CTMW-01S-20170531	05/31/17	PME3	<50	<5.0	**350**	**75**	<2.5	<2.5	**0.15**	<5.0	<5.0	**780**	<5.0	**910**	**13 J**	<5.0	<5.0	<5.0	**190**	<10	<25
	CTMW-01S-20170619	06/19/17	PME4	<50	<5.0	**460**	**47**	<2.5	<2.5	**0.15**	**5.2 J**	**13 J**	**370**	<5.0	**2,600**	**61**	<5.0	<5.0	<5.0	**23**	<10	<25
	CTMW-01S-20170720	07/20/17	PME5	**48 J**	<2.5	**380**	**400**	<1.3	<1.3	**0.11**	**3.7 J**	**4.2 J**	**5,200**	<2.5	**4,500**	**37**	<2.5	<2.5	<2.5	**6.6**	<5.0	**17 J**
	CTMW-01S-20170824	08/24/17	PME6	<50	<5.0	**910**	**360**	<2.5	<2.5	**0.09**	<5.0	<5.0	**390**	<5.0	**2,300**	**30**	<5.0	<5.0	<5.0	**80**	**19 J**	<25
	CTMW-01S-20170920	09/20/17	PME7	<25	**4.2 J**	**700**	**570**	<1.3	<1.3	**0.067**	**2.8 J**	**3.0 J**	**220**	<2.5	**3,200**	**18**	<2.5	<2.5	<2.5	**44**	**8.1 J**	<13
	CTMW-01S-20171003	10/03/17	PME8	<25	<2.5	**440**	**610**	<1.3	<1.3	**0.059**	<2.5	**2.8 J**	**430**	<2.5	**3,000**	**15**	<2.5	<2.5	<2.5	**5.2**	<5.0	**16 J**
	CTMW-01S-20180305	03/05/18	PME9	<25	<2.5	**590**	**390**	<1.3	<1.3	**0.043**	<2.5	**7.2 J**	**250**	<2.5	**160**	**2.9 J**	<2.5	<2.5	<2.5	**16**	**6.1 J**	**13 J**
	CTMW-01S-20180621	06/21/18	PME10	<25	**2.7 J**	**440**	**530**	<1.3	<1.3	**0.073**	<2.5	<2.5	**230**	<2.5	**94**	**9.0 J**	**2.7 J**	<2.5	<2.5	**4.5 J**	**11**	<13
CTMW-01D	CTMW-01D-20170403	04/03/17	Baseline	<500	<50	<50	<50	<25	<25	**22**	<50	<50	<320	<50	<50	<50	<50	<50	<50	<50	<40	<250
	CTMW-01D-20170503	05/03/17	PME1	**36**	**0.96 J**	**20**	**47**	<0.25	<0.25	**28**	**0.77 J**	**2.5**	**65**	<0.50	**44**	**5.1**	**3.5**	<0.50	<0.50	**29**	<150	**6.7 J**
	CTMW-01D-20170516	05/16/17	PME2	**12**	<0.50	**21**	**43**	<0.25	<0.25 UJ	**21**	**0.83 J**	**2.3 J-**	**55**	**1.2**	**58 J-**	**6.6 J-**	**2.4 J-**	<0.50	<0.50	**30**	<250 R	**9.5 J**
	CTMW-01D-20170531	05/31/17	PME3	<50	<5.0	**24**	**43**	<2.5	<2.5	**21**	<5.0	<5.0	<80	<5.0	**36**	**6.3 J**	<5.0	<5.0	<5.0	**43**	<10	<25
	CTMW-01D-20170619	06/19/17	PME4	<50	<5.0	**33**	**43**	<2.5	<2.5	**18**	<5.0	<5.0	<80	<5.0	**46**	<5.0	<5.0	<5.0	<5.0	**67**	<10 R	<25
	CTMW-01D-20170720	07/20/17	PME5	<25	<2.5	**39**	**47**	<1.3	<1.3	**15**	<2.5	**3.5 J**	<40	<2.5	**85**	**8.0 J**	**7.3 J**	<2.5	<2.5	**140**	<5.0 R	**32 J**
	CTMW-01D-20170720-FD	07/20/17	PME5	<25	<2.5	**43**	**49**	<1.3	<1.3	**17**	<2.5	**3.2 J**	**100**	<2.5	**88**	**7.6 J**	**6.8 J**	<2.5	<2.5	**140**	<5.0	<13
	CTMW-01D-20170824	08/24/17	PME6	<50	<5.0	**33**	**50**	<2.5	<2.5	**11**	<5.0	<5.0	<80	<5.0	**180**	**8.0 J**	**6.0 J**	<5.0	<5.0	**230**	<10	<25
	CTMW-01D-20170920	09/20/17	PME7	<25	<2.5	**32**	**51**	<1.3	<1.3	**12**	<2.5	**3.0 J**	**83 J**	<2.5	**200**	**7.4 J**	**5.3 J**	<2.5	<2.5	**230**	<5.0	<13
	CTMW-01D-20171003	10/03/17	PME8	**6.2 J**	**0.54 J**	**29**	**53**	<0.25	<0.25	**13**	**0.50 J**	**0.58 J**	<8.0	<0.50	**200**	**2.7**	**4.8**	<0.50	<0.50	**220**	**7.5**	**3.7 J**
	CTMW-01D-20180305	03/05/18	PME9	<25	<2.5	**40**	**270**	<1.3	<1.3	**8.6**	<2.5	<2.5	<40	<2.5	**760**	**4.7 J**	**4.7 J**	<2.5	<2.5	**240**	**10**	**45 J**
	CTMW-01D-20180305-FD	03/05/18	PME9	<25	<2.5	**37**	**270**	<1.3	<1.3	**8.4**	<2.5	**2.6 J**	<40	<2.5	**740**	**4.6 J**	<2.5	<2.5	<2.5	**220**	**9.9 J**	**50 J**
	CTMW-01D-20180621	06/21/18	PME10	<25	<2.5	**45**	**400**	<1.3	<1.3	**7.4**	<2.5	<2.5	<40	<2.5	**1,000**	**4.4 J**	**4.1 J**	<2.5	<2.5	**290**	**9.5 J**	<13
	CTMW-01D-20180621-FD	06/21/18	PME10	<25	<2.5	**44**	**370**	<1.3	<1.3	**7.8**	<2.5	<2.5	<40	<2.5	**990**	**4.5 J**	<2.5	<2.5	<2.5	**310**	**9.8 J**	<13
CTMW-02S	CTMW-02S-20170405	04/05/17	Baseline	<50	<5.0	**73**	**36**	<2.5	<2.5	**11**	<5.0	<5.0	<800 R	<5.0	**38**	**11 J**	<5.0	<5.0	<5.0	**31**	<100 R	**86 J**
	CTMW-02S-20170504	05/04/17	PME1	**27**	**1.6 J**	**85**	**58**	<0.25	<0.25	**1.5**	**2.1**	**24**	**79**	<0.50	**290**	**11**	**1.6 J**	<0.50	<0.50	**200**	<150	**18 J**
	CTMW-02S-20170516	05/16/17	PME2	**6.3 J**	<0.50	**53**	**53**	<0.25	<0.25	**0.24**	**2.1**	**5.2**	**38**	<0.50	**270**	**22**	**2.4**	<0.50	<0.50	**260**	**20**	**13 J**
	CTMW-02S-20170601	06/01/17	PME3	**8.7 J**	<0.50	**110**	**40**	<0.25	<0.25	**0.58**	**1.3**	**5.1**	<8.0	<0.50	**180**	**4.4**	**2.2**	<0.50	<0.50	**380**	**13**	**5.1 J**
	CTMW-02S-20170620	06/20/17	PME4	<50	<5.0	**850**	**58**	<2.5	<2.5	**0.13**	<5.0	<5.0	**2,000**	<5.0	**1,000**	**19 J**	<5.0	<5.0	<5.0	**420**	**11 J**	<25
	CTMW-02S-20170719	07/19/17	PME5	<50	**5.0 J**	**640**	**350**	<2.5	<2.5	**0.042**	<5.0	<5.0	**6,800**	<5.0	**2,400**	**9.0 J**	<5.0	<5.0	<5.0	**63**	<10	<25
	Not Analyzed	08/24/17	PME6	**Well Dry; Unable to sample**																		
	CTMW-02S-20170920	09/20/17	PME7	<25	**3.0 J**	**530**	**360**	<1.3	<1.3	**0.046**	<2.5	**24**	**3,500**	<2.5	**1,200**	**11**	<2.5	<2.5	<2.5	**25**	**9.8 J**	**14 J**
	CTMW-02S-20171003	10/03/17	PME8	<10	**2.5 J**	**340**	**430**	<0.50	<0.50	**0.037**	<1.0	**18**	**340**	**1.2 J**	**850**	**5.9**	<1.0	<1.0	<1.0	**4.1**	**6.4**	**22 J**
	CTMW-02S-20180306	03/06/18	PME9	<25	**13**	**1,300**	**250**	<1.3	<1.3	**0.037**	<2.5	<2.5	**140**	<2.5	**590**	**6.8 J**	<2.5	<2.5	<2.5	**2.5 J**	**8.2 J**	<13
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**																		
CTMW-02D	CTMW-02D-20170404	04/04/17	Baseline	<5.0	<0.50	**28**	**41**	<0.25	<0.25	**18**	**0.80 J**	**1.9 J**	<80	<0.50	**58**	**3.7**	**4.2 J-**	<0.50	<0.50	**39**	<100 R	**3.6 J**
	CTMW-02D-20170404-FD	04/04/17	Baseline	**6.4 J**	<0.50	**28**	**39**	<0.25	<0.25	**18**	**0.76 J**	**1.8 J**	<80	<0.50	**55**	**3.9**	**3.6**	<0.50	<0.50	**36**	<100	**4.7 J**
	CTMW-02D-20170503	05/03/17	PME1	**30**	**1.0 J**	**36**	**44**	<0.25	<0.25	**20**	**0.81 J**	**1.8 J**	**64**	<0.50	**100**	**5.0**	**3.2**	<0.50	<0.50	**62**	<150	**9.3 J**
	CTMW-02D-20170503-FD	05/03/17	PME1	**40**	**0.91 J**	**38**	**47**	<0.25	<0.25	**22**	**0.84 J**	**1.9 J**	**81**	<0.50	**110**	**5.0**	**3.5**	<0.50	<0.50	**65**	<150	**9.8 J**
	CTMW-02D-20170517	05/17/17	PME2	<25	<2.5	**27**	**47**	<1.3	<1.3	**19**	<2.5	<2.5	**82 J**	<2.5	**86**	**5.6 J**	**4.9 J**	<2.5	<2.5	**86**	<200	**14 J**
	CTMW-02D-20170601	06/01/17	PME3	<50	<5.0	**39**	**52**	<2.5	<2.5	**21**	<5.0	<5.0	<80	<5.0	**120**	**6.5 J**	<5.0	<5.0	<5.0	**94**	<10	<25
	CTMW-02D-20170601-FD	06/01/17	PME3	<50	<5.0	**39**	**52**	<2.5	<2.5	**20**	<5.0	<5.0	<80	<5.0	**140**	**5.5 J**	<5.0	<5.0	<5.0	**100**	<10	<25
	CTMW-02D-20170619	06/19/17	PME4	<50	<5.0	**47**	**42**	<2.5	<2.5	**15**	<5.0	<5.0	<80	<5.0	**120**	<5.0	<5.0	<5.0	<5.0	**110**	<10	<25
	CTMW-02D-20170619-FD	06/19/17	PME4	<50	<5.0	**45**	**43**	<2.5	<2.5	**16**	<5.0	**6.6 J**	<80	<5.0	**120**	**5.4 J**	**5.4 J**	<5.0	<5.0	**110**	<10	<25
	CTMW-02D-20170719	07/19/17	PME5	<50	<5.0	**88**	**56**	<2.5	<2.5	**12**	<5.0	<5.0	<80 UJ	<5.0	**290**	**5.4 J**	<5.0	<5.0	<5.0	**150**	<10 R	<25
	CTMW-02D-20170824	08/24/17	PME6	<50	<5.0	**48**	**66**	<2.5	<2.5	**15**	<5.0	<5.0	<80	<5.0	**400**	**9.2 J**	**7.8 J**	<5.0	<5.0	**130**	<10 R	**33 J**
	CTMW-02D-20170920	09/20/17	PME7	<25	<2.5	**55**	**57**	<1.3	<1.3	**13**	<2.5	**3.0 J**	**60 J**	<2.5	**380**	**6.9 J**	**4.9 J**	<2.5	<2.5	**150**	<5.0 R	<13
	CTMW-02D-20171003	10/03/17	PME8	<25	<2.5	**47**	**54**	<1.3	<1.3	**14**	<2.5	**16**	<40	<2.5	**320**	**7.3 J**	**3.4 J**	<2.5	<2.5	**140**	<5.0 UJ	**39 J**
	CTMW-02D-20180305	03/05/18	PME9	<25	<2.5	**59**	**110**	<1.3	<1.3	**15**	<2.5	<2.5	<40	<2.5	**510**	**2.8 J**	**4.0 J**	<2.5	<2.5	**170**	**15**	<13
	CTMW-02D-20180621	06/21/18	PME10	<25	<2.5	**59**	**80**	**1.4 J**	<1.3	**14**	<2.5	<2.5	<40	<2.5	**460**	**3.9 J**	**6.0 J**	<2.5	<2.5	**210**	**16**	<13

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Dissolved Metals by USEPA Method 6020 (ug/L)																		
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	<50	<5.0	**120**	**29**	<2.5	<2.5	**13**	<5.0	<5.0	<800	<5.0	**9.1 J**	<5.0	<5.0	<5.0	<5.0	**27**	<100	<25
	CTMW-03S-20170505	05/05/17	PME1	**26 J**	<2.5	**97**	**31**	<1.3	<1.3	**13**	<2.5	<2.5	<8.0	<2.5	**60**	**3.1 J**	**4.9 J**	<2.5	<2.5	**27**	<100	<13
	CTMW-03S-20170517	05/17/17	PME2	**30 J**	<2.5	**110**	**33**	<1.3	<1.3	**14**	<2.5	<2.5	**100**	<2.5	**68**	**3.3 J**	**3.9 J**	<2.5	<2.5	**31**	<200	**22 J**
	CTMW-03S-20170601	06/01/17	PME3	<50	<5.0	**140**	**45**	<2.5	<2.5	**17**	<5.0	<5.0	<80	<5.0	**87**	<5.0	<5.0	<5.0	<5.0	**43**	<10	<25
	CTMW-03S-20170620	06/20/17	PME4	**63 J**	<5.0	**160**	**51**	<2.5	<2.5	**4.8**	<5.0	<5.0	<80	<5.0	**320**	**10 J**	<5.0	<5.0	<5.0	**110**	<10	<25
	CTMW-03S-20170718	07/18/17	PME5	<25	<2.5	**130**	**43**	<1.3	<1.3	**16**	<2.5	<2.5	<40	<2.5	**240**	**4.9 J**	<2.5	<2.5	<2.5	**47**	<5.0	<13
	CTMW-03S-20170823	08/23/17	PME6	**9.2 J**	**0.51 J**	**180**	**61**	<0.25	<0.25	**4.6**	**3.1**	**4.0**	**36**	<0.50	**520**	**7.2**	**3.0**	**0.56 J**	<0.50	**98**	<1.0 R	**8.1 J**
	CTMW-03S-20170921	09/21/17	PME7	<25	<2.5	**110**	**43**	<1.3	<1.3	**14**	<2.5	**4.9 J**	<40	<2.5	**330**	**4.6 J**	**8.6 J**	**57 J-**	<2.5	**44**	<5.0 R	<13
	CTMW-03S-20171003	10/03/17	PME8	<25	<2.5	**120**	**42**	<1.3	<1.3	**13**	<2.5	**29**	<40	<2.5	**320**	**6.5 J**	**3.9 J**	<2.5	<2.5	**45**	**41**	**31 J**
CTMW-03D	CTMW-03D-20170406	04/06/17	Baseline	**110 J-**	<5.0	**100**	**32**	<2.5	<2.5	**16**	<5.0	<5.0	<80	<5.0	**36**	<5.0	<5.0	<5.0	<5.0	**29**	<50 R	**36 J**
	CTMW-03D-20170505	05/05/17	PME1	<25	<2.5	**98**	**30**	<1.3	<1.3	**14**	<2.5	**4.3 J**	**9.1 J**	<2.5	**24**	<2.5	**5.8 J**	**12**	<2.5	**32**	<100 R	<13
	CTMW-03D-20170517	05/17/17	PME2	<25	<2.5	**110**	**31**	<1.3	<1.3	**15**	<2.5	**3.1 J**	**42 J**	<2.5	**22**	**3.9 J**	**5.3 J**	<2.5	<2.5	**36**	<200 R	**44 J**
	CTMW-03D-20170601	06/01/17	PME3	<50	<5.0	**120 J+**	**36**	<2.5	<2.5	**16**	<5.0	<5.0	<80	<5.0	**26**	**5.7 J**	<5.0	<5.0	<5.0	**40**	<10 R	<25
	CTMW-03D-20170620	06/20/17	PME4	<50	<5.0	**100**	**29**	<2.5	<2.5	**14**	<5.0	<5.0	<80	<5.0	**22**	<5.0	<5.0	<5.0	<5.0	**46**	<10	<25
	CTMW-03D-20170719	07/19/17	PME5	<50	<5.0	**110**	**31**	<2.5	<2.5	**15**	<5.0	<5.0	<80	<5.0	**25**	<5.0	**5.7 J**	<5.0	<5.0	**52**	<10	<25
	CTMW-03D-20170823	08/23/17	PME6	<25	<2.5	**110**	**31**	<1.3	<1.3	**14**	<2.5	<2.5	**89 J**	<2.5	**23**	**3.8 J**	**5.3 J**	<2.5	<2.5	**63**	<5.0	<13
	CTMW-03D-20170921	09/21/17	PME7	<25	<2.5	**100**	**29**	<1.3	<1.3	**13**	<2.5	<2.5	<40	<2.5	**25**	**3.1 J**	**6.0 J**	<2.5	<2.5	**49**	<5.0	<13
	CTMW-03D-20171003	10/03/17	PME8	<25	<2.5	**92**	**27**	<1.3	<1.3	**13**	<2.5	**18**	<40	<2.5	**22**	**3.3 J**	**3.4 J**	<2.5	<2.5	**48**	<5.0 UJ	**29 J**
CTMW-04S	CTMW-04S-20170405	04/05/17	Baseline	<50	<5.0	**65**	**33**	<2.5	<2.5	**9.9**	<5.0	<5.0	<800	<5.0	**38**	**7.2 J**	<5.0	<5.0	<5.0	**34**	<100	<25
	CTMW-04S-20170504	05/04/17	PME1	**41**	**0.89 J**	**120**	**35**	<0.25	<0.25	**6**	**1.2**	**1.5 J**	**100**	<0.50	**150**	**4.3**	**3.0**	<0.50	<0.50	**130**	<150	**5.5 J**
	CTMW-04S-20170517	05/17/17	PME2	**20**	<0.50	**130**	**44**	<0.25	<0.25	**0.55**	**2.0**	**2.3**	**29**	<0.50	**320**	**6.3**	**2.7**	<0.50	<0.50	**260**	**17**	**7.1 J**
	CTMW-04S-20170602	06/02/17	PME3	**11**	<0.50	**170**	**40**	<0.25	<0.25	**0.71**	**1.6**	**3.1**	**54**	<0.50	**290**	**6.5**	**2.0**	<0.50	<0.50	**230**	**9.6**	**11 J**
	CTMW-04S-20170620	06/20/17	PME4	<50	<5.0	**130**	**43**	<2.5	<2.5	**0.18**	**5.1 J**	<5.0	**140 J**	<5.0	**460**	**130**	<5.0	<5.0	<5.0	**320**	**16 J**	**26 J**
	CTMW-04S-20170718	07/18/17	PME5	<25	<2.5	**510**	**57**	<1.3	<1.3	**0.2**	**5.3**	<2.5	**170**	<2.5	**1,200**	**53**	<2.5	<2.5	<2.5	**480**	**6.4 J**	<13
	CTMW-04S-20170823	08/23/17	PME6	**16**	**2.1**	**440**	**99**	<0.25	<0.25	**0.12**	**1.5**	**1.6 J**	**460**	<0.50	**1,800**	**7.6**	**1.4 J**	<0.50	<0.50	**140**	**4.2**	**16 J**
	CTMW-04S-20170921	09/21/17	PME7	**26**	**1.3 J**	**370**	**100**	<0.50	<0.50	**0.086**	<1.0	**1.9 J**	**530**	<1.0	**1,400**	**160**	**1.3 J**	<1.0	<1.0	**40**	**3.8 J**	**5.0 J**
	CTMW-04S-20171003	10/03/17	PME8	<25	<2.5	**150**	**200**	<1.3	<1.3	**0.07**	<2.5	**13**	**62 J**	<2.5	**2,000**	**2.5 J**	<2.5	<2.5	<2.5	**190**	<5.0	**21 J**
	CTMW-04S-20180307	03/07/18	PME9	**20 J+**	**0.93 J**	**66**	**130**	<0.25	<0.25	**2**	**2.9**	**1.0 J**	**41**	<0.50 UJ	**930**	**6.2 J-**	**3.9**	<0.50	**0.99 J**	**150**	**42**	**7.4 J**
	CTMW-04S-20180621	06/21/18	PME10	**37 J**	**3.0 J**	**61**	**100**	<1.3	<1.3	**6**	**3.5 J**	<2.5	<40	<2.5	**1,600**	**5.5 J**	**8.1 J**	<2.5	<2.5	**140**	**55**	<13
CTMW-04D	CTMW-04D-20170405	04/05/17	Baseline	<50	<5.0	**72**	**39**	<2.5	<2.5	**18**	<5.0	<5.0	<800	<5.0	**16**	<5.0	<5.0	<5.0	<5.0	**32**	<100	<25
	CTMW-04D-20170504	05/04/17	PME1	**28**	<0.50	**78**	**45**	<0.25	<0.25	**22**	**0.50 J**	**1.5 J**	**52**	<0.50	**15**	**3.1**	**3.3 J-**	<0.50	<0.50	**33**	<150 R	**17 J**
	CTMW-04D-20170517	05/17/17	PME2	<25	<2.5	**92**	**41**	<1.3	<1.3	**19**	<2.5	<2.5	**71 J**	<2.5	**11**	**3.5 J**	<2.5	<2.5	<2.5	**33**	<250	<13
	CTMW-04D-20170517-FD	05/17/17	PME2	<25	<2.5	**95**	**43**	<1.3	<1.3	**20**	<2.5	<2.5	**65 J**	<2.5	**12**	**3.8 J**	**4.0 J**	<2.5	<2.5	**35**	<250	<13
	CTMW-04D-20170602	06/02/17	PME3	<50	<5.0	**110**	**49**	<2.5	<2.5	**22**	<5.0	<5.0	<80	<5.0	**22**	**5.8 J**	<5.0	<5.0	<5.0	**50**	<10	<25
	CTMW-04D-20170621	06/21/17	PME4	<50	<5.0	**80**	**40**	<2.5	<2.5	**18**	<5.0	<5.0	<80	<5.0	**11**	<5.0	<5.0	<5.0	<5.0	**32**	<10	<25
	CTMW-04D-20170718	07/18/17	PME5	<25	<2.5	**120**	**51**	<1.3	<1.3	**23**	<2.5	<2.5	<40	<2.5	**14**	**4.8 J**	**3.4 J**	<2.5	<2.5	**42**	<5.0	<13
	CTMW-04D-20170823	08/23/17	PME6	<25	<2.5	**93**	**41**	<1.3	<1.3	**18**	<2.5	<2.5	**100**	<2.5	**14 J**	**4.5 J**	**5.6 J**	<2.5	<2.5	**34**	<5.0	<13
	CTMW-04D-20170823-FD	08/23/17	PME6	<25	<2.5	**90**	**40**	<1.3	<1.3	**17**	<2.5	<2.5	**100**	<2.5	**21 J**	**4.7 J**	**5.1 J**	<2.5	<2.5	**32**	<5.0	<13
	CTMW-04D-20170920	09/20/17	PME7	<25	<2.5	**110**	**40**	<1.3	<1.3	**17**	<2.5	<2.5	**90 J**	<2.5	**11**	**4.8 J**	**5.2 J**	<2.5	<2.5	**43**	<5.0	<13
	CTMW-04D-20171003	10/03/17	PME8	**55**	<2.5	**110**	**40**	<1.3	<1.3	**17**	<2.5	**8.6 J**	<40	<2.5	**9.4**	**4.0 J**	**3.2 J**	<2.5	<2.5	**45**	<5.0 UJ	**19 J**
	CTMW-04D-20180307	03/07/18	PME9	**30 J**	<2.5	**96**	**63**	<1.3	<1.3	**13**	<2.5	<2.5	<40	<2.5	**27**	<2.5	**4.3 J**	<2.5	<2.5	**60**	**17**	<13
	CTMW-04D-20180621	06/21/18	PME10	<25	<2.5	**110**	**56**	<1.3	<1.3	**15**	<2.5	**2.5 J**	**65 J**	<2.5	**19**	**2.6 J**	**5.1 J**	<2.5	<2.5	**73**	**22**	**40 J**

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study
In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Dissolved Metals by USEPA Method 6020 (ug/L)																		
				Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Nickel	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
CTMW-05S	CTMW-05S-20170621	06/21/17	PME4	<50	<5.0	**88**	**50**	<2.5	<2.5	**4.9**	<5.0	<5.0	<80	<5.0	**190**	<5.0	<5.0	<5.0	<5.0	**170**	<10	<25
	CTMW-05S-20170717	07/17/17	PME5	<25	<2.5	**130**	**54**	<1.3	<1.3	**3**	<2.5	<2.5	<40	<2.5	**260**	**5.5 J**	<2.5	<2.5	<2.5	**250**	<5.0	<13
	CTMW-05S-20170822	08/22/17	PME6	**120**	<0.50	**110**	**56**	<0.25	<0.25	**3.2**	**1.2**	**1.9 J**	**80**	<0.50	**210**	**4.1**	**4.1**	<0.50	<0.50	**160**	<1.0	**5.5 J**
	CTMW-05S-20170919	09/19/17	PME7	<10	<1.0	**140**	**53**	<0.50	<1.3	**2.1**	**1.3 J**	**2.8 J**	<16	<1.0	**230**	**4.9**	**4.2**	<1.0	<1.0	**170**	<10	**9.3 J**
	CTMW-05S-20171004	10/04/17	PME8	**530**	<0.50	**110**	**49**	<0.25	<0.25	**6.5**	**0.52 J**	**85**	**17 J**	**8.0**	**190**	**2.6**	**3.3**	<0.50	<0.50	**110**	**20**	**74**
CTMW-05D	CTMW-05D-20170621	06/21/17	PME4	<50	<5.0	**85**	**34**	<2.5	<2.5	**14**	<5.0	<5.0	<80	<5.0	**16**	<5.0	<5.0	<5.0	<5.0	**40**	<10	<25
	CTMW-05D-20170621-FD	06/21/17	PME4	<50	<5.0	**94**	**33**	<2.5	<2.5	**14**	<5.0	<5.0	<80	<5.0	**19**	<5.0	**18 J**	<5.0	<5.0	**37**	<10	<25
	CTMW-05D-20170718	07/18/17	PME5	<25	<2.5	**130**	**46**	<1.3	<1.3	**19**	<2.5	<2.5	<40	<2.5	**21**	**3.5 J**	**6.1 J**	<2.5	<2.5	**57 J+**	<5.0 R	<13
	CTMW-05D-20170822	08/22/17	PME6	**92 J**	<5.0	**110**	**34**	<2.5	<2.5	**14**	<5.0	<5.0	**130 J**	<5.0	**12**	**5.2 J**	**6.6 J**	<5.0	<5.0	**52**	<10	<25
	CTMW-05D-20170919	09/19/17	PME7	<25	<2.5	**120**	**36**	<1.3	<5.0	**14**	<2.5	<2.5	<40	<2.5	**21**	**3.9 J**	**5.6 J**	<2.5	<2.5	**56**	<100	<13
	CTMW-05D-20171004	10/04/17	PME8	<25	**3.6 J**	**110**	**34**	<1.3	<1.3	**13**	<2.5	**16 J-**	<40	<2.5	**17**	<2.5	**5.2 J**	<2.5	<2.5	**60**	**21**	**25 J**
CTMW-06S	CTMW-06S-20170621	06/21/17	PME4	**56 J**	<5.0	**190**	**210**	<2.5	<2.5	**0.16**	<5.0	<5.0	**110 J**	<5.0	**1,600**	**15 J**	**8.3 J**	<5.0	<5.0	**450**	<10	<25
	CTMW-06S-20170717	07/17/17	PME5	<25	**4.0 J**	**660**	**1,100**	<1.3	<1.3	**0.12**	**3.1 J**	<2.5	<40	<2.5	**4,300**	**34**	<2.5	<2.5	<2.5	**370**	**11**	<13
	CTMW-06S-20170822	08/22/17	PME6	**58**	**1.6 J**	**120**	**1,400**	<0.25	<0.25	**0.062**	**3.9**	**1.7 J**	**410**	<0.50	**4,700**	**11**	**1.2 J**	<0.50	<0.50	**19**	**2.7**	**5.9 J**
	CTMW-06S-20170919	09/19/17	PME7	**43**	**1.9 J**	**190**	**1,200**	<0.50	<0.50	**0.053**	**1.3 J**	**2.9 J**	**210**	<1.0	**5,400**	**8.2**	**1.1 J**	<1.0	<1.0	**1.4 J**	**2.0 J**	**16 J**
	CTMW-06S-20171004	10/04/17	PME8	**7.2 J**	**2.1**	**210**	**920**	<0.25	<0.25	**0.047**	<0.50	<0.50	**100**	<0.50	**5,600**	**4.1**	**0.82 J**	<0.50	<0.50	**1.3**	**1.4 J**	**3.3 J**
	CTMW-06S-20180306	03/06/18	PME9	<25	<2.5	**430**	**510**	<1.3	<1.3	**0.027**	<2.5	<2.5	**89 J**	<2.5	**1,500**	**3.3 J**	<2.5	<2.5	<2.5	**5.6**	<5.0	<13
	CTMW-06S-20180622	06/22/18	PME10	**27 J+**	**1.3 J**	**300**	**500**	<0.25	**0.25 J**	**0.035**	<0.50	**0.75 J**	**66**	<0.50	**630**	**2.8**	**0.59 J**	<0.50	<0.50	**13**	**4.6**	<2.5
CTMW-06D	CTMW-06D-20170622	06/22/17	PME4	<10	<1.0	**74**	**37**	<0.50	<0.50	**18**	<1.0	**1.9 J**	**96 J**	<1.0	**50**	**3.6 J**	**3.4 J**	<1.0	<1.0	**74**	<10	**7.2 J**
	CTMW-06D-20170717	07/17/17	PME5	<25	<2.5	**110**	**46**	<1.3	<1.3	**22**	<2.5	<2.5	<40	<2.5	**61**	**4.7 J**	**2.9 J**	<2.5	<2.5	**110**	<5.0	<13
	CTMW-06D-20170717-FD	07/17/17	PME5	<25	<2.5	**110**	**46**	<1.3	<1.3	**23**	<2.5	**3.8 J**	<40	<2.5	**55**	**5.4 J**	**3.8 J**	<2.5	<2.5	**110**	<5.0	<13
	CTMW-06D-20170822	08/22/17	PME6	<50	<5.0	**90**	**40**	<2.5	<2.5	**15**	<5.0	<5.0	<80	<5.0	**92**	**8.0 J**	**7.4 J**	<5.0	<5.0	**130**	<10 R	<25
	CTMW-06D-20170919	09/19/17	PME7	<25	<2.5	**99**	**46**	<1.3	<5.0	**13**	<2.5	<2.5	<40	<2.5	**140**	**5.8 J**	**11**	**36 J**	<2.5	**160**	<100 R	<13
	CTMW-06D-20170919-FD	09/19/17	PME7	<25	<2.5	**100**	**46**	<1.3	<5.0	**13**	<2.5	<2.5	<40	<2.5	**140**	**5.7 J**	**5.1 J**	<2.5 UJ	<2.5	**160**	<100 R	<13
	CTMW-06D-20171004	10/04/17	PME8	<25	<2.5	**110**	**64**	<1.3	<1.3	**12**	<2.5	<2.5	<40	<2.5	**180**	**2.7 J**	**4.1 J**	<2.5	<2.5	**170**	**19**	<13
	CTMW-06D-20171004-FD	10/04/17	PME8	**35 J**	<2.5	**120**	**64**	<1.3	<1.3	**12**	<2.5	<2.5	<40	<2.5	**180**	**2.6 J**	**4.3 J**	<2.5	<2.5	**180**	**20**	<13
	CTMW-06D-20180307	03/07/18	PME9	**23 J+**	<0.50	**94**	**310**	<0.25	<0.25	**4.6**	**0.55 J**	<0.50	**33**	<0.50	**280**	**3.1**	**2.3**	<0.50	<0.50	**160**	**10**	**5.0 J**
	CTMW-06D-20180622	06/22/18	PME10	**46 J+**	<0.50	**77**	**340**	<0.25	<0.25	**2.2**	**0.74 J**	**0.63 J**	**29**	<0.50	**320**	**3.8**	**2.1**	<0.50	<0.50	**270**	**10**	<2.5
CTMW-07S	Not Analyzed	10/09/17	PME8	**Well Dry; Unable to sample**																		
	CMTW-07S-20180306	03/06/18	PME9	<25	<2.5	**120**	**30**	<1.3	<1.3	**14**	<2.5	**3.6 J**	<40	<2.5	**61**	<2.5	**5.5 J**	**38 J-**	<2.5	**47**	**44**	**40 J**
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**																		
CTMW-07D	CTMW-07D-20171009	10/09/17	PME8	**30**	**1.1 J**	**14**	**12**	<0.25	<0.25	**0.023**	<0.50	**0.55 J**	**20 J+**	<0.50	**5.9**	**0.68 J**	**2.1**	<0.50	<0.50	**5.0**	**7.1**	**2.5 J**
	CTMW-07D-20180306	03/06/18	PME9	<25	<2.5	<2.5	**63**	<1.3	<1.3	**0.027**	<2.5	**5.2 J**	<40	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<13
	CTMW-07D-20180622	06/22/18	PME10	**62 J+**	<0.50	**16**	**17**	<0.25	<0.25	**0.014**	<0.50	<0.50	<8.0	<0.50	**10**	<0.50	**1.3 J**	<0.50	<0.50	**7.1**	**9.8**	<2.5

Notes:

USEPA	United States Environmental Protection Agency
ug/L	Microgram per liter
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
–	Not Analyzed

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Detected VOCs by USEPA Method 8260B (ug/L)																					
				Acetone	Benzene	Bromodichloro-methane	Bromoform	2-Butanone (MEK)	Carbon Tetrachloride	Chlorobenzene	Chloroform	1,1-Dichloroethene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Hexachloro-butadiene	2-Hexanone	Methylene Chloride	Methyl-t-Butyl Ether (MTBE)	Naphthalene	p-Isopropyltoluene	Tetrachloro-ethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	Trichloro-ethene
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	<400	<10	<10	<16	<100	<10	<10	**950**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
CTIW-01D	CTIW-01D-20170406	04/06/17	Baseline	**2,400**	<6.3	<6.3	<10	**1,200**	<6.3	<6.3	**1,100**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
CTIW-02S	CTIW-02S-20170403	04/03/17	Baseline	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**960**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
CTIW-02D	CTIW-02D-20170404	04/04/17	Baseline	**650**	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,400**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
CTIW-03S	CTIW-03S-20170404	04/04/17	Baseline	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**780**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
CTIW-03D	CTIW-03D-20170404	04/04/17	Baseline	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,700**	<6.3	**18**	<6.3	**7.0 J**	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
CTMW-01S	CTMW-01S-20170404	04/04/17	Baseline	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**850**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-01S-20170503	05/03/17	PME1	**2,800**	<2.5	<2.5	<4.0	**360**	<2.5	<2.5	**420**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-01S-20170516	05/16/17	PME2	<1,000	<25	<25	<40	**1,200**	<25	<25	**340**	<25	<25	<25	<25	<25	<250	<88	<25	<40	<25	<25	<40	<40	<25
	CTMW-01S-20170531	05/31/17	PME3	<250	<6.3	<6.3	<10	**1,300**	<6.3	<6.3	**230**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	**45 J**	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01S-20170619	06/19/17	PME4	**300 J**	<6.3	<6.3	<10	**3,500**	<6.3	<6.3	**140**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	**27 J**	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01S-20170720	07/20/17	PME5	<400	<10	<10	<16	**2,400**	<10	<10	**130**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-01S-20170824	08/24/17	PME6	**630 J**	<13	<13	<20	**6,400**	<13	<13	**86**	<13	<13	<13	<13	<13	<130	**78 J**	<13	<20	<13	<13	<20	<20	<13
	CTMW-01S-20170920	09/20/17	PME7	**750 J**	<13	<13	<20	**7,200**	<13	<13	**19 J**	<13	<13	<13	<13	<13	<130	<44	<13	<20	<13	<13	<20	<20	<13
	CTMW-01S-20171003	10/03/17	PME8	<1,000 R	<25 R	<25 R	<40 R	**11,000 J-**	<25 R	<25 R	<25 R	**35 J**	<25 R	<25 R	<25 R	<25 R	<250 R	**140 J**	<25 R	<40 R	<25 R	<25 R	<40 R	<40 R	<25 R
	CTMW-01S-20180305	03/05/18	PME9	**600**	**0.44 J**	<0.25	<0.40	**6,600**	<0.25	<0.25	**3.2**	<0.25	**0.45 J**	**0.55**	**0.58**	<0.25	**4.5 J**	**1.4 J**	**0.36 J**	<0.40	**0.62**	<0.25	**1.0**	**0.49 J**	<0.25
	CTMW-01S-20180621	06/21/18	PME10	**54 J**	<0.25 UJ	<0.25 UJ	<0.40 UJ	<2.5 UJ	<0.25 UJ	<0.25 UJ	<0.25 UJ	<0.25 UJ	<0.25 UJ	<0.25 UJ	<0.25 UJ	<0.25 UJ	<2.5 UJ	<0.88 UJ	<0.25 UJ	<0.40 UJ	<0.25 UJ	<0.25 UJ	<0.40 UJ	<0.40 UJ	<0.25 UJ
CTMW-01D	CTMW-01D-20170403	04/03/17	Baseline	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,800**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-01D-20170503	05/03/17	PME1	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,700**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01D-20170516	05/16/17	PME2	<400	<10	<10	<16	<100	<10	<10	**1,700**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-01D-20170531	05/31/17	PME3	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,800**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01D-20170619	06/19/17	PME4	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,600**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01D-20170720	07/20/17	PME5	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,700**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01D-20170720-FD	07/20/17	PME5	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,700**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-01D-20170824	08/24/17	PME6	**320 J**	<5.0	<5.0	<8.0	**150**	<5.0	<5.0	**1,500**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-01D-20170920	09/20/17	PME7	**440**	<5.0	<5.0	<8.0	**360**	<5.0	<5.0	**1,500**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-01D-20171003	10/03/17	PME8	**560 J**	<10	<10	<16	**440**	<10	<10	**1,300**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-01D-20180305	03/05/18	PME9	**640**	<2.5	<2.5	<4.0	**730**	<2.5	<2.5	**750**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**13 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-01D-20180305-FD	03/05/18	PME9	**650**	<2.5	<2.5	<4.0	**650**	<2.5	<2.5	**720**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**12 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-01D-20180621	06/21/18	PME10	**440**	<5.0	<5.0	<8.0	**940 J**	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**27 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-01D-20180621-FD	06/21/18	PME10	**510 J**	<5.0 UJ	<5.0 UJ	<8.0 UJ	**1,300 J**	<5.0 UJ	<5.0 UJ	**1,500 J**	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ	<5.0 UJ	<50 UJ	**36 J**	<5.0 UJ	<8.0 UJ	<5.0 UJ	<5.0 UJ	<8.0 UJ	<8.0 UJ	<5.0 UJ
CTMW-02S	CTMW-02S-20170405	04/05/17	Baseline	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**950**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02S-20170504	05/04/17	PME1	**420**	**0.37 J**	<0.25	<0.40	**38**	<0.25	<0.25	**620**	<0.25	<0.25	<0.25	<0.25	<0.25	<2.5	<0.88	**0.87**	<0.40	<0.25	**0.28 J**	**0.57 J**	<0.40	**1.2**
	CTMW-02S-20170516	05/16/17	PME2	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**420**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-02S-20170601	06/01/17	PME3	**47 J**	<0.63	<0.63	<1.0	<6.3	<0.63	<0.63	**520**	<0.63	<0.63	<0.63	<0.63	<0.63	<6.3	**4.3 J**	<0.63	<1.0	<0.63	<0.63	<1.0	<1.0	<0.63
	CTMW-02S-20170620	06/20/17	PME4	**260**	**1.0 J**	<0.63	<1.0	**2,000**	<0.63	<0.63	**210**	<0.63	<0.63	<0.63	<0.63	<0.63	<6.3	**24**	<0.63	<1.0	<0.63	<0.63	**3.0**	<1.0	<0.63
	CTMW-02S-20170719	07/19/17	PME5	<250	<6.3	<6.3	<10	**1,600**	<6.3	<6.3	**180**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	**41 J**	<6.3	**12 J**	<6.3	<6.3	<10	<10	<6.3
	Not Analyzed	08/24/17	PME6	**Well Dry; Unable to sample**																					
	CTMW-02S-20170920	09/20/17	PME7	<250	<6.3	<6.3	<10	**1,500**	<6.3	<6.3	**78**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	**25 J**	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02S-20171003	10/03/17	PME8	<200 R	<5.0 R	<5.0 R	<8.0 R	**1,200 J-**	<5.0 R	<5.0 R	**13 J-**	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<50 R	**27 J**	<5.0 R	<8.0 R	<5.0 R	<5.0 R	<8.0 R	<8.0 R	<5.0 R
	CTMW-02S-20180306	03/06/18	PME9	<10	**0.66**	<0.25	<0.40	**6.9**	<0.25	<0.25	**1.9**	<0.25	**0.59**	**0.28 J**	**0.36 J**	<0.25	<2.5	<0.88	**0.30 J**	<0.40	**0.60**	<0.25	**3.8**	**0.43 J**	<0.25
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**																					
CTMW-02D	CTMW-02D-20170404	04/04/17	Baseline	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,500**	<6.3	**9.4 J**	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02D-20170404-FD	04/04/17	Baseline	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,500**	<6.3	**9.4 J**	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02D-20170503	05/03/17	PME1	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,500**	<6.3	**13**	<6.3	**6.5 J**	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02D-20170503-FD	05/03/17	PME1	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,500**	<6.3	**14**	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02D-20170517	05/17/17	PME2	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	**17**	<5.0	**6.7 J**	<5.0	<50	**29 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-02D-20170601	06/01/17	PME3	<400	<10	<10	<16	<100	<10	<10	**1,900**	<10	**19 J**	<10	<10	<10	<100	**38 J**	<10	<16	<10	<10	<16	<16	<10
	CTMW-02D-20170601-FD	06/01/17	PME3	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,800**	<5.0	**15**	<5.0	**7.2 J**	<5.0	<50	**22 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-02D-20170619	06/19/17	PME4	<400	<10	<10	<16	<100	<10	<10	**1,500**	<10	**16 J**	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-02D-20170619-FD	06/19/17	PME4	<200	<5.0	<5.0	<8.0	**82 J**	<5.0	<5.0	**1,600**	<5.0	**16**	<5.0	**7.9 J**	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-02D-20170719	07/19/17	PME5	<250	<6.3	<6.3	<10	**290**	<6.3	<6.3	**1,600**	<6.3	**12 J**	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-02D-20170824	08/24/17	PME6	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,400**	<5.0	**18**	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-02D-20170920	09/20/17	PME7	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**1,500**	<2.5	**15**	<2.5	**6.4**	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-02D-20171003	10/03/17	PME8	<400	<10	<10	<16	<100	<10	<10	**1,500**	<10	**22**	<10	**10 J**	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-02D-20180305	03/05/18	PME9	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**990**	<5.0	**7.5 J**	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-02D-20180621	06/21/18	PME10	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,600**	<5.0	**13**	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Detected VOCs by USEPA Method 8260B (ug/L)																				
				Acetone	Benzene	Bromodichloro-methane	Bromoform	2-Butanone (MEK)	Carbon Tetrachloride	Chlorobenzene	Chloroform	1,1-Dichloroethene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Hexachloro-butadiene	2-Hexanone	Methylene Chloride	Methyl-t-Butyl Ether (MTBE)	Naphthalene	p-Isopropyltoluene	Tetrachloro-ethene	1,2,3-Triehlorobenzene	1,2,4-Triehlorobenzene	Trichloro-ethene
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**930**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**21 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03S-20170505	05/05/17	PME1	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,100**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**18 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03S-20170517	05/17/17	PME2	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**970**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**17 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-03S-20170601	06/01/17	PME3	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,200**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**18 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03S-20170620	06/20/17	PME4	**250**	<2.5	<2.5	<4.0	**690**	<2.5	<2.5	**920**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**16 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-03S-20170718	07/18/17	PME5	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03S-20170823	08/23/17	PME6	<100	<2.5	<2.5	<4.0	**280**	<2.5	<2.5	**900**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**19 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-03S-20170921	09/21/17	PME7	<50	<1.3	<1.3	<2.0	<13	<1.3	<1.3	**510**	<1.3	<1.3	<1.3	<1.3	<1.3	<13	<4.4	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	<1.3
	CTMW-03S-20171003	10/03/17	PME8	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**700**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
CTMW-03D	CTMW-03D-20170406	04/06/17	Baseline	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**880**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-03D-20170505	05/05/17	PME1	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**19 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03D-20170517	05/17/17	PME2	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,100**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**26 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03D-20170601	06/01/17	PME3	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**1,400**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**11 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	**2.5 J**
	CTMW-03D-20170620	06/20/17	PME4	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,200**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**29 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03D-20170719	07/19/17	PME5	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-03D-20170823	08/23/17	PME6	<50	<1.3	<1.3	<2.0	<13	<1.3	<1.3	**1,100**	<1.3	<1.3	<1.3	<1.3	<1.3	<13	<4.4	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	**3.0**
	CTMW-03D-20170921	09/21/17	PME7	<10	<0.25	<0.25	<0.40	<2.5	**0.58**	<0.25	**1,100**	<0.25	<0.25	<0.25	<0.25	<0.25	<2.5	<0.88	**1.2**	<0.40	<0.25	**0.37 J**	<0.40	<0.40	**2.9**
	CTMW-03D-20171003	10/03/17	PME8	<400	<10	<10	<16	<100	<10	<10	**1,000**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
CTMW-04S	CTMW-04S-20170405	04/05/17	Baseline	<10	<0.25	<0.25	**0.82 J**	<2.5	**0.41 J**	<0.25	**720**	<0.25	<0.25	<0.25	<0.25	**0.58**	<2.5	<0.88	**0.86**	<0.40	<0.25	**0.26 J**	<0.40	<0.40	**2.0**
	CTMW-04S-20170504	05/04/17	PME1	**220**	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**810**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-04S-20170517	05/17/17	PME2	**1,800**	<2.5	<2.5	<4.0	**1,000**	<2.5	<2.5	**640**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-04S-20170602	06/02/17	PME3	**860**	<2.5	<2.5	<4.0	**370**	<2.5	<2.5	**610**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**9.7 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-04S-20170620	06/20/17	PME4	**1,900**	**0.46 J**	<0.25	<0.40	**670**	<0.25	<0.25	**590**	<0.25	<0.25	<0.25	<0.25	**0.36 J**	**3.3 J**	**2.6**	**0.81**	<0.40	<0.25	<0.25	<0.40	<0.40	**0.92**
	CTMW-04S-20170718	07/18/17	PME5	**920**	<2.5	<2.5	<4.0	**650**	<2.5	<2.5	**620**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**15 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-04S-20170823	08/23/17	PME6	**1,200**	<1.3	<1.3	<2.0	**1,300**	<1.3	<1.3	**520**	<1.3	<1.3	<1.3	<1.3	<1.3	<13	**24**	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	<1.3
	CTMW-04S-20170921	09/21/17	PME7	**770**	<0.25	<0.25	<0.40	**1,900**	<0.25	<0.25	**67**	<0.25	<0.25	<0.25	<0.25	<0.25	<2.5	**1.7 J**	**0.49 J**	<0.40	<0.25	<0.25	<0.40	<0.40	<0.25
	CTMW-04S-20171003	10/03/17	PME8	**89**	<0.25	<0.25	<0.40	**140**	<0.25	<0.25	**48**	<0.25	<0.25	<0.25	<0.25	<0.25	<2.5	**4.3**	**0.89**	<0.40	<0.25	<0.25	<0.40	<0.40	<0.25
	CTMW-04S-20180307	03/07/18	PME9	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**580**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-04S-20180621	06/21/18	PME10	<50	<1.3	<1.3	<2.0	<13	<1.3	<1.3	**570**	<1.3	<1.3	<1.3	<1.3	<1.3	<13	<4.4	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	<1.3
CTMW-04D	CTMW-04D-20170405	04/05/17	Baseline	<50	<1.3	<1.3	<2.0	<13	<1.3	<1.3	**1,600**	<1.3	**5.1**	<1.3	**3.7**	<1.3	<13	<4.4	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	<1.3
	CTMW-04D-20170504	05/04/17	PME1	<10	<0.25	<0.25	**0.81 J**	<2.5	**0.46 J**	<0.25	**1,400**	<0.25	**2.8**	**0.34 J**	**1.9**	<0.25	<2.5	<0.88	**0.85**	<0.40	<0.25	**0.36 J**	<0.40	<0.40	**1.1**
	CTMW-04D-20170517	05/17/17	PME2	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,600**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20170517-FD	05/17/17	PME2	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,600**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20170602	06/02/17	PME3	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,600**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**24 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20170621	06/21/17	PME4	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,600**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	**34 J**	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-04D-20170718	07/18/17	PME5	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,700**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20170823	08/23/17	PME6	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,700**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**24 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20170823-FD	08/23/17	PME6	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,700**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**27 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20170920	09/20/17	PME7	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,400**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20171003	10/03/17	PME8	<400	<10	<10	<16	<100	<10	<10	**1,300**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-04D-20180307	03/07/18	PME9	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**960**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-04D-20180621	06/21/18	PME10	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0

Appendix D - Summary of Groundwater Analytical - Biological Reduction Study

In-Situ Chromium Treatability Study

Well Location	Sample ID	Sample Date	Week	Detected VOCs by USEPA Method 8260B (ug/L)																				
				Acetone	Benzene	Bromodichloro-methane	Bromoform	2-Butanone (MEK)	Carbon Tetrachloride	Chlorobenzene	Chloroform	1,1-Dichloroethene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Hexachloro-butadiene	2-Hexanone	Methylene Chloride	Methyl-t-Butyl Ether (MTBE)	Naphthalene	p-Isopropyltoluene	Tetrachloro-ethene	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	Trichloro-ethene
CTMW-05S	CTMW-05S-20170621	06/21/17	PME4	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**960**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**14 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-05S-20170717	07/17/17	PME5	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**1,100**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-05S-20170822	08/22/17	PME6	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**750**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-05S-20170919	09/19/17	PME7	<50	<1.3	<1.3	<2.0	<13	<1.3	<1.3	**410**	<1.3	<1.3	<1.3	<1.3	<1.3	<13	<4.4	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	<1.3
	CTMW-05S-20171004	10/04/17	PME8	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**630**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
CTMW-05D	CTMW-05D-20170621	06/21/17	PME4	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**30 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-05D-20170621-FD	06/21/17	PME4	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**35 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-05D-20170718	07/18/17	PME5	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,300**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-05D-20170822	08/22/17	PME6	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,200**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-05D-20170919	09/19/17	PME7	<100	<2.5	<2.5	<4.0	<25	<2.5	<2.5	**630**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<8.8	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-05D-20171004	10/04/17	PME8	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,000**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
CTMW-06S	CTMW-06S-20170621	06/21/17	PME4	**1,700**	<2.5	<2.5	<4.0	**730**	<2.5	<2.5	**670**	<2.5	<2.5	<2.5	<2.5	<2.5	<25	**18 J**	<2.5	<4.0	<2.5	<2.5	<4.0	<4.0	<2.5
	CTMW-06S-20170717	07/17/17	PME5	**1,400**	<10	<10	<16	**2,800**	<10	<10	**610**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-06S-20170822	08/22/17	PME6	**1,400**	<5.0	<5.0	<8.0	**3,200**	<5.0	<5.0	**320**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	**30 J**	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-06S-20170919	09/19/17	PME7	**780 J-**	<5.0 R	<5.0 R	<8.0 R	**3,700 J-**	<5.0 R	<5.0 R	**170 J-**	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<5.0 R	<50 R	**41 J-**	<5.0 R	<8.0 R	<5.0 R	<5.0 R	<8.0 R	<8.0 R	<5.0 R
	CTMW-06S-20171004	10/04/17	PME8	**620 J-**	**2.6 J**	<2.5 R	<4.0 R	**4,000 J-**	<2.5 R	<2.5 R	**120 J-**	<2.5 R	<2.5 R	<2.5 R	<2.5 R	<2.5 R	<25 R	**13 J**	<2.5 R	<4.0 R	<2.5 R	<2.5 R	<4.0 R	<4.0 R	<2.5 R
	CTMW-06S-20180306	03/06/18	PME9	<10	<0.25	<0.25	<0.40	<2.5	<0.25	<0.25	**16**	<0.25	**0.43 J**	**0.74**	<0.25	**0.52**	<2.5	**1.7 J**	**0.30 J**	<0.40	<0.25	<0.25	**0.64 J**	<0.40	<0.25
	CTMW-06S-20180622	06/22/18	PME10	**12 J**	<0.25 UJ	<0.25 UJ	<0.40 UJ	<2.5 UJ	<0.25 UJ	<0.25 UJ	**4.9 J**	<0.25 UJ	<0.25 UJ	**0.33 J**	<0.25 UJ	**0.30 J**	<2.5 UJ	**1.4 J**	<0.25 UJ	<0.40 UJ	<0.25 UJ	<0.25 UJ	**0.49 J**	<0.40 UJ	<0.25 UJ
CTMW-06D	CTMW-06D-20170622	06/22/17	PME4	<400	<10	<10	<16	<100	<10	<10	**1,500**	<10	<10	<10	<10	<10	<100	<35	<10	<16	<10	<10	<16	<16	<10
	CTMW-06D-20170717	07/17/17	PME5	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,700**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-06D-20170717-FD	07/17/17	PME5	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,700**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-06D-20170822	08/22/17	PME6	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,400**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-06D-20170919	09/19/17	PME7	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**1,200**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	CTMW-06D-20170919-FD	09/19/17	PME7	**250**	<0.25	**0.27 J**	<0.40	**150**	**0.54**	<0.25	**1,000**	<0.25	**3.6**	**0.32 J**	**1.0**	**0.45 J**	<2.5	**1.1 J**	**0.68**	<0.40	<0.25	**0.44 J**	**0.72 J**	<0.40	**1.0**
	CTMW-06D-20171004	10/04/17	PME8	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,200**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-06D-20171004-FD	10/04/17	PME8	<250	<6.3	<6.3	<10	<63	<6.3	<6.3	**1,200**	<6.3	<6.3	<6.3	<6.3	<6.3	<63	<22	<6.3	<10	<6.3	<6.3	<10	<10	<6.3
	CTMW-06D-20180307	03/07/18	PME9	**69 J**	<1.3	<1.3	<2.0	**140**	<1.3	<1.3	**440 J**	<1.3	<1.3	<1.3	<1.3	<1.3	<13	**11**	<1.3	<2.0	<1.3	<1.3	<2.0	<2.0	<1.3
	CTMW-06D-20180622	06/22/18	PME10	<50 UJ	<1.3 UJ	<1.3 UJ	<2.0 UJ	<13 UJ	<1.3 UJ	<1.3 UJ	**270 J**	<1.3 UJ	<1.3 UJ	<1.3 UJ	<1.3 UJ	<1.3 UJ	<13 UJ	**19 J**	<1.3 UJ	<2.0 UJ	<1.3 UJ	<1.3 UJ	<2.0 UJ	<2.0 UJ	<1.3 UJ
CTMW-07S	Not Analyzed	10/09/17	PME8	**Well Dry; Unable to sample**																					
	CMTW-07S-20180306	03/06/18	PME9	<200	<5.0	<5.0	<8.0	<50	<5.0	<5.0	**830**	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<18	<5.0	<8.0	<5.0	<5.0	<8.0	<8.0	<5.0
	Not Analyzed	06/22/18	PME10	**Well Dry; Unable to sample**																					
CTMW-07D	CTMW-07D-20171009	10/09/17	PME8	<10	<0.25	<0.25	<0.40	<2.5	<0.25	**0.64**	**11**	<0.25	**0.90**	<0.25	<0.25	<0.25	<2.5	<0.88	<0.25	<0.40	<0.25	<0.25	<0.40	<0.40	<0.25
	CTMW-07D-20180306	03/06/18	PME9	<10	<0.25	<0.25	<0.40	<2.5	<0.25	<0.25	**1.5**	<0.25	<0.25	<0.25	<0.25	<0.25	<2.5	<0.88	<0.25	<0.40	<0.25	<0.25	<0.40	<0.40	<0.25
	CTMW-07D-20180622	06/22/18	PME10	**34**	<0.25	<0.25	<0.40	**5.3**	<0.25	<0.25	**0.41 J**	<0.25	<0.25	<0.25	<0.25	<0.25	<2.5	**0.97 J**	<0.25	<0.40	<0.25	<0.25	<0.40	<0.40	<0.25

Notes:

USEPA	United States Environmental Protection Agency
ug/L	Microgram per liter
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
–	Not Analyzed

Appendix E
Data Validation Summary Report

Data Validation Summary Report
(DVSR ID: TetraTech-M12Addendum-2019)
Addendum to the In-Situ Chromium Treatability Study Results Report
Nevada Environmental Response Trust Site
Henderson, Nevada

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Acronyms/Abbreviations	Definition
CCB	continuing calibration blank
CCV	continuing calibration verification
DL	detection limit
DMC	deuterated monitoring compound
DQO	data quality objectives
DUP	duplicate
DVSR	data validation summary report
EB	equipment blank
EDD	electronic data delivery
EDL	estimated detection limit
EMPC	estimated maximum possible concentration
FD	field duplicate
GC-MS	gas chromatography-mass spectroscopy
ICAL	initial calibration
ICB	initial calibration blank
ICS	interference check samples
ICV	initial calibration verification
LCS/LCSD	laboratory control sample/laboratory control sample duplicate
MDL	method detection limit
mg/kg	milligram per kilogram
mg/L	milligram per liter
MS/MSD	matrix spike/matrix spike duplicate
MSI	matrix spike-insoluble
N	normal field sample
N/A	not applicable
NDEP	Nevada Division of Environmental Protection
NERT	Nevada Environmental Response Trust
NFG	National Functional Guidelines
%C	percent completeness
%D	percent difference or drift
%R	percent recovery
%RSD	percent relative standard deviation

Acronyms/Abbreviations	Definition
PARCCS	precision, accuracy, representativeness, comparability, completeness, sensitivity
PQL	practical quantitation limit
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
SDG	sample delivery group
SO	soil
SQL	sample quantitation limit
SVOC	semivolatile organic compound
Tetra Tech	Tetra Tech, Inc.
Treatability Study	In-Situ Chromium Treatability Study
USEPA	United States Environmental Protection Agency
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
VOC	volatile organic compound
WG	groundwater
WQ	water quality

1.0 INTRODUCTION

On behalf of the Nevada Environmental Response Trust (NERT), Tetra Tech, Inc. (Tetra Tech) has prepared this Data Validation Summary Report (DVSR) to assess the validity and usability of laboratory analytical data from the additional groundwater monitoring completed for the biological reduction study component of the In-Situ Chromium Treatability Study (Treatability Study) for the NERT site, located in Clark County, Nevada. Sampling protocol can be found in the *In-Situ Chromium Treatability Study Work Plan* (Tetra Tech, 2016). Tetra Tech performed the Treatability Study, which included the collection and analyses of samples to assess the effectiveness of the Treatability Study. Tetra Tech collected additional quality assurance and quality control (QA/QC) samples to aid in assessing data quality. Data associated with the In-Situ Chromium Treatability Study that were submitted previously as an appendix to the *In-Situ Chromium Treatability Study Results Report* (Tetra Tech, 2018) are not included in this DVSR.

TestAmerica provided laboratory analytical services. The analyses were performed by the methods shown in Table 1.

The laboratory assigns job numbers, also called sample delivery groups (SDGs), to all samples. The samples associated with QA/QC are designed to document the data quality of the samples in each sampling round or within an SDG. Table 2 cross-references each sample with its analysis, SDG, collection date, client sample number, laboratory sample number, QC type, matrix, and stage of validation. Samples included in Table 2 are those submitted in the DVSR electronic data deliverable (EDD). Field readings and microbial data for the samples in Table 2 are submitted in a separate EDD file because they are not validated.

The laboratory analytical data were verified and validated in accordance with procedures described in the *Quality Assurance Project Plan, Revision 2* (Ramboll Environ, 2017), *NDEP Data Verification and Validation Requirements* (NDEP, 2018), and the references contained therein. Analytical field sample results from groundwater and field quality blanks were validated to Stage 2A. Approximately ninety percent of the analytical results from soil were validated to Stage 2B and at least ten percent were validated to Stage 4.

Data validation checklists are compiled in Appendix E.1. Laboratory data packages may be found in Appendix E.2. A database of the analytical results is provided in Appendix E.3.

This report summarizes the QA/QC evaluation of the data using precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) relative to the project data quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability of the data.

2.0 PRECISION AND ACCURACY OF ENVIRONMENTAL DATA

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sampling procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which may affect the overall quality of a measurement. Errors for sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining equipment properly, and complying with QC requirements. The sample matrix also is an important factor in the ability to obtain precise and accurate results within a given medium.

Environmental and laboratory QA/QC samples provide information on the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. Field QA/QC samples include equipment blanks (EBs), field duplicates (FDs), and matrix spike/matrix spike duplicates (MS/MSDs), and trip blanks (TBs). Laboratory QA/QC samples include method blanks, laboratory control samples/laboratory control sample duplicates (LCS/LCSDs), laboratory duplicates (DUP), matrix spike-insoluble (MSI) samples, and additional MS/MSDs needed to meet method requirements.

2.1 PRECISION

Precision is a measure of the agreement of analytical results under a given set of conditions. It is a quantity that is not measured directly but is calculated from concentrations. Precision can be expressed as the relative percent difference (RPD) between two measurements:

$$RPD = \frac{(C1 - C2)*100}{(C1 + C2)/2}$$

where:
C1 = reported concentration for the sample
C2 = reported concentration for the duplicate

Precision can be expressed as the percent relative standard deviation (%RSD) between three or more measurements:

$$\%RSD = (s/\bar{a})*100$$

where:
%RSD = percent relative standard deviation
s = standard deviation
$\bar{a}$ = mean of replicate analyses

Precision is assessed by calculating %RSD during an initial calibration (ICAL) and RPD from the percent recoveries of the spiked compounds for each sample in the MS/MSD pair. In the absence of an MS/MSD pair, a laboratory duplicate or LCS/LCSD pair can be analyzed as an alternative means of assessing precision. An additional measure of sampling precision is obtained by collecting and analyzing field duplicate samples, which are compared using the RPD results as the evaluation criteria.

MS and MSD samples are field samples which have been spiked by the laboratory with target analytes prior to preparation and analysis. The MSI is used to evaluate soil samples that are analyzed by methods developed for waters. These samples measure the appropriateness of the analytical method and effectiveness in recovering target analytes from a specific environmental matrix. The LCS sample is spiked with the same target analytes as the MS/MSD using an interference-free matrix instead of a field sample aliquot. The LCS measures laboratory

efficiency in recovering target analytes in the absence of matrix interferences. It is used to verify that the analyses are being performed in control.

The laboratory analyzes laboratory replicates. A field sample is analyzed and an unspiked duplicate of that sample is also analyzed. The data reviewer compares the reported results of the primary analysis and the laboratory duplicate and calculates RPDs to assess laboratory precision.

Calibration precision is determined by calculating %RSD. Laboratory and field sampling precision are evaluated by calculating RPDs for field sample duplicate pairs. The sampler collects two field samples at the same location and under identical conditions. The laboratory then analyzes the samples under identical conditions.

An RPD outside the allowed limit between MS/MSD samples or LCS/LCSD samples indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a reported result. The actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample heterogeneity, sample matrix interference, improper sample collection or handling, inconsistent sample preparation, instrument column fouling, and poor instrument stability. In duplicate pairs, results may be reported in either the primary or duplicate samples at levels below the practical quantitation limit (PQL) or non-detected. Since these values are estimated, RPD exceedances from these duplicate pairs do not suggest a significant impact to data quality.

2.2 ACCURACY

Accuracy is a measure of the closeness of agreement between a measured value and the true value of an analytical parameter. It may be used to identify bias in each measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of continuing calibrations, MS, MSD, MSI, LCS, and LCSD. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Accuracy is determined using the percent recovery (%R) of MS and LCS analyses.

Percent recovery is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:
A = measured concentration in the spiked sample
B = measured native concentration in the unspiked sample
C = concentration of the spike

The percent recovery of each analyte spiked in MS/MSD samples, MSIs, and LCS/LCSD is evaluated with the acceptance criteria specified by the QAPP and laboratory limits. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

2.3 REPRESENTATIVENESS

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blanks, samples, and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, calibration blanks, EBs, and TBs.

A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample

preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

Several methods require the use of initial calibration blanks (ICBs) and continuing calibration blanks (CCBs). ICBs and CCBs are laboratory-grade water samples that are analyzed at the beginning, during, and at the end of sample analysis runs. The frequency is dependent on the analytical method. These blanks estimate residual contaminants from the previous sample or standards analysis and measure baseline shifts that commonly occur in emission and absorption spectroscopy.

EBs consist of analyte-free water poured over or through the sample collection equipment. The water is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated; they are used to measure effectiveness of the decontamination procedure. Equipment blanks are collected and analyzed for all target analytes.

TBs consist of analyte-free water prepared at the laboratory, shipped to the field with sample containers, and returned to the laboratory with the samples receiving volatile organic compound (VOC) analysis. The trip blank is analyzed for VOCs using the same sample preparation and analysis procedures used for the actual field samples.

Contaminants found in both the environmental sample and the blank sample are assumed to be laboratory artifacts if both values are less than the PQL or if a sample result and blank contaminant value are greater than the PQL and the sample result is less than 10 times the blank contaminant value.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times are specific for each method and matrix analyzed. Holding time exceedance can cause loss of sample constituents due to biodegradation, precipitation, volatilization, and chemical degradation. Sample results for analyses that were performed after the method holding time are qualified according to NDEP requirements. The qualifiers and bias recommendations are taken from USEPA National Functional Guidelines (NFGs).

2.4 COMPARABILITY

Comparability is a qualitative characteristic that defines the extent to which the data for a chemical parameter measurement are consistent with, and may be compared with, data from other sampling events. Comparability is dependent upon the design of the sampling plans and execution of activities consistent with approved plans. Factors affecting comparability include sample collection and handling techniques, matrix type, and analytical method. Comparability is achieved through the use of standard techniques to collect representative samples, consistent application of analytical method protocols, and use of appropriate units in reporting analytical results. Comparability is also dependent upon other PARCCS criteria, because only when precision, accuracy, and representativeness are known can datasets be compared with confidence.

2.5 COMPLETENESS

Completeness is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 90 percent.

Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

where:
%C = percent completeness

T = total number of sample results
R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the QAPP, with the number determined above.

2.6 SENSITIVITY

Sensitivity is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. It is generally used to describe the instrument detection limits (DLs) or PQLs established to meet project DQOs. The method detection limit (MDL) represents the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Sample quantitation limits (SQLs) are adjusted MDL values that reflect sample-specific actions, such as dilutions or varying aliquot sizes. The laboratory data reports show MDL in place of the SQL. The MDL was adjusted to reflect the sample analysis conditions. The PQL is the minimum concentration that can be reported based on the analysis of a specific matrix. The PQL is often the lowest acceptable calibration point for the analyte.

For this project, the laboratory data reports show reporting limit (RL) in place of the PQL. The laboratory reported detected analytes down to the adjusted MDL/SQL. All results reported between the SQL and PQL were qualified “J” by the laboratory. Sample results are compared to method and field blank results to identify possible effects of laboratory background and field procedures on sensitivity.

3.0 VALIDATION RESULTS AND PARCCS

This section discusses the validation results and the associated PARCCS criteria. Before conducting the PARCCS evaluation, the analytical data were validated according to the QAPP in place at the time of validation (Ramboll Environ, 2017).

Samples not meeting the acceptance criteria were denoted with a validation qualifier that indicates a deficiency with the data. Table 3 contains validation qualifiers used in data validation.

When more than one validation qualifier is applicable to a data point, the final validation qualifier applied is based on the following hierarchy:

R > J	R takes precedence over the J qualifier.
J+	The high bias (J+) qualifier is applied to detected results only.
J > J+ or J-	The unbiased (J) qualifier supersedes biased (J+ or J-) qualifiers since it is not possible to assess the direction of the potential bias.
J = J+ plus J-	Adding biased (J+ or J-) qualifiers with opposite signs results in an unbiased qualifier (J).
UJ = U plus J	The UJ qualifier is used when a non-detected (U) flag is added to a (J) flag.

Table 4 identifies the QC elements reviewed for each validation level. The actual elements are method-dependent.

Table 5 lists the reason codes used. Reason codes explain why data were qualified and identify possible limitations of data use. Reason codes are cumulative except when one of the flags is R. In that case, only the reason code associated with the R flag is used.

Table 6 presents the overall qualified results after the validation qualifiers and associated reason codes were applied.

3.1 PRECISION

3.1.1 Instrument Calibration

The objective of an ICAL is to ensure that an instrument can produce acceptable qualitative and quantitative data by determining the ratio of instrument response to analyte concentration. %RSD is used to evaluate ICAL results in method SW-8260B and provides a means of evaluating precision within an analytical system. Calibration criteria are not reviewed in Stage 2A validation.

3.1.2 MS/MSD and Laboratory Duplicate Samples

MS/MSD and laboratory duplicate RPDs were within the acceptance criteria stated in the QAPP.

3.1.3 LCS/LCSD Samples

No data were qualified for LCS/LCSD RPD outliers.

3.1.4 Field Duplicate Samples

For results > 5X the PQL, the FD samples were evaluated for acceptable precision with RPDs. If one or both results was < 5X the PQL, samples were evaluated by the difference between the two measurements. Table 7 includes results where RPDs exceeded 30 percent for water or 50 percent for soils, or the difference between the values was greater than the absolute value of the PQL. Ten results were qualified for imprecision between the

parent and FD. They are found in Table 6 with reason code “fd.” The parent sample and the FD were qualified “J” for detects.

3.2 ACCURACY

3.2.1 Calibration and Continuing Calibration

As stated previously, the objective of initial calibration is to ensure that an instrument is capable of producing acceptable qualitative and quantitative data by determining the ratio of instrument response to analyte concentrations. Typically, inorganic methods use regression models for initial calibration. Regression may also be used in organic analyses. The correlation coefficient indicates the linearity of the calibration curve. The coefficient of determination is an overall measure of the accuracy of the regression calibration curve. The objective of continuing calibration is to ensure that the instrument continues to meet the sensitivity and linearity criteria throughout each analytical sequence. Initial and continuing calibration verification (CCV) results provide a means of evaluating accuracy. Percent difference or drift (%D), percent recovery (%R), correlation coefficient, and coefficient of determination are the parameters used to measure the effectiveness of instrument calibration. %R and %D are used to verify the ongoing calibration acceptability of the analytical system.

Calibration criteria are not reviewed in Stage 2A validation. In cases where an outlier is mentioned in the case narrative, the outlier is reviewed and may be qualified. For method SW-8260B, 2,2-dichloropropane %D was 35.3% in CCV sample CCVIS 440-485540/2. The allowed limit is 30%. Two 2,2-dichloropropane results were qualified “UJ.” They are found in Table 6 with reason code “c.”

3.2.2 MS/MSD and MSI Samples

Several MS/MSD %Rs were outside of acceptance criteria shown in the QAPP. MS/MSD %R exceedances can be found in Table 8. Analytes that were present in the parent sample in concentrations greater than 4 times the amount spiked were not qualified and are not shown in the table. In cases where the recoveries were high and the parent sample was non-detect, no qualification was applied. Qualifiers were applied to parent samples only, unless FDs were analyzed in the same SDG. Table 8 contains the spiked sample only. In cases where dilutions caused the low recoveries, the data were not rejected or qualified. Per the inorganic NFG, MS/MSD recoveries < 30% resulted in rejection of the data point. In cases where dilutions caused the low recoveries, the data were not rejected or qualified. The effect of dilution on matrix spike recoveries is determined on a case-by-case-basis using professional judgment, knowledge of the lab’s procedures, and input from the lab. For some analyses, the lab may dilute the sample prior to preparation for analyses and prior to addition of the matrix spike compounds. The lab approaches this on a case-by-case basis. Twenty-six results were qualified for MS/MSD %Rs. Seven results were rejected. Associated results qualified for MS/MSD recoveries can be found in Table 6 with reason code “m.”

3.2.3 LCS/LCSD Samples

No data were qualified for LCS/LCSD %R outliers.

3.2.4 Surrogates

Surrogates are added to all samples analyzed by EPA 300.1B and SW-8260B to measure the efficiency of the analytical method. No data were qualified for surrogate recovery outliers.

3.3 REPRESENTATIVENESS

3.3.1 Sample Condition, Preservation, and Holding Times

Sample condition, preservation, and holding times were evaluated to verify compliance with the analytical methods.

Two methane results were qualified “J” because they were received at the lab with headspace. They are designated with reason code “vh” for volatile headspace in Table 6. The samples are shown in Table 9.

Two TOC results were qualified for improper preservation and holding time infractions, designated with reason codes “h” for holding time and “pH” for preservation in Table 6. The samples were collected in jars containing HCl, but when checked, the pH was >2. The lab adjusted the pH of the samples to pH < 2 prior to analysis. Since the samples were not analyzed within the 4-hour holding time for unpreserved samples, the holding time was grossly exceeded. The preservation infractions are shown in Table 9. The holding time exceedances are shown in Table 10. The results were qualified “J- “.

Six samples analyzed for VOCs by SW-8260B and three samples analyzed for methane by RSK175 were analyzed outside of the 7-day analytical holding time for unpreserved samples. The samples were collected in vials containing HCl, but when checked prior to analysis, the pH was >2. 263 undetected VOC compound results were qualified “UJ” according to current NDEP guidance. Fifteen VOC results were qualified “J.” No bias was assigned to the VOC detected results, based on NFG and professional judgment. The methane results were qualified “J-.” All are designated with reason code “h” in Table 6. The holding time exceedances are shown in Table 10.

3.3.2 Blanks

Method blanks, ICBs, CCBs, EBs, and TBs were analyzed to evaluate representativeness. The concentration of an analyte in any blank was used for data qualification. If contaminants were detected in a blank, the blank concentration was compared to the sample results. If the analyte was not detected in the sample, no qualification was applied to the sample. If the sample concentration was greater than 10 times the amount in the blank, after dilutions were considered, no qualification was applied. For radiochemistry methods, the normalized difference was used to determine if sample results differed from blank results.

For concentrations detected in the sample below the PQL, the sample result was qualified “J.” Based on the hierarchy of validation qualification, the “J” qualifier, in this case applied to detected results below the PQL, supersedes the positive bias associated with blank contamination. For concentrations detected in the sample above the PQL and less than 10 times the amount in the blank, the sample results were qualified “J+.”

3.3.2.1 Method and Calibration Blanks

Several contaminants were detected in the laboratory blanks. Fifteen results were qualified because of contamination in laboratory blanks. Laboratory blank detections, including preparation and calibration blanks, that resulted in qualification are shown in Table 10. Qualified results are shown in Table 6 with reason code “bl.”

3.3.2.2 Equipment Blanks and Trip Blanks

There were three detections in the EBs and TBs associated with this dataset. Hexavalent chromium was detected in CTMW-07D-130.0-20170922-EB at a concentration of 0.39 µg/L. Tetrachloroethene and methylene chloride were detected in M12-20180622-TB at concentrations of 0.38 µg/L and 1 µg/L, respectively. No associated data required qualification.

3.4 COMPARABILITY

The laboratory used standard analytical methods for all analyses. In all cases, the SQLs attained were at or below the PQLs. Target compounds detected below the PQLs were flagged "J" by the laboratory and should be considered estimated. A total of 132 qualified results are shown with reason code "sp" in Table 6. The comparability of the data is acceptable.

3.5 COMPLETENESS

The completeness level attained for the field samples, equipment blanks, and trip blanks is 99.8% and meets the project goal of 90 percent. Seven results were rejected because of MS/MSD recoveries. The percentage was calculated as the total number of accepted (non-rejected) sample results divided by the total number of sample results multiplied by 100. A completeness summary by method is provided in Table 12.

3.6 SENSITIVITY

Due to high analyte concentrations, many analytical runs were analyzed at dilutions. For diluted analyses, SQLs and PQLs were elevated.

In Stage 2A validation, the calibrations are not evaluated for instrument sensitivity. In cases where an outlier is known however, the outlier will be qualified. For method SW-8260B, the relative response factor (RRF) for 1,1,2-trichloroethane in ICAL 17676 was 0.1809. In CCVIS 440-435536/2, the 1,1,2-trichloroethane RRF was 0.1899. The organic NFG requires an RRF of 0.200 for this compound and recommends rejecting the data point. Since method SW-8260B and the lab's operating procedure do not require a minimum RRF for 1,1,2-trichloroethane, the validator using professional judgment qualified the result "UJ." The PQL may be inaccurate or imprecise. One 1,1,2-trichloroethane result in CTMW-07D-20171009 was qualified "UJ" and found in Table 6 with reason code "c."

4.0 CONCLUSIONS AND RECOMMENDATIONS

The analytical data quality assessment for the soil and water laboratory analytical results generated during the additional sampling at the In-Situ Treatability Study site at the NERT site in Henderson, Nevada, established that the overall project requirements and completeness levels were met. Most sample results were found to be usable. Seven results were rejected because of MS/MSD recoveries. Rejected results are not usable. Sample results that were qualified as estimated are usable for limited purposes only.

5.0 REFERENCES

Nevada Division of Environmental Protection. (2018). *NDEP Data Verification and Validation Requirements*.

Ramboll Environ. (2017). *Quality Assurance Project Plan, Revision 2, Nevada Environmental Response Trust Site, Henderson, Nevada*

Tetra Tech. (2016). *In-Situ Chromium Treatability Study Work Plan.*

Tetra Tech. (2018). *In-Situ Chromium Treatability Study Results Report*.

Tables

Table 1 Analytical Methods

Method	Parameters	Number of Aqueous Samples	Number of Soil Samples
EPA 300.0	Chloride	21	0
EPA 300.0	Nitrate [as N]	21	0
EPA 300.0	Sulfate	21	0
EPA 300.1B	Chlorate	25	9
EPA 300.1B	Chlorite	21	0
EPA 314.0	Perchlorate	25	9
EPA 351.2	Total Kjeldahl Nitrogen [TKN]	21	0
EPA 365.3	Orthophosphate (as P), Orthophosphorus as PO4, Phosphorus, Total	21	0
RSK175	Methane	21	0
SM2320B	Alkalinity as CaCO3, Bicarbonate as CaCO3, Carbonate as CaCO3, and Hydroxide as CaCO3	21	0
SM2340C	Hardness as CaCO3	21	0
SM2540C	Total Dissolved Solids [TDS]	21	0
SM4500-S2-D	Sulfide	21	0
SM5220D	Chemical Oxygen Demand	10	0
SM5310B	Total Organic Carbon	21	0
SW-6010B	Metals	25	9
SW-6020A	Metals	21	0
SW-7199	Chromium [VI]	25	9
SW-8260B	Volatile Organic Compounds	33	9
VFA-IC	Volatile Fatty Acids	21	0

Table 2 Sample Cross-Reference

SDG	Client Sample ID	Lab Sample ID	Matrix	Type	Sample Date	Validation Stage	EPA 300.0	EPA 300.1B	EPA 314.0	EPA 351.2	EPA 365.3	RSK175	SM2320B	SM2340C	SM2540C	SM4500-S2-D	SM5220D	SM5310B	SW-6010B	Dissolved SW-6020A	SW-7199	SW-8260B	VFA-IC
440-192727-1	CTMW-07D-50.0-20170921	440-192727-1	WG	NORM	2017-09-21	Stage 2A		X	X										X		X	X	
440-192727-1	CTMW-07D-60.0-20170921	440-192727-2	SO	NORM	2017-09-21	Stage 2B		X	X										X		X	X	
440-192727-1	CTMW-07D-70.0-20170921-GW	440-192727-3	WG	NORM	2017-09-21	Stage 2A		X	X										X		X	X	
440-192727-1	CTMW-07D-70.0-20170921-SO	440-192727-4	SO	NORM	2017-09-21	Stage 2B		X	X										X		X	X	
440-192727-1	Trip_Blank-M12-20170921*	440-192727-5	BW	TB	2017-09-21	Stage 2A																X	
440-192727-1	CTMW-07D-80.0-20170921	440-192727-6	SO	NORM	2017-09-21	Stage 2B		X	X										X		X	X	
440-192727-1	CTMW-07D-90.0-20170921	440-192727-7	SO	NORM	2017-09-21	Stage 2B		X	X										X		X	X	
440-192727-1	CTMW-07D-100.0-20170921	440-192727-8	SO	NORM	2017-09-21	Stage 2B		X	X										X		X	X	
440-192727-1	CTMW-07D-110.0-20170921	440-192727-9	SO	NORM	2017-09-21	Stage 2B		X	X										X		X	X	
440-192727-1	CTMW-07.D-60.0-20170921-EB	440-192727-10	BW	EB	2017-09-21	Stage 2A		X	X										X		X	X	
440-192727-1	CTMW-07D-90.0-20170921-FD	440-192727-11	SO	FD	2017-09-21	Stage 2B		X	X										X		X	X	
440-192817-1	CTMW-07D-120.0-20170922	440-192817-1	SO	NORM	2017-09-22	Stage 2B		X	X										X		X	X	
440-192817-1	CTMW-07D-130.0-20170922-EB	440-192817-2	BW	EB	2017-09-22	Stage 2A		X	X										X		X	X	
440-192817-1	Trip_Blank-M12-20170922*	440-192817-3	BW	TB	2017-09-22	Stage 2A																X	
440-192835-1	CTMW-07D-130.0-20170922	440-192835-1	SO	NORM	2017-09-22	Stage 4		X	X										X		X	X	
440-193864-1	Trip_Blank-M12-20171009*	440-193864-1	BW	TB	2017-10-09	Stage 2A																X	
440-193864-1	CTMW-07D-20171009	440-193864-2	WG	NORM	2017-10-09	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-204893-1	Trip_Blank-M12-20180305*	440-204893-1	BW	TB	2018-03-05	Stage 2A																X	
440-204893-1	CTMW-01S-20180305	440-204893-2	WG	NORM	2018-03-05	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	CTMW-01D-20180305	440-204893-3	WG	NORM	2018-03-05	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	CTMW-01D-20180305-FD	440-204893-4	WG	FD	2018-03-05	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	CTMW-02D-20180305	440-204893-5	WG	NORM	2018-03-05	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	Trip_Blank-M12-20180306*	440-204893-6	BW	TB	2018-03-06	Stage 2A																X	
440-204893-1	CTMW-02S-20180306	440-204893-7	WG	NORM	2018-03-06	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	CTMW-07D-20180306	440-204893-8	WG	NORM	2018-03-06	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	CTMW-07S-20180306	440-204893-9	WG	NORM	2018-03-06	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-204893-1	CTMW-06S-20180306	440-204893-10	WG	NORM	2018-03-06	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-205188-1	Trip_Blank-M12-20180307*	440-205188-1	BW	TB	2018-03-07	Stage 2A																X	
440-205188-1	CTMW-06D-20180307	440-205188-2	WG	NORM	2018-03-07	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-205188-1	CTMW-04S-20180307	440-205188-3	WG	NORM	2018-03-07	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-205188-2	CTMW-04D-20180307	440-205188-4	WG	NORM	2018-03-07	Stage 2A	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
440-214187-1	CTMW-01S-20180621	440-214187-1	WG	NORM	2018-06-21	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214187-1	CTMW-01D-20180621	440-214187-2	WG	NORM	2018-06-21	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214187-1	CTMW-01D-20180621-FD	440-214187-3	WG	FD	2018-06-21	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214187-1	CTMW-02D-20180621	440-214187-4	WG	NORM	2018-06-21	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214189-1	CTMW-04S-20180621	440-214189-1	WG	NORM	2018-06-21	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214189-1	CTMW-04D-20180621	440-214189-2	WG	NORM	2018-06-21	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214189-1	M12-20180621-TB	440-214189-3	BW	TB	2018-06-21	Stage 2A																X	
440-214285-1	M12-20180622-TB	440-214285-1	BW	TB	2018-06-22	Stage 2A																X	
440-214285-1	CTMW-06S-20180622	440-214285-2	WG	NORM	2018-06-22	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214285-1	CTMW-06D-20180622	440-214285-3	WG	NORM	2018-06-22	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
440-214285-1	CTMW-07D-20180622	440-214285-4	WG	NORM	2018-06-22	Stage 2A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

* Samples designated as "Trip Blank" on chain-of-custody forms were changed to unique IDs in the database.

Table 3 Validation Qualifiers and Definitions

Validation Qualifier	Definition
J-	The result is an estimated quantity, but the result may be biased low.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Table 4 Validation Checks and Stages

Verification and Validation Checks	Stage 2A	Stage 2B	Stage 4
Documentation identifies the laboratory receiving and conducting analyses, and includes documentation for all samples submitted by the project or requester for analyses.	X	X	X
Requested analytical methods were performed and the analysis dates are present.	X	X	X
Requested target analyte results are reported along with the original laboratory data qualifiers and data qualifier definitions for each reported result (and the uncertainty of each result and clear indication of the type of uncertainty reported if required, e.g., for radiochemical analyses).	X	X	X
Requested target analyte result units are reported (along with their associated uncertainty units if required, e.g., for radiochemical analyses).	X	X	X
Requested reporting limits for all samples are present and results at and below the requested (required) reporting limits are clearly identified (including sample detection limits if required).	X	X	X
Sampling dates (including times if needed), date and time of laboratory receipt of samples, and sample conditions upon receipt at the laboratory (including preservation, pH, and temperature) are documented.	X	X	X
For radiochemical analyses, the sample-specific critical values (sometimes called "critical level," "decision level," or "detection threshold") and sample specific minimum detectable value, activity, or concentration for all samples are reported and results at and below the requested (required) critical values are clearly identified.	X	X	X
For radiochemical analyses, the chemical yield (if applicable to the method) and reference date and time (especially for short lived isotopes) are reported for all samples (as appropriate).	X	X	X
Sample results are evaluated by comparing sample conditions upon receipt at the laboratory (e.g., preservation checks) and sample characteristics (e.g., percent moisture) to the requirements and guidelines present in national or regional data validation documents, analytical method(s), or contract.	X	X	X
Requested methods (handling, preparation, cleanup, and analytical) are performed.	X	X	X
Method dates (including dates, times and duration of analysis for radiation counting measurements and other methods, if needed) for handling (e.g., Toxicity Characteristic Leaching Procedure), preparation, cleanup and analysis are present, as appropriate.	X	X	X
Sample-related QC data and QC acceptance criteria (e.g., method blanks, surrogate recoveries, deuterated monitoring compounds (DMC) recoveries, laboratory control sample (LCS) recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post digestion spikes, standard reference materials) are provided and linked to the reported field samples (including the field quality control samples such as trip and equipment blanks).	X	X	X
Requested spike analytes or compounds (e.g., surrogate, DMCs, LCS spikes, post digestion spikes) have been added, as appropriate.	X	X	X
Sample holding times (from sampling date to preparation and preparation to analysis) are evaluated.	X	X	X
Frequency of QC samples is checked for appropriateness (e.g., one LCS per 20 samples in a preparation batch).	X	X	X

Table 4 Validation Checks and Stages

Verification and Validation Checks	Stage 2A	Stage 2B	Stage 4
Sample results are evaluated by comparing holding times and sample-related QC data to the requirements and guidelines present in national or regional data validation documents, analytical method(s) or contract.	X	X	X
Initial calibration data (e.g., initial calibration standards, initial calibration verification [ICV] standards, initial calibration blanks [ICBs]) are provided for all requested analytes and linked to field samples reported. For each initial calibration, the calibration type used is present along with the initial calibration equation used including any weighting factor(s) applied and the associated correlation coefficients, as appropriate. Recalculations of the standard concentrations using the initial calibration curve are present, along with their associated percent recoveries, as appropriate (e.g., if required by the project, method, or contract). For the ICV standard, the associated percent recovery (or percent difference, as appropriate) is present.		X	X
Appropriate number and concentration of initial calibration standards are present.		X	X
Continuing calibration data (e.g., continuing calibration verification [CCV] standards and continuing calibration blanks [CCBs]) are provided for all requested analytes and linked to field samples reported, as appropriate. For the CCV standard(s), the associated percent recoveries (or percent differences, as appropriate) are present.		X	X
Reported samples are bracketed by CCV standards and CCBs standards as appropriate.		X	X
Method specific instrument performance checks are present as appropriate (e.g., tunes for mass spectrometry methods, DDT/Endrin breakdown checks for pesticides and aroclors, instrument blanks and interference checks for ICP methods).		X	X
Frequency of instrument QC samples is checked for appropriateness (e.g., gas chromatography-mass spectroscopy [GC-MS] tunes have been run every 12 hours).		X	X
Sample results are evaluated by comparing instrument-related QC data to the requirements and guidelines present in national or regional data validation documents, analytical method(s), or contract.		X	X
Instrument response data (e.g., GC peak areas, ICP corrected intensities) are reported for requested analytes, surrogates, internal standards, and DMCs for all requested field samples, matrix spikes, matrix spike duplicates, LCS, and method blanks, as well as calibration data and instrument QC checks (e.g., tunes, DDT/Endrin breakdowns, interelement correction factors, and Florisil cartridge checks).			X
Reported target analyte instrument responses are associated with appropriate internal standard analyte(s) for each (or selected) analyte(s) (for methods using internal standard for calibration).			X
Fit and appropriateness of the initial calibration curve used or required (e.g., mean calibration factor, regression analysis [linear or non-linear, with or without weighting factors, with or without forcing]) is checked with recalculation of the initial calibration curve for each (or selected) analyte(s) from the instrument response.			X
Comparison of instrument response to the minimum response requirements for each (or selected) analyte(s)			X

Table 4 Validation Checks and Stages

Verification and Validation Checks	Stage 2A	Stage 2B	Stage 4
Recalculation of each (or selected) opening and closing CCV (and CCB) response from the peak data reported for each (or selected) analyte(s) from the instrument response, as appropriate			X
Compliance check of recalculated opening and/or closing CCV (and CCB) response to recalculated initial calibration response for each (or selected) analyte(s)			X
Recalculation of percent ratios for each (or selected) tune from the instrument response, as appropriate			X
Compliance check of recalculated percent ratio for each (or selected) tune from the instrument response.			X
Recalculation of each (or selected) instrument performance check (e.g., DDT/Endrin breakdown for pesticide analysis, instrument blanks, interference checks) from the instrument response			X
Recalculation and compliance check of retention time windows (for chromatographic methods) for each (or selected) analyte(s) from the laboratory reported retention times			X
Recalculation of reported results for each reported (or selected) target analyte(s) from the instrument response			X
Recalculation of each (or selected) reported spike recovery (surrogate recoveries, DMC recoveries, LCS recoveries, duplicate analyses, matrix spike and matrix spike duplicate recoveries, serial dilutions, post digestion spikes, standard reference materials, etc.) from the instrument response			X
Each (or selected) sample result(s) and spike recovery(ies) are evaluated by comparing the recalculated numbers to the laboratory reported numbers according to the requirements and guidelines present in national or regional data validation documents, analytical method(s) or contract.			X
All required instrument outputs (e.g., chromatograms, mass spectra, atomic emission spectra, instrument background corrections, and interference corrections) for evaluating sample and instrument performance are present.			X
Sample results are evaluated by checking each (or selected) instrument output (e.g., chromatograms, mass spectra, atomic emission spectra data, instrument background corrections, interference corrections) for correct identification and quantitation of analytes (e.g., peak integrations, use of appropriate internal standards for quantitation, elution order of analytes, and interferences).			X
Each (or selected) instrument's output(s) is evaluated for confirmation of non-detected or tentatively identified analytes.			X

Table 5 Reason Codes

Reason Code	Description of Qualification
a	Qualified due to low abundance (radiochemical activity)
be	Qualified due to equipment blank contamination
bf	Qualified due to field blank contamination
bl	Qualified due to lab blank contamination
bt	Qualified due to trip blank contamination
bp	Qualified due to pump blank contamination (for wells without dedicated pumps)
br	Qualified due to filter blank contamination (aqueous hexavalent chromium and dissolved sample fractions)
c	Qualified due to calibration problems
cp	Qualified due to insufficient ingrowth (radiochemical only)
dc	Dual column confirmation % difference exceeded
e	Sample concentration exceeded the calibration range
fd	Qualified due to field duplicate imprecision
h	Qualified due to holding time exceedance
i	Qualified due to internal standard areas or retention times
k	Qualified as Estimated Maximum Possible Concentrations (dioxins and PCB congeners)
l	Qualified due to LCS recoveries
ld	Qualified due to lab duplicate imprecision (matrix duplicate, MSD, LCSD)
m	Qualified due to matrix spike recoveries
nb	Qualified due to negative lab blank contamination (nondetect results only)
nd	Qualified due to non-detected target analyte
o	Other
p	Qualified as a false positive due to contamination during shipping
pH	Sample preservation not within acceptance range
q	Qualified due to quantitation problem
s	Qualified due to surrogate recoveries
sd	Serial dilution did not meet control criteria
sp	Detected value reported between MDL/SQL and RL/PQL
st	Sample receipt temperature exceeded
t	Qualified due to elevated helium tracer concentrations
vh	Headspace detected in aqueous sample containers submitted for volatile analysis
x	Qualified due to low % solids
z	Qualified due to interference check sample results

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-192727-1	CTMW-07D-50.0-20170921	9/21/2017	SW-8260B	Total	Chloroform	720	ug/L		2.5	5	J	h	Holding Time
440-192727-1	CTMW-07D-70.0-20170921-GW	9/21/2017	SW-8260B	Total	Chloroform	500	ug/L		2.5	5	J	h	Holding Time
440-192727-1	CTMW-07D-80.0-20170921	9/21/2017	EPA 314.0	N/A	Perchlorate	1.2	mg/kg	F1	0.027	0.11	J-	m	MS Recovery
440-192727-1	CTMW-07D-90.0-20170921	9/21/2017	EPA 300.1B	N/A	Chlorate	180	ug/kg	J	70	280	J	sp	Detect < PQL
440-192727-1	CTMW-07D-90.0-20170921-FD	9/21/2017	EPA 300.1B	N/A	Chlorate	180	ug/kg	J	70	280	J	sp	Detect < PQL
440-192817-1	CTMW-07D-130.0-20170922-EB	9/22/2017	SW-7199	Dissolved	Chromium [VI]	0.39	ug/L	J	0.25	2	J	sp	Detect < PQL
440-193864-1	CTMW-07D-20171009	10/9/2017	RSK175	Total	Methane	0.0005	mg/L	J	0.00025	0.00099	J	sp	Detect < PQL
440-193864-1	CTMW-07D-20171009	10/9/2017	SW-6020A	Dissolved	Antimony	1.1	ug/L	J	0.5	2	J	sp	Detect < PQL
440-193864-1	CTMW-07D-20171009	10/9/2017	SW-6020A	Dissolved	Copper	0.55	ug/L	J	0.5	2	J	sp	Detect < PQL
440-193864-1	CTMW-07D-20171009	10/9/2017	SW-6020A	Dissolved	Iron	20	ug/L		8	20	J+	bl	Lab Blank
440-193864-1	CTMW-07D-20171009	10/9/2017	SW-6020A	Dissolved	Nickel	0.68	ug/L	J	0.5	2	J	sp	Detect < PQL
440-193864-1	CTMW-07D-20171009	10/9/2017	SW-6020A	Dissolved	Zinc	2.5	ug/L	J	2.5	20	J	sp	Detect < PQL
440-193864-1	CTMW-07D-20171009	10/9/2017	SW-8260B	Total	1,1,2-Trichloroethane	0.25	ug/L	U	0.25	0.5	UJ	c	Calibration
440-204893-1	CTMW-01D-20180305	3/5/2018	EPA 365.3	Total	Orthophosphate (as P)	0.072	mg/L	F1	0.02	0.05	J	fd,m	FD, MS Recovery
440-204893-1	CTMW-01D-20180305	3/5/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.22	mg/L	F1	0.06	0.15	J	fd,m	FD, MS Recovery
440-204893-1	CTMW-01D-20180305	3/5/2018	SW-6020A	Dissolved	Nickel	4.7	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305	3/5/2018	SW-6020A	Dissolved	Selenium	4.7	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305	3/5/2018	SW-6020A	Dissolved	Zinc	45	ug/L	J	13	100	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305	3/5/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	13	ug/L	J	8.8	20	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	EPA 300.0	Total	Nitrate [as N]	5	mg/L	J	2.8	5.5	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	EPA 365.3	Total	Orthophosphate (as P)	0.17	mg/L		0.02	0.05	J	fd,m	FD, MS Recovery
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.51	mg/L		0.06	0.15	J	fd,m	FD, MS Recovery
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	SW-6020A	Dissolved	Copper	2.6	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	SW-6020A	Dissolved	Nickel	4.6	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	SW-6020A	Dissolved	Vanadium	9.9	ug/L	J	5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	SW-6020A	Dissolved	Zinc	50	ug/L	J	13	100	J	sp	Detect < PQL
440-204893-1	CTMW-01D-20180305-FD	3/5/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	12	ug/L	J	8.8	20	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	RSK175	Total	Methane	2.9	mg/L		0.5	1	J-	h	Holding Time
440-204893-1	CTMW-01S-20180305	3/5/2018	SM4500-S2-D	Total	Sulfide	0.031	mg/L	J	0.027	0.05	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SM5310B	Total	Total Organic Carbon	1200	mg/L		65	100	J-	h,pH	Holding Time, Preservation
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-6020A	Dissolved	Copper	7.2	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-6020A	Dissolved	Nickel	2.9	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-6020A	Dissolved	Vanadium	6.1	ug/L	J	5	10	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-6020A	Dissolved	Zinc	13	ug/L	J	13	100	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-8260B	Total	1,2,4-Trichlorobenzene	0.49	ug/L	J	0.4	1	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-8260B	Total	1,2-Dichlorobenzene	0.45	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-8260B	Total	2-Hexanone	4.5	ug/L	J	2.5	5	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-8260B	Total	Benzene	0.44	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	1.4	ug/L	J	0.88	2	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	0.36	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	VFA	Total	Formic-acid	3.6	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-01S-20180305	3/5/2018	VFA	Total	n-Butyric Acid	8.5	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-02D-20180305	3/5/2018	SW-6020A	Dissolved	Nickel	2.8	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-02D-20180305	3/5/2018	SW-6020A	Dissolved	Selenium	4	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-02D-20180305	3/5/2018	SW-8260B	Total	1,2-Dichlorobenzene	7.5	ug/L	J	5	10	J	sp	Detect < PQL
440-204893-1	CTMW-02D-20180305	3/5/2018	VFA	Total	Formic-acid	3.6	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	EPA 300.0	Total	Sulfate	6.7	mg/L	J	5	10	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	RSK175	Total	Methane	3.9	mg/L		0.5	1	J-	h	Holding Time
440-204893-1	CTMW-02S-20180306	3/6/2018	SM5310B	Total	Total Organic Carbon	35	mg/L		0.65	1	J-	h,pH	Holding Time, Preservation
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-6020A	Dissolved	Nickel	6.8	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-6020A	Dissolved	Uranium	2.5	ug/L	J	2.5	5	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-6020A	Dissolved	Vanadium	8.2	ug/L	J	5	10	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-8260B	Total	1,2,4-Trichlorobenzene	0.43	ug/L	J	0.4	1	J	sp	Detect < PQL

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-8260B	Total	1,3-Dichlorobenzene	0.28	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-8260B	Total	1,4-Dichlorobenzene	0.36	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	0.3	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	VFA	Total	Acetic acid	4.6	mg/L	J	2.9	10	J	sp	Detect < PQL
440-204893-1	CTMW-02S-20180306	3/6/2018	VFA	Total	Formic-acid	3.6	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	EPA 300.0	Total	Sulfate	6.4	mg/L	J	5	10	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	RSK175	Total	Methane	6	mg/L		0.5	1	J-	h	Holding Time
440-204893-1	CTMW-06S-20180306	3/6/2018	SW-6020A	Dissolved	Iron	89	ug/L	J	40	100	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	SW-6020A	Dissolved	Nickel	3.3	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	SW-8260B	Total	1,2,3-Trichlorobenzene	0.64	ug/L	J	0.4	1	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	SW-8260B	Total	1,2-Dichlorobenzene	0.43	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	1.7	ug/L	J	0.88	2	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	0.3	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	VFA	Total	Acetic acid	3.1	mg/L	J	2.9	10	J	sp	Detect < PQL
440-204893-1	CTMW-06S-20180306	3/6/2018	VFA	Total	Formic-acid	3.5	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-07D-20180306	3/6/2018	EPA 300.0	Total	Nitrate [as N]	0.099	mg/L	J	0.055	0.11	J	sp	Detect < PQL
440-204893-1	CTMW-07D-20180306	3/6/2018	EPA 365.3	Total	Orthophosphate (as P)	0.031	mg/L	J	0.02	0.05	J	sp	Detect < PQL
440-204893-1	CTMW-07D-20180306	3/6/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.096	mg/L	J	0.06	0.15	J	sp	Detect < PQL
440-204893-1	CTMW-07D-20180306	3/6/2018	EPA 365.3	Total	Phosphorus, Total	0.045	mg/L	J	0.025	0.05	J	sp	Detect < PQL
440-204893-1	CTMW-07D-20180306	3/6/2018	SW-6010B	Total	Iron	0.35	mg/L	B	0.05	0.1	J+	bl	Lab Blank
440-204893-1	CTMW-07D-20180306	3/6/2018	SW-6020A	Dissolved	Copper	5.2	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-07D-20180306	3/6/2018	VFA	Total	Formic-acid	3.8	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	EPA 314.0	Total	Perchlorate	510000	ug/L	F1	5000	10000	J-	m	MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	EPA 351.2	Total	Total Kjeldahl Nitrogen [TKN]	0.1	mg/L	UF1	0.1	0.2	R	m	MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	EPA 365.3	Total	Orthophosphate (as P)	0.049	mg/L	JF1	0.02	0.05	J	m,sp	MS Recovery, Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.15	mg/L	F1	0.06	0.15	J-	m	MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	EPA 365.3	Total	Phosphorus, Total	0.025	mg/L	UF1	0.025	0.05	R	m	MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	SM4500-S2-D	Total	Sulfide	0.027	mg/L	UF1	0.027	0.05	R	m	MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	SW-6010B	Total	Iron	0.41	mg/L	B	0.05	0.1	J	bl,m	Lab Blank, MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	SW-6010B	Total	Manganese	0.092	mg/L	J	0.075	0.1	J	sp	Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	SW-6020A	Dissolved	Copper	3.6	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	SW-6020A	Dissolved	Selenium	5.5	ug/L	J	2.5	10	J	sp	Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	SW-6020A	Dissolved	Silver	38	ug/L	F1	2.5	5	J-	m	MS Recovery
440-204893-1	CTMW-07S-20180306	3/6/2018	SW-6020A	Dissolved	Zinc	40	ug/L	JF1	13	100	J	m,sp	MS Recovery, Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	VFA	Total	Formic-acid	3.6	mg/L	J	2.6	10	J	sp	Detect < PQL
440-204893-1	CTMW-07S-20180306	3/6/2018	VFA	Total	Pyruvic Acid	3.7	mg/L	UF1	3.7	15	UJ	m	MS Recovery
440-205188-1	CTMW-04S-20180307	3/7/2018	EPA 365.3	Total	Phosphorus, Total	0.026	mg/L	J	0.025	0.05	J	sp	Detect < PQL
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Aluminum	20	ug/L	B	5	10	J+	bl	Lab Blank
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Antimony	0.93	ug/L	J	0.5	2	J	sp	Detect < PQL
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Copper	1	ug/L	JF1	0.5	2	J	m,sp	MS Recovery, Detect < PQL
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Lead	0.5	ug/L	UF1	0.5	1	UJ	m	MS Recovery
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Nickel	6.2	ug/L	F1	0.5	2	J-	m	MS Recovery
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Thallium	0.99	ug/L	J	0.5	1	J	sp	Detect < PQL
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-6020A	Dissolved	Zinc	7.4	ug/L	JF1	2.5	20	J	m,sp	MS Recovery, Detect < PQL
440-205188-1	CTMW-04S-20180307	3/7/2018	SW-7199	Total	Chromium [VI]	2500	ug/L	J	500	4000	J	sp	Detect < PQL
440-205188-1	CTMW-06D-20180307	3/7/2018	EPA 365.3	Total	Phosphorus, Total	0.032	mg/L	J	0.025	0.05	J	sp	Detect < PQL
440-205188-1	CTMW-06D-20180307	3/7/2018	SW-6020A	Dissolved	Aluminum	23	ug/L	B	5	10	J+	bl	Lab Blank
440-205188-1	CTMW-06D-20180307	3/7/2018	SW-6020A	Dissolved	Cobalt	0.55	ug/L	J	0.5	1	J	sp	Detect < PQL
440-205188-1	CTMW-06D-20180307	3/7/2018	SW-6020A	Dissolved	Zinc	5	ug/L	J	2.5	20	J	sp	Detect < PQL
440-205188-1	CTMW-06D-20180307	3/7/2018	SW-8260B	Total	Acetone	69	ug/L	J	50	100	J	sp	Detect < PQL
440-205188-1	CTMW-06D-20180307	3/7/2018	SW-8260B	Total	Chloroform	440	ug/L	F1	1.3	2.5	J	m	MS Recovery
440-205188-1	CTMW-06D-20180307	3/7/2018	VFA	Total	Acetic acid	32	mg/L	J	15	50	J	sp	Detect < PQL
440-205188-2	CTMW-04D-20180307	3/7/2018	EPA 365.3	Total	Orthophosphate (as P)	0.042	mg/L	JF1	0.02	0.05	J	m,sp	MS Recovery, Detect < PQL

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-205188-2	CTMW-04D-20180307	3/7/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.13	mg/L	JF1	0.06	0.15	J	m,sp	MS Recovery, Detect < PQL
440-205188-2	CTMW-04D-20180307	3/7/2018	SW-6020A	Dissolved	Aluminum	30	ug/L	JB	25	50	J	bl,sp	Lab Blank, Detect < PQL
440-205188-2	CTMW-04D-20180307	3/7/2018	SW-6020A	Dissolved	Selenium	4.3	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	EPA 300.0	Total	Nitrate [as N]	5.2	mg/L	J	2.8	5.5	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.65	mg/L		0.06	0.15	J	fd	FD
440-214187-1	CTMW-01D-20180621	6/21/2018	EPA 365.3	Total	Phosphorus, Total	0.17	mg/L	J	0.13	0.25	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	SM5220D	Total	Chemical Oxygen Demand	870	mg/L		100	200	J	fd	FD
440-214187-1	CTMW-01D-20180621	6/21/2018	SW-6010B	Total	Iron	0.12	mg/L	J	0.1	0.2	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	SW-6020A	Dissolved	Nickel	4.4	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	SW-6020A	Dissolved	Selenium	4.1	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	SW-6020A	Dissolved	Vanadium	9.5	ug/L	J	5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	27	ug/L	J	18	40	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621	6/21/2018	SW-8260B	Total	Methyl ethyl ketone [2-Butanone]	940	ug/L		50	100	J	fd	FD
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	EPA 300.0	Total	Nitrate [as N]	5	mg/L	J	2.8	5.5	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.48	mg/L		0.06	0.15	J	fd	FD
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SM5220D	Total	Chemical Oxygen Demand	650	mg/L		50	100	J	fd	FD
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-6010B	Total	Iron	0.1	mg/L	J	0.1	0.2	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-6020A	Dissolved	Nickel	4.5	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-6020A	Dissolved	Vanadium	9.8	ug/L	J	5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1,1,2-Tetrachloroethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1,1-Trichloroethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1,2,2-Tetrachloroethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1,2-Trichloroethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1-Dichloroethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1-Dichloroethene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,1-Dichloropropene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2,3-Trichlorobenzene	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2,3-Trichloropropane	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2,4-Trichlorobenzene	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2,4-Trimethylbenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2-Dichlorobenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2-Dichloroethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,2-Dichloropropane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,3,5-Trimethylbenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,3-Dichlorobenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,3-Dichloropropane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	1,4-Dichlorobenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	2,2-Dichloropropane	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	2-Chlorotoluene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	2-Hexanone	50	ug/L	U	50	100	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	2-Methoxy-2-methyl-butane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	4-Chlorotoluene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	4-Methyl-2-pentanone [MIBK]	50	ug/L	U	50	100	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Acetone	510	ug/L		200	400	J	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Benzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Bromobenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Bromodichloromethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Bromoform	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Bromomethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Carbon tetrachloride	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Chlorobenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Chlorobromomethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Chloroethane	8	ug/L	U	8	20	UJ	h	Holding Time

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Chloroform	1500	ug/L		5	10	J	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Chloromethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	cis-1,2-Dichloroethene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	cis-1,3-Dichloropropene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Cymene [Isopropyltoluene]	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Dibromochloromethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Dibromochloropropane	10	ug/L	U	10	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Dibromomethane	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	36	ug/L	J	18	40	J	h,sp	Holding Time, Detect < PQL
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Diisopropyl ether	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Ethane, 1,2-dibromo-	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Ethyl tert-butyl ether	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Ethylbenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Freon-11 [Trichlorofluoromethane]	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Freon-12 [Dichlorodifluoromethane]	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Hexachlorobutadiene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Isopropylbenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	m,p-Xylene	10	ug/L	U	10	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Methyl ethyl ketone [2-Butanone]	1300	ug/L		50	100	J	fd,h	FD, Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Naphthalene	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	n-Butyl benzene	8	ug/L	U	8	20	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	n-Propylbenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	o-Xylene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	sec-Butylbenzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Styrene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	tert-Butyl alcohol	100	ug/L	U	100	200	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	tert-Butyl benzene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Tetrachloroethene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Toluene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	trans-1,2-Dichloroethene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	trans-1,3-Dichloropropene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Trichloroethene	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Vinyl chloride	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01D-20180621-FD	6/21/2018	SW-8260B	Total	Xylenes [total]	10	ug/L	U	10	20	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	RSK175	Total	Methane	0.87	mg/L		0.00025	0.00099	J	vh	Head Space
440-214187-1	CTMW-01S-20180621	6/21/2018	SM4500-S2-D	Total	Sulfide	0.041	mg/L	J	0.027	0.05	J	sp	Detect < PQL
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-6020A	Dissolved	Antimony	2.7	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-6020A	Dissolved	Nickel	9	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-6020A	Dissolved	Selenium	2.7	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-6020A	Dissolved	Uranium	4.5	ug/L	J	2.5	5	J	sp	Detect < PQL
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1,1,2-Tetrachloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1,1-Trichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1,2,2-Tetrachloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1,2-Trichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1-Dichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1-Dichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,1-Dichloropropene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2,3-Trichlorobenzene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2,3-Trichloropropane	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2,4-Trichlorobenzene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2,4-Trimethylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2-Dichlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2-Dichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,2-Dichloropropane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,3,5-Trimethylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,3-Dichlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,3-Dichloropropane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	1,4-Dichlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	2,2-Dichloropropane	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	2-Chlorotoluene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	2-Hexanone	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	2-Methoxy-2-methyl-butane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	4-Chlorotoluene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	4-Methyl-2-pentanone [MIBK]	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Acetone	54	ug/L		10	20	J	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Benzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Bromobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Bromodichloromethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Bromoform	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Bromomethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Carbon tetrachloride	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Chlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Chlorobromomethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Chloroethane	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Chloroform	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Chloromethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	cis-1,2-Dichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	cis-1,3-Dichloropropene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Cymene [Isopropyltoluene]	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Dibromochloromethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Dibromochloropropane	0.5	ug/L	U	0.5	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Dibromomethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	0.88	ug/L	U	0.88	2	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Diisopropyl ether	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Ethane, 1,2-dibromo-	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Ethyl tert-butyl ether	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Ethylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Freon-11 [Trichlorofluoromethane]	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Freon-12 [Dichlorodifluoromethane]	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Hexachlorobutadiene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Isopropylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	m,p-Xylene	0.5	ug/L	U	0.5	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Methyl ethyl ketone [2-Butanone]	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Naphthalene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	n-Butyl benzene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	n-Propylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	o-Xylene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	sec-Butylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Styrene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	tert-Butyl alcohol	5	ug/L	U	5	10	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	tert-Butyl benzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Tetrachloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Toluene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	trans-1,2-Dichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	trans-1,3-Dichloropropene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Trichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Vinyl chloride	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	SW-8260B	Total	Xylenes [total]	0.5	ug/L	U	0.5	1	UJ	h	Holding Time
440-214187-1	CTMW-01S-20180621	6/21/2018	VFA	Total	Pyruvic Acid	3.7	mg/L	UF1	3.7	15	UJ	m	MS Recovery
440-214187-1	CTMW-02D-20180621	6/21/2018	EPA 365.3	Total	Phosphorus, Total	0.036	mg/L	J	0.025	0.05	J	sp	Detect < PQL
440-214187-1	CTMW-02D-20180621	6/21/2018	SW-6010B	Total	Iron	0.81	mg/L	J	0.5	1	J	sp	Detect < PQL
440-214187-1	CTMW-02D-20180621	6/21/2018	SW-6010B	Total	Manganese	0.54	mg/L	F1	0.15	0.2	J+	m	MS Recovery
440-214187-1	CTMW-02D-20180621	6/21/2018	SW-6020A	Dissolved	Beryllium	1.4	ug/L	J	1.3	2.5	J	sp	Detect < PQL
440-214187-1	CTMW-02D-20180621	6/21/2018	SW-6020A	Dissolved	Nickel	3.9	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214187-1	CTMW-02D-20180621	6/21/2018	SW-6020A	Dissolved	Selenium	6	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214189-1	CTMW-04D-20180621	6/21/2018	EPA 351.2	Total	Total Kjeldahl Nitrogen [TKN]	0.1	mg/L	UF1	0.1	0.2	R	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	EPA 365.3	Total	Orthophosphate (as P)	0.051	mg/L	F1	0.02	0.05	J-	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	EPA 365.3	Total	Orthophosphorus as PO4	0.16	mg/L	F1	0.06	0.15	J-	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	EPA 365.3	Total	Phosphorus, Total	0.025	mg/L	UF1	0.025	0.05	R	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	RSK175	Total	Methane	0.071	mg/L		0.00025	0.00099	J	vh	Head Space
440-214189-1	CTMW-04D-20180621	6/21/2018	SM4500-S2-D	Total	Sulfide	0.027	mg/L	UF1	0.027	0.05	R	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	SM5220D	Total	Chemical Oxygen Demand	20	mg/L	UF1	20	40	R	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	SW-6010B	Total	Iron	0.59	mg/L	F1	0.25	0.5	J-	m	MS Recovery
440-214189-1	CTMW-04D-20180621	6/21/2018	SW-6020A	Dissolved	Copper	2.5	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214189-1	CTMW-04D-20180621	6/21/2018	SW-6020A	Dissolved	Iron	65	ug/L	JB	40	100	J	bl,sp	Lab Blank, Detect < PQL
440-214189-1	CTMW-04D-20180621	6/21/2018	SW-6020A	Dissolved	Nickel	2.6	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214189-1	CTMW-04D-20180621	6/21/2018	SW-6020A	Dissolved	Selenium	5.1	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214189-1	CTMW-04D-20180621	6/21/2018	SW-6020A	Dissolved	Zinc	40	ug/L	JB	13	100	J	bl,sp	Lab Blank, Detect < PQL
440-214189-1	CTMW-04D-20180621	6/21/2018	VFA	Total	Pyruvic Acid	3.7	mg/L	UF1	3.7	15	UJ	m	MS Recovery
440-214189-1	CTMW-04S-20180621	6/21/2018	SW-6010B	Total	Iron	0.087	mg/L	J	0.05	0.1	J	sp	Detect < PQL
440-214189-1	CTMW-04S-20180621	6/21/2018	SW-6020A	Dissolved	Aluminum	37	ug/L	JB	25	50	J	bl,sp	Lab Blank, Detect < PQL
440-214189-1	CTMW-04S-20180621	6/21/2018	SW-6020A	Dissolved	Antimony	3	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214189-1	CTMW-04S-20180621	6/21/2018	SW-6020A	Dissolved	Cobalt	3.5	ug/L	J	2.5	5	J	sp	Detect < PQL
440-214189-1	CTMW-04S-20180621	6/21/2018	SW-6020A	Dissolved	Nickel	5.5	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214189-1	CTMW-04S-20180621	6/21/2018	SW-6020A	Dissolved	Selenium	8.1	ug/L	J	2.5	10	J	sp	Detect < PQL
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-6010B	Total	Chromium	3.3	mg/L	B	0.0025	0.005	J+	bl	Lab Blank
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-6020A	Dissolved	Aluminum	46	ug/L	B	5	10	J+	bl	Lab Blank
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-6020A	Dissolved	Cobalt	0.74	ug/L	J	0.5	1	J	sp	Detect < PQL
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-6020A	Dissolved	Copper	0.63	ug/L	J	0.5	2	J	sp	Detect < PQL
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1,1,2-Tetrachloroethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1,1-Trichloroethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1,2,2-Tetrachloroethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1,2-Trichloroethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1-Dichloroethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1-Dichloroethene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,1-Dichloropropene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2,3-Trichlorobenzene	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2,3-Trichloropropane	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2,4-Trichlorobenzene	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2,4-Trimethylbenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2-Dichlorobenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2-Dichloroethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,2-Dichloropropane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,3,5-Trimethylbenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,3-Dichlorobenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,3-Dichloropropane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	1,4-Dichlorobenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	2,2-Dichloropropane	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	2-Chlorotoluene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	2-Hexanone	13	ug/L	U	13	25	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	2-Methoxy-2-methyl-butane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	4-Chlorotoluene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	4-Methyl-2-pentanone [MIBK]	13	ug/L	U	13	25	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Acetone	50	ug/L	U	50	100	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Benzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Bromobenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Bromodichloromethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Bromoform	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Bromomethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Carbon tetrachloride	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Chlorobenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Chlorobromomethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Chloroethane	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Chloroform	270	ug/L		1.3	2.5	J	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Chloromethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	cis-1,2-Dichloroethene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	cis-1,3-Dichloropropene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Cymene [Isopropyltoluene]	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Dibromochloromethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Dibromochloropropane	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Dibromomethane	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	19	ug/L		4.4	10	J	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Diisopropyl ether	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Ethane, 1,2-dibromo-	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Ethyl tert-butyl ether	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Ethylbenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Freon-11 [Trichlorofluoromethane]	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Freon-12 [Dichlorodifluoromethane]	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Hexachlorobutadiene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Isopropylbenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	m,p-Xylene	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Methyl ethyl ketone [2-Butanone]	13	ug/L	U	13	25	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Naphthalene	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	n-Butyl benzene	2	ug/L	U	2	5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	n-Propylbenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	o-Xylene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	sec-Butylbenzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Styrene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	tert-Butyl alcohol	25	ug/L	U	25	50	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	tert-Butyl benzene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Tetrachloroethene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Toluene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	trans-1,2-Dichloroethene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	trans-1,3-Dichloropropene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Trichloroethene	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Vinyl chloride	1.3	ug/L	U	1.3	2.5	UJ	h	Holding Time
440-214285-1	CTMW-06D-20180622	6/22/2018	SW-8260B	Total	Xylenes [total]	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-6010B	Total	Chromium	0.042	mg/L	B	0.0025	0.005	J+	bl	Lab Blank
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-6020A	Dissolved	Aluminum	27	ug/L	B	5	10	J+	bl	Lab Blank

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-6020A	Dissolved	Antimony	1.3	ug/L	J	0.5	2	J	sp	Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-6020A	Dissolved	Cadmium	0.25	ug/L	J	0.25	1	J	sp	Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-6020A	Dissolved	Copper	0.75	ug/L	J	0.5	2	J	sp	Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-6020A	Dissolved	Selenium	0.59	ug/L	JF1	0.5	2	J	m,sp	MS Recovery, Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1,1,2-Tetrachloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1,1-Trichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1,2,2-Tetrachloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1,2-Trichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1-Dichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1-Dichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,1-Dichloropropene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2,3-Trichlorobenzene	0.49	ug/L	J	0.4	1	J	h,sp	Holding Time, Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2,3-Trichloropropane	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2,4-Trichlorobenzene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2,4-Trimethylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2-Dichlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2-Dichloroethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,2-Dichloropropane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,3,5-Trimethylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,3-Dichlorobenzene	0.33	ug/L	J	0.25	0.5	J	h,sp	Holding Time, Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,3-Dichloropropane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	1,4-Dichlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	2,2-Dichloropropane	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	2-Chlorotoluene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	2-Hexanone	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	2-Methoxy-2-methyl-butane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	4-Chlorotoluene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	4-Methyl-2-pentanone [MIBK]	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Acetone	12	ug/L	J	10	20	J	h,sp	Holding Time, Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Benzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Bromobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Bromodichloromethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Bromoform	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Bromomethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Carbon tetrachloride	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Chlorobenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Chlorobromomethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Chloroethane	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Chloroform	4.9	ug/L		0.25	0.5	J	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Chloromethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	cis-1,2-Dichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	cis-1,3-Dichloropropene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Cymene [Isopropyltoluene]	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Dibromochloromethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Dibromochloropropane	0.5	ug/L	U	0.5	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Dibromomethane	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	1.4	ug/L	J	0.88	2	J	h,sp	Holding Time, Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Diisopropyl ether	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Ethane, 1,2-dibromo-	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Ethyl tert-butyl ether	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Ethylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Freon-11 [Trichlorofluoromethane]	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Freon-12 [Dichlorodifluoromethane]	0.4	ug/L	U	0.4	1	UJ	h	Holding Time

Table 6 Results Qualified During Validation

SDG	Sample ID	Sample Date	Method	Total or Dissolved	Analyte	Result	Units	Lab Qualifier	SQL	PQL	Validator Qualifier	Reason Code	Reason Code Definition
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Hexachlorobutadiene	0.3	ug/L	J	0.25	0.5	J	h,sp	Holding Time, Detect < PQL
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Isopropylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	m,p-Xylene	0.5	ug/L	U	0.5	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Methyl ethyl ketone [2-Butanone]	2.5	ug/L	U	2.5	5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	MTBE [Methyl tert-butyl ether]	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Naphthalene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	n-Butyl benzene	0.4	ug/L	U	0.4	1	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	n-Propylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	o-Xylene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	sec-Butylbenzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Styrene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	tert-Butyl alcohol	5	ug/L	U	5	10	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	tert-Butyl benzene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Tetrachloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Toluene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	trans-1,2-Dichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	trans-1,3-Dichloropropene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Trichloroethene	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Vinyl chloride	0.25	ug/L	U	0.25	0.5	UJ	h	Holding Time
440-214285-1	CTMW-06S-20180622	6/22/2018	SW-8260B	Total	Xylenes [total]	0.5	ug/L	U	0.5	1	UJ	h	Holding Time
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-6010B	Total	Chromium	0.018	mg/L	B	0.0025	0.005	J+	bl	Lab Blank
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-6010B	Total	Iron	0.075	mg/L	J	0.05	0.1	J	sp	Detect < PQL
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-6010B	Total	Manganese	0.015	mg/L	J	0.015	0.02	J	sp	Detect < PQL
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-6020A	Dissolved	Aluminum	62	ug/L	B	5	10	J+	bl	Lab Blank
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-6020A	Dissolved	Selenium	1.3	ug/L	J	0.5	2	J	sp	Detect < PQL
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-8260B	Total	2,2-Dichloropropane	0.4	ug/L	U	0.4	1	UJ	c	Calibration
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-8260B	Total	Chloroform	0.41	ug/L	J	0.25	0.5	J	sp	Detect < PQL
440-214285-1	CTMW-07D-20180622	6/22/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	0.97	ug/L	J	0.88	2	J	sp	Detect < PQL
440-214285-1	M12-20180622-TB	6/22/2018	SW-8260B	Total	2,2-Dichloropropane	0.4	ug/L	U	0.4	1	UJ	c	Calibration
440-214285-1	M12-20180622-TB	6/22/2018	SW-8260B	Total	Dichloromethane [Methylene chloride]	1	ug/L	J	0.88	2	J	sp	Detect < PQL
440-214285-1	M12-20180622-TB	6/22/2018	SW-8260B	Total	Tetrachloroethene	0.38	ug/L	J	0.25	0.5	J	sp	Detect < PQL

Table 7 Field Duplicate Exceedances

SDG	Method	Parameter	Filtered	Units	Parent Sample ID	Result	FD Result	RPD (%)	Allowed RPD (%)	Difference >PQL
440-204893-1	EPA 365.3	Orthophosphate (as P)	Total	mg/L	CTMW-01D-20180305	0.072	0.17	---	N/A	0.098
440-204893-1	EPA 365.3	Orthophosphorus as PO4	Total	mg/L	CTMW-01D-20180305	0.22	0.51	---	N/A	0.29
440-214187-1	EPA 365.3	Orthophosphorus as PO4	Total	mg/L	CTMW-01D-20180621	0.65	0.48	---	N/A	0.17
440-214187-1	SM5220D	Chemical Oxygen Demand	Total	mg/L	CTMW-01D-20180621	870	650	---	N/A	220
440-214187-1	SW-8260B	Methyl ethyl ketone [2-Butanone]	Total	ug/L	CTMW-01D-20180621	940	1300	32	30	---

Table 8 MS/MSD Recovery Exceedances

SDG	Spiked Sample	Lab Sample ID	Method	Filtered	Parameter	MS Recovery (%)	MSD Recovery (%)	Acceptance Range (%)
440-192727-1	CTMW-07D-80.0-20170921	440-192727-6	EPA 314.0	N	Perchlorate	86	67	80 - 120
440-204893-1	CTMW-01D-20180305	440-204893-3	EPA 365.3	N	Orthophosphate (as P)	33	30	75 - 125
440-204893-1	CTMW-01D-20180305	440-204893-3	EPA 365.3	N	Orthophosphorus as PO4	33	30	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	EPA 314.0	N	Perchlorate	57	59	80 - 120
440-204893-1	CTMW-07S-20180306	440-204893-9	EPA 351.2	N	Total Kjeldahl Nitrogen [TKN]	0	0	90 - 110
440-204893-1	CTMW-07S-20180306	440-204893-9	EPA 365.3	N	Orthophosphate (as P)	24	25	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	EPA 365.3	N	Orthophosphorus as PO4	24	25	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	EPA 365.3	N	Phosphorus, Total	24	20	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	SM4500-S2-D	N	Sulfide	14	14	70 - 130
440-204893-1	CTMW-07S-20180306	440-204893-9	SW-6010B	N	Iron	155	148	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	SW-6020A	Y	Silver	59	53	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	SW-6020A	Y	Zinc	62	62	75 - 125
440-204893-1	CTMW-07S-20180306	440-204893-9	VFA-IC	N	Pyruvic Acid	73	67	80 - 120
440-205188-1	CTMW-04S-20180307	440-205188-3	SW-6020A	Y	Copper	70	77	75 - 125
440-205188-1	CTMW-04S-20180307	440-205188-3	SW-6020A	Y	Lead	69	69	75 - 125
440-205188-1	CTMW-04S-20180307	440-205188-3	SW-6020A	Y	Nickel	72	77	75 - 125
440-205188-1	CTMW-04S-20180307	440-205188-3	SW-6020A	Y	Zinc	73	76	75 - 125
440-205188-1	CTMW-06D-20180307	440-205188-2	SW-8260B	N	Chloroform	92	54	70 - 130
440-205188-2	CTMW-04D-20180307	440-205188-4	EPA 365.3	N	Orthophosphate (as P)	29	28	75 - 125
440-205188-2	CTMW-04D-20180307	440-205188-4	EPA 365.3	N	Orthophosphorus as PO4	29	28	75 - 125
440-214187-1	CTMW-01S-20180621	440-214187-1	VFA-IC	N	Pyruvic Acid	76	Not analyzed	80 - 120
440-214187-1	CTMW-02D-20180621	440-214187-4	SW-6010B	N	Manganese	112	128	75 - 125
440-214189-1	CTMW-04D-20180621	440-214189-2	EPA 351.2	N	Total Kjeldahl Nitrogen [TKN]	0	0	90 - 110
440-214189-1	CTMW-04D-20180621	440-214189-2	EPA 365.3	N	Orthophosphate (as P)	24	21	75 - 125
440-214189-1	CTMW-04D-20180621	440-214189-2	EPA 365.3	N	Orthophosphorus as PO4	24	21	75 - 125
440-214189-1	CTMW-04D-20180621	440-214189-2	EPA 365.3	N	Phosphorus, Total	18	20	75 - 125
440-214189-1	CTMW-04D-20180621	440-214189-2	SM4500-S2-D	N	Sulfide	28	28	70 - 130
440-214189-1	CTMW-04D-20180621	440-214189-2	SM5220D	N	Chemical Oxygen Demand	0	0	70 - 120
440-214189-1	CTMW-04D-20180621	440-214189-2	SW-6010B	N	Iron	61	70	75 - 125
440-214189-1	CTMW-04D-20180621	440-214189-2	VFA-IC	N	Pyruvic Acid	63	63	80 - 120
440-214285-1	CTMW-06S-20180622	440-214285-2	SW-6020A	Y	Selenium	75	74	75 - 125

Table 9 Sample Condition and Preservation Infractions

SDG	Sample ID	Method	Parameter	Outlier	Limit
440-204893-1	CTMW-01S-20180305	SM5310B	Total Organic Carbon	pH > 2	pH < 2
440-204893-1	CTMW-02S-20180306	SM5310B	Total Organic Carbon	pH > 2	pH < 2
440-214187-1	CTMW-01S-20180621	RSK175	Methane	Headspace	No Headspace
440-214189-1	CTMW-04D-20180621	RSK175	Methane	Headspace	No Headspace

Table 10 Holding Time Exceedances

SDG	Sample ID	Method	Filtered	Parameter	Time Limit	Time Elapsed
440-192727-1	CTMW-07D-50.0-20170921	SW-8260B	Total	Chloroform	7 days	11.2 days
440-192727-1	CTMW-07D-70.0-20170921-GW	SW-8260B	Total	Chloroform	7 days	11.2 days
440-204893-1	CTMW-01S-20180305	RSK175	Total	Methane	7 days	10.1 days
440-204893-1	CTMW-01S-20180305	SM5310B	Total	Total Organic Carbon	4 hours	355.2 hours
440-204893-1	CTMW-02S-20180306	RSK175	Total	Methane	7 days	8.9 days
440-204893-1	CTMW-02S-20180306	SM5310B	Total	Total Organic Carbon	4 hours	314.4 hours
440-204893-1	CTMW-06S-20180306	RSK175	Total	Methane	7 days	9.1 days
440-214187-1	CTMW-01D-20180621-FD	SW-8260B	Total	VOCs	7 days	10.3 days
440-214187-1	CTMW-01S-20180621	SW-8260B	Total	VOCs	7 days	10.2 days
440-214285-1	CTMW-06D-20180622	SW-8260B	Total	VOCs	7 days	11.4 days
440-214285-1	CTMW-06S-20180622	SW-8260B	Total	VOCs	7 days	11.5 days

Table 11 Laboratory Blank Detections

SDG	Sample ID	Method	Parameter	Result	Units	Associated Samples with Qualification
440-193864-1	CCB 440-435352/16	SW-6020A	Iron	8.29	ug/L	CTMW-07D-20171009
440-204893-1	MB 440-463023/1-A	SW-6010B	Iron	0.0574	mg/L	CTMW-07D-20180306, CTMW-07S-20180306
440-205188-1	MB 440-463327/1-G	SW-6020A	Aluminum	7.31	ug/L	CTMW-04S-20180307, CTMW-06D-20180307
440-205188-2	MB 440-463327/1-G	SW-6020A	Aluminum	7.31	ug/L	CTMW-04D-20180307
440-214189-1	MB 440-484150/1-B	SW-6020A	Iron	9.08	ug/L	CTMW-04D-20180621
440-214189-1	MB 440-484150/1-F	SW-6020A	Zinc	3.61	ug/L	CTMW-04D-20180621
440-214189-1	MB 440-484625/1-F	SW-6020A	Aluminum	7.84	ug/L	CTMW-04S-20180621
440-214285-1	MB 440-484831/1-E	SW-6020A	Aluminum	7.2	ug/L	CTMW-06D-20180622, CTMW-06S-20180622, CTMW-07D-20180622
440-214285-1	MB 440-485831/1-A	SW-6010B	Chromium	0.0044	mg/L	CTMW-06D-20180622, CTMW-06S-20180622, CTMW-07D-20180622

Table 12 Completeness Summary

Method	Total Number of Validated Results	Number of Rejected Results	Percent Completeness
EPA 300.0	63	0	100.0%
EPA 300.1B	55	0	100.0%
EPA 314.0	34	0	100.0%
EPA 351.2	21	2	90.5%
EPA 365.3	63	2	96.8%
RSK175	21	0	100.0%
SM2320B	84	0	100.0%
SM2340C	21	0	100.0%
SM2540C	21	0	100.0%
SM4500-S2-D	21	2	90.5%
SM5220D	10	1	90.0%
SM5310B	21	0	100.0%
SW-6010B	76	0	100.0%
SW-6020A	399	0	100.0%
SW-7199	34	0	100.0%
SW-8260B	1878	0	100.0%
VFA-IC	126	0	100.0%

Appendix E.1
Validation Checklists

Data Verification and Validation Summary

Project Name:	In-Situ Chromium Monitoring	SDG/Report No.:	440-192727-1
Task No.:	M12	Lab ID:	Test America
No. of Samples:	11	Matrix:	Soil/Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		No	None
2. Chain-of-Custody		X	No	None
3. Holding Times	X		Yes	CTMW-07D-50.0-20170921 and CTMW-07D-70.0-20170921: Qualify chloroform "J".
4. Instrument Performance		X	No	None
5. Initial Calibration		X	No	None
6. Continuing Calibration Verification		X	No	None
7. Blanks		X	No	None
8. Surrogates/Monitoring Compounds	X		No	None
9. Matrix Spike/Matrix Spike Duplicate/MSI	X		Yes	CTMW-07D-80.0-20170921: Qualify perchlorate "J-".
10. Serial Dilution		X	No	None
11. Laboratory Control Samples		X	No	None
12. Interference Check Samples		X	No	None
13. Internal Standards		X	No	None
14. Duplicates		X	No	None
15. Compound Quantitation and Reporting Limits		X	Yes	Qualify all results detected between the MDL and RL "J".
16. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Soil: Stage_2B_Validation_Manual Water: Stage_2A_Validation_Manual
Verification and Validation Label Code	Soil: S2BVM Water: S2AVM

Overall Assessment: Results are acceptable as qualified.
Usability: Qualified sample results (J, J-) are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Data Verification and Validation Summary

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperature(s)	Validation Stage
CTMW-07D-50.0-20170921	440-192727-1	9/21/2017	1.5 °C/4.0 °C	Stage 2A
CTMW-07D-60.0-20170921	440-192727-2	9/21/2017	1.5 °C/4.0 °C	Stage 2B
CTMW-07D-70.0-20170921-GW	440-192727-3	9/21/2017	1.5 °C/4.0 °C	Stage 2A
CTMW-07D-70.0-20170921-SO	440-192727-4	9/21/2017	1.5 °C/4.0 °C	Stage 2B
Trip Blank	440-192727-5	9/21/2017	1.5 °C/4.0 °C	Stage 2A
CTMW-07D-80.0-20170921	440-192727-6	9/21/2017	1.5 °C/4.0 °C	Stage 2B
CTMW-07D-90.0-20170921	440-192727-7	9/21/2017	1.5 °C/4.0 °C	Stage 2B
CTMW-07D-100.0-20170921	440-192727-8	9/21/2017	1.5 °C/4.0 °C	Stage 2B
CTMW-07D-110.0-20170921	440-192727-9	9/21/2017	1.5 °C/4.0 °C	Stage 2B
CTMW-07.D-60.0-20170921-EB	440-192727-10	9/21/2017	1.5 °C/4.0 °C	Stage 2A
CTMW-07D-90.0-20170921-FD	440-192727-11	9/21/2017	1.5 °C/4.0 °C	Stage 2B

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4°C (+ or – 2°C)? Were samples received in proper condition?	No/No/Yes
8260B: The following samples were collected in bottles with preservative added but were not preserved to pH<2: CTMW-07D-50.0-20170921 and CTMW-07D-70.0-20170921-GW. The method allows unpreserved samples.	

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	No
8260B: The following samples were analyzed after the 7-day turn-around-time for unpreserved samples: CTMW-07D-50.0-20170921 and CTMW-07D-70.0-20170921-GW.	

4. Instrument Performance	
Was BFB analyzed before and within 12 hours of sample analysis? Were mass assignments correct and normalized to m/z 95? Were ion abundance criteria met?	Yes/Yes/Yes

5. Initial Calibration (ICAL)	
Were the correct number of standards analyzed to establish the calibration curve for each analyte? Were Percent Relative Standard Deviations (%RSDs) of the Response Factors (RFs) ≤ method or national functional guideline (NFG) requirements or Coefficient of Correlation or Coefficient of Determination ≥ method or NFG requirements? Were Relative Response Factors (RRFs) and average RRFs ≥ method or NFG requirements?	Yes/Yes/Yes

6. Continuing Calibration Verification (CCV)	
Were CCVs analyzed at the beginning and end of sample analysis, if applicable? Were calibrations compared to the correct initial calibrations? Were Percent Differences (%D) ≤ method or NFG requirements? Did RRFs and average RRFs meet method or NFG requirements?	Yes/Yes/Yes/Yes

7. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were calibration blanks analyzed at appropriate intervals? Were analytes detected in any blanks?	Yes/Yes/Yes/No

8. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported on data forms? Were recoveries within laboratory limits?	Yes/Yes/No
8260B: 4-Bromofluorobenzene recovery was high in CTMW-07D-90.0-20170921-FD. Chloroform was not detected, so there can be no high bias.	

9. Matrix Spike/Matrix Spike Duplicate/MSI	
Was a MS/MSD pair or MSI extracted and/or analyzed with each batch? Were recoveries/RPDs reported correctly on data forms? Were recoveries/RPDs within laboratory established limits?	Yes/Yes/No
Qualifiers, if applicable, were applied to parent samples and their FDs only.	
314.0: Perchlorate recovery was low in the MSD of CTMW-07D-80.0-20170921.	
6010B: Total chromium recoveries were outside limits in the MS/MSD of CTMW-07D-50.0-20170921. The concentrations in the parent sample were > 4x the amount spiked. No qualification is needed.	

10. Serial Dilution	
Were serial dilutions analyzed at appropriate intervals? For results > 50x the MDL, were %Ds within acceptable limits of the true value?	Yes/N/A

11. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

12. Interference Check Sample (ICS)	
Were interference check samples (ICS) analyzed at appropriate intervals? Were ICS recoveries within acceptable limits of the true value? Were ICSA samples non-detect for analytes not in the solution?	Yes/Yes/Yes

13. Internal Standards (IS)	
Were ISs added to each sample in the run including calibrations, samples, and QC samples? Were area counts of the ISs for all samples within 50% and 200% of its response in the CCV? Was the Retention Time of the IS within ±30 seconds from the RT of the IS in the associated CCV or mid-point standard from ICAL?	Yes/Yes/Yes

14. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water) or 50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/Yes/Yes

15. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

16. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 10/15/2018

Data Verification and Validation Summary

Project Name:	In-Situ Chromium Monitoring	SDG/Report No.:	440-192817-1
Task No.:	M12	Lab ID:	Test America
No. of Samples:	3	Matrix:	Soil/Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		No	None
2. Chain-of-Custody	X		No	None
3. Holding Times		X	No	None
4. Instrument Performance		X	No	None
5. Initial Calibration		X	No	None
6. Continuing Calibration Verification		X	No	None
7. Blanks	X		No	None
8. Surrogates/Monitoring Compounds		X	No	None
9. Matrix Spike/Matrix Spike Duplicate/MSI		X	No	None
10. Serial Dilution		X	No	None
11. Laboratory Control Samples		X	No	None
12. Interference Check Samples		X	No	None
13. Internal Standards		X	No	None
14. Duplicates		X	No	None
15. Compound Quantitation and Reporting Limits		X	Yes	Qualify all results detected between the MDL and RL "J".
16. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Soil: Stage_2B_Validation_Manual Water: Stage_2A_Validation_Manual
Verification and Validation Label Code	Soil: S2BVM Water: S2AVM

Overall Assessment: Results are acceptable as qualified.
Usability: Qualified sample results (J) are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperature(s)	Validation Stage
CTMW-07D-120.0-20170922	440-192817-1	9/22/2017	1.9 °C/4.1 °C	Stage 2B
CTMW-07D-130.0-20170922-EB	440-192817-2	9/22/2017	1.9 °C/4.1 °C	Stage 2A
Trip Blank	440-192817-3	9/22/2017	1.9 °C/4.1 °C	Stage 2A

Data Verification and Validation Summary

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	Yes/No/Yes

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes
CTMW-07D-130.0-20170922-EB did not have a sample time on the COC. Sample time was on the labels	

3. Holding Times	
Were samples analyzed within acceptable holding times?	Yes

4. Instrument Performance	
Was BFB analyzed before and within 12 hours of sample analysis? Were mass assignments correct and normalized to m/z 95? Were ion abundance criteria met?	Yes/Yes/Yes

5. Initial Calibration (ICAL)	
Were the correct number of standards analyzed to establish the calibration curve for each analyte? Were Percent Relative Standard Deviations (%RSDs) of the Response Factors (RFs) ≤ method or national functional guideline (NFG) requirements or Coefficient of Correlation or Coefficient of Determination ≥ method or NFG requirements? Were Relative Response Factors (RRFs) and average RRFs ≥ method or NFG requirements?	Yes/Yes/Yes

6. Continuing Calibration Verification (CCV)	
Were CCVs analyzed at the beginning and end of sample analysis, if applicable? Were calibrations compared to the correct initial calibrations? Were Percent Differences (%D) ≤ method or NFG requirements? Did RRFs and average RRFs meet method or NFG requirements?	Yes/Yes/Yes/Yes

7. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were calibration blanks analyzed at appropriate intervals? Were analytes detected in any blanks?	Yes/Yes/Yes/Yes
314.0: Perchlorate was detected in CTMW-07D-130.0-20170922-EB. It was not detected in the sample.	

8. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

9. Matrix Spike/Matrix Spike Duplicate/MSI	
Was a MS/MSD pair or MSI extracted and/or analyzed with each batch? Were recoveries/RPDs reported correctly on data forms? Were recoveries/RPDs within laboratory established limits?	Yes/Yes/N/A

10. Serial Dilution	
Were serial dilutions analyzed at appropriate intervals? For results > 50x the MDL, were %Ds within acceptable limits of the true value?	Yes/N/A

11. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

12. Interference Check Sample (ICS)	
Were interference check samples (ICS) analyzed at appropriate intervals? Were ICS recoveries within acceptable limits of the true value? Were ICSA samples non-detect for analytes not in the solution?	Yes/Yes/Yes

13. Internal Standards (IS)	
Were ISs added to each sample in the run including calibrations, samples, and QC samples? Were area counts of the ISs for all samples within 50% and 200% of its response in the CCV? Was the Retention Time of the IS within ±30 seconds from the RT of the IS in the associated CCV or mid-point standard from ICAL?	Yes/Yes/Yes

14. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water) or 50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/Yes/N/A

15. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

16. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 10/15/2018

Data Verification and Validation Summary

Project Name:	In-Situ Chromium Monitoring	SDG/Report No.:	440-192835-1
Task No.:	M12	Lab ID:	Test America
No. of Samples:	1	Matrix:	Soil

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		No	None
2. Chain-of-Custody		X	No	None
3. Holding Times		X	No	None
4. Instrument Performance		X	No	None
5. Initial Calibration		X	No	None
6. Continuing Calibration Verification		X	No	None
7. Blanks		X	No	None
8. Surrogates/Monitoring Compounds		X	No	None
9. Matrix Spike/Matrix Spike Duplicate/MSI		X	No	None
10. Serial Dilution		X	No	None
11. Laboratory Control Samples		X	No	None
12. Interference Check Samples		X	No	None
13. Internal Standards		X	No	None
14. Duplicates		X	No	None
15. Compound Quantitation and Reporting Limits		X	No	None
16. Calculations and Raw Data		X	No	None
17. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Stage_4_Validation_Manual
Verification and Validation Label Code	S4VM

Overall Assessment: Acceptable as reported.
Usability: Sample results are considered valid and useable for all purposes.

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperature(s)
CTMW-07D-120.0-20170922	440-192835-1	9/22/2017	1.9 ºC/4.1 ºC

Data Verification and Validation Summary

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	Yes/No/Yes

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes
The client requested that Manganese be added to all samples.	

3. Holding Times	
Were samples analyzed within acceptable holding times?	Yes

4. Instrument Performance	
Was BFB analyzed before and within 12 hours of sample analysis? Were mass assignments correct and normalized to m/z 95? Were ion abundance criteria met?	Yes/Yes/Yes

5. Initial Calibration (ICAL)	
Were the correct number of standards analyzed to establish the calibration curve for each analyte? Were Percent Relative Standard Deviations (%RSDs) of the Response Factors (RFs) ≤ method or national functional guideline (NFG) requirements or Coefficient of Correlation or Coefficient of Determination ≥ method or NFG requirements? Were Relative Response Factors (RRFs) and average RRFs ≥ method or NFG requirements?	Yes/Yes/Yes

6. Continuing Calibration Verification (CCV)	
Were CCVs analyzed at the beginning and end of sample analysis, if applicable? Were calibrations compared to the correct initial calibrations? Were Percent Differences (%D) ≤ method or NFG requirements? Did RRFs and average RRFs meet method or NFG requirements?	Yes/Yes/Yes/Yes

7. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were calibration blanks analyzed at appropriate intervals? Were analytes detected in any blanks?	Yes/Yes/Yes/No

8. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

9. Matrix Spike/Matrix Spike Duplicate/MSI	
Was a MS/MSD pair or MSI extracted and/or analyzed with each batch? Were recoveries/RPDs reported correctly on data forms? Were recoveries/RPDs of project samples within laboratory established limits?	Yes/Yes/No
Outlier was from a sample in another data package.	

10. Serial Dilution	
Were serial dilutions analyzed at appropriate intervals? For results > 50x the MDL, were %Ds within acceptable limits of the true value?	Yes/N/A

11. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

12. Interference Check Sample (ICS)	
Were interference check samples (ICS) analyzed at appropriate intervals? Were ICS recoveries within acceptable limits of the true value? Were ICSA samples non-detect for analytes not in the solution?	Yes/Yes/Yes

13. Internal Standards (IS)	
Were ISs added to each sample in the run including calibrations, samples, and QC samples? Were area counts of the ISs for all samples within 50% and 200% of its response in the CCV? Was the Retention Time of the IS within ±30 seconds from the RT of the IS in the associated CCV or mid-point standard from ICAL?	Yes/Yes/Yes

14. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/No/N/A

15. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

16. Calculations and Raw Data	
Did calculated results and raw data match the reported data?	Yes
Slight differences due to rounding.	

17. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 10/15/18

Data Verification and Validation Summary

Project Name: In-Situ Chromium Monitoring
Project No.: M12
No. of Samples: 2
SDG/Report No.: 440-193864-1
Lab ID: Test America – Irvine/Buffalo
Matrix: Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport		X	No	None
2. Chain-of-Custody		X	No	None
3. Holding Times		X	No	None
4. Blanks	X		Yes	CTMW-07D-20171009: Qualify dissolved iron "J+".
5. Surrogates/Monitoring Compounds		X	No	None
6. Matrix Spike/Matrix Spike Duplicate	X		No	None
7. Laboratory Control Samples		X	No	None
8. Duplicates		X	No	None
9. Compound Quantitation and Reporting Limits		X	Yes	Qualify all results detected between the MDL and RL "J".
10. Data Package/EDD comparison (10%)		X	No	None
11. Other - Calibration	X		Yes	CTMW-07D-20171009: Qualify 1,1,2-Trichloroethane "UJ".

Verification and Validation Label	Stage_2A_Validation_ Manual
Verification and Validation Label Code	S2AVM

Overall Assessment: Acceptable as qualified.
Usability: Sample results qualified as estimated are useable for limited purposes only. All other results are considered valid and useable for all purposes.
CCBs and calibrations are not reviewed in 2A, but items were noticed by validator.

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperature(s)
Trip Blank	440-193864-1	10/9/2017	2.3 ºC, 2.3 ºC, 2.9 ºC
CTMW-07D-20171009	440-193864-2	10/9/2017	2.3 ºC, 2.3 ºC, 2.9 ºC

Data Verification and Validation Summary

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	Yes/Yes/Yes

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	Yes

4. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were analytes detected in any blanks?	Yes/Yes/Yes
6020: Iron was detected in calibration blank CCB 440-435352/16 (8.29 ug/L).	

5. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported correctly on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

6. Matrix Spike/Matrix Spike Duplicate/MSI	
Was a MS/MSD pair or MSI extracted and/or analyzed with each batch? Were recoveries/RPDs reported correctly on data forms? Were recoveries/RPDs within laboratory established limits?	No/Yes/No
6010B: Iron recoveries were high in the MS/MSD of CTMW-07D-2017100. Concentration in the parent sample was >4x the amount spiked, so recovery criteria do not apply.	

7. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/No

8. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/Yes/N/A
Notes: Lab analyzed duplicates from other work orders for general chemistry parameters.	

9. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

10. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

11. Other - Calibration
8260B: ICAL 17676: 1,1,2-Trichloroethane RRF = 0.1809. NFG requires ≥ 0.200. *CCVIS 440-435536/2:* 1,1,2-Trichloroethane RRF = 0.1899. NFG requires ≥ 0.200

Validated by: Maureen McMyler 10/23/17

Data Verification and Validation Summary

Project Name: In-Situ Chromium Monitoring
Task No.: M12
No. of Samples: 10
SDG/Report No.: 440-204893-1
Lab ID: Test America
Matrix: Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		Yes	CTMW-01S-20180305 and CTMW-02S-20180306: Qualify TOC "J-".
2. Chain-of-Custody		X	No	None
3. Holding Times	X		Yes	CTMW-01S-20180305, CTMW-02S-20180306, and CTMW-06S-20180306: Qualify methane "J-". CTMW-01S-20180305 and CTMW-02S-20180306: Qualify TOC "J-".
4. Blanks	X		Yes	CTMW-07S-20180306 and CTMW-07D-20180306: Qualify iron "J", and "J+", respectively.
5. Surrogates/Monitoring Compounds		X	No	None
6. Matrix Spike/Matrix Spike Duplicate	X		Yes	CTMW-07S-20180306: Qualify perchlorate, orthophosphorus as PO4, and dissolved silver "J-"; orthophosphate as P, total iron, and dissolved zinc "J"; sulfide, total phosphorus, and TKN "R"; and pyruvic acid "UJ". CTMW-01D-20180305, CTMW-01D-20180305-FD: Qualify orthophosphate as P and orthophosphorus as PO4 "J".
7. Laboratory Control Samples		X	No	None
8. Duplicates	X		Yes	CTMW-01D-20180305, CTMW-01D-20180305-FD: Qualify orthophosphate as P and orthophosphorus as PO4 "J".
9. Compound Quantitation and Reporting Limits		X	Yes	All: Qualify results between the MDL and RL "J".
10. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Stage_2A_Validation_Manual
Verification and Validation Label Code	S2AVM

Overall Assessment: Results are acceptable as qualified, except for rejected results.
Usability: Rejected results are not useable. Qualified sample results (UJ, J-, J, J+) are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Data Verification and Validation Summary

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperatures
Trip Blank	440-204893-1	3/5/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-01S-20180305	440-204893-2	3/5/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-01D-20180305	440-204893-3	3/5/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-01D-20180305-FD	440-204893-4	3/5/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-02D-20180305	440-204893-5	3/5/2018	2.3 ºC/4.0 ºC/4.5 ºC
Trip Blank	440-204893-6	3/6/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-02S-20180306	440-204893-7	3/6/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-07D-20180306	440-204893-8	3/6/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-07S-20180306	440-204893-9	3/6/2018	2.3 ºC/4.0 ºC/4.5 ºC
CTMW-06S-20180306	440-204893-10	3/6/2018	2.3 ºC/4.0 ºC/4.5 ºC

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	No/Yes/Yes
8260B, RSK-175: The following samples were collected in bottles with preservative added, but were not preserved to pH<2: CTMW-01S-20180305, CTMW-02S-20180306, and CTMW-06S-20180306. Both methods allow unpreserved samples.	
SM5310B: The following samples were not preserved to pH<2: CTMW-01S-20180305, CTMW-02S-20180306. They were adjusted prior to analysis.	

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	No
RSK-175: The following samples were analyzed after the 7-day turn-around-time for unpreserved samples: CTMW-01S-20180305, CTMW-02S-20180306, and CTMW-06S-20180306.	

4. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were analytes detected in any blanks?	Yes/Yes/Yes
6010B: Iron was detected in MB 440-463023/1-A.	
SM2320B: Alkalinity and bicarbonate alkalinity were detected in MB 440-463386/2. The concentrations in the associated samples were >10x the amount in the blank or ND. No qualification needed.	

5. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported correctly on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

6. Matrix Spike/Matrix Spike Duplicate	
Was a MS/MSD pair extracted and/or analyzed with each batch? Were recoveries/RPDs reported on data forms? Were recoveries/RPDs of project samples within laboratory established limits?	Yes/Yes/No
300.0: Chloride recoveries were high in the MS/MSD of CTMW-01S-20180305. The concentration in the parent sample was > 4x the amount spiked. No qualification is needed.	
300.1B: Chlorate recoveries were high in the MS/MSD of CTMW-07S-20180306. The concentration in the parent sample was > 4x the amount spiked. Chlorite was not recovered in the MS/MSD of CTMW-07S-20180306 because of dilution. No qualification is needed for either.	
314.0: Perchlorate recoveries were low in the MS/MSD of CTMW-07S-20180306.	
351.2: Total Kjeldahl Nitrogen was not recovered in the MS/MSD of CTMW-07S-20180306. Per inorganic NFG, the data point is rejected.	
365.3: Orthophosphate as P and Orthophosphorus as PO4 were low in the MS/MSDs of CTMW-01D-20180305 and CTMW-07S-20180306. Total phosphorus was low in the MS/MSD of CTMW-07S-20180306.	
SM4500-D: Sulfide recoveries were low in the MS/MSD of CTMW-07S-20180306.	
6010B: CTMW-07S-20180306: Total and dissolved chromium recoveries were high in the MS/MSD. The concentrations in the parent sample were > 4x the amount spiked. No qualification is needed. Total iron recoveries were high. Dissolved silver and zinc were low in the MS/MSD. Dissolved aluminum was high in the MSD, but was ND in the parent.	
SW7199: Hexavalent chromium recovery was high in the MS of CTMW-07S-20180306. The concentration in the parent sample was > 4x the amount spiked. No qualification is needed.	
VFA-IC: Pyruvic acid recoveries were low in the MS/MSD of CTMW-07S-20180306. Propionic recovery was high in the MS, but it was ND in the parent.	

7. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

8. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water)/50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/Yes/No
365.3: Orthophosphate as P and Orthophosphorus as PO4 were detected in CTMW-01D-20180305 and CTMW-01D-20180305-FD at concentrations <5X the RL. The differences between the parent and FD were > the RL.	

9. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

10. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 05/14/18

Data Verification and Validation Summary

Project Name: In-Situ Chromium Monitoring
Task No.: M12
No. of Samples: 4
SDG/Report No.: 440-205188-1/2
Lab ID: Test America
Matrix: Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport		X	No	None
2. Chain-of-Custody		X	No	None
3. Holding Times		X	No	None
4. Blanks	X		Yes	CTMW-06D-20180307 and CTMW-04S-20180307: Qualify aluminum "J+". CTMW-04D-20180307: Qualify aluminum "J".
5. Surrogates/Monitoring Compounds		X	No	None
6. Matrix Spike/Matrix Spike Duplicate	X		Yes	CTMW-06D-20180307: Qualify chloroform "J". CTMW-04S-20180307: Qualify the following dissolved metals: copper and zinc "J"; lead "UJ", nickel "J-". CTMW-04D-20180307: Qualify orthophosphate as P and orthophosphorus as PO4 "J".
7. Laboratory Control Samples		X	No	None
8. Duplicates		X	No	None
9. Compound Quantitation and Reporting Limits		X	Yes	All: Qualify results between the MDL and RL "J".
10. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Stage_2A_Validation_Manual
Verification and Validation Label Code	S2AVM

Overall Assessment: Results are acceptable as qualified.
Usability: Qualified sample results are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Data Verification and Validation Summary

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperatures
Trip Blank	440-205188-1	3/7/2018	2.6 ºC/3.9 ºC/4.1 ºC
CTMW-06D-20180307	440-205188-2	3/7/2018	2.6 ºC/3.9 ºC/4.1 ºC
CTMW-04S-20180307	440-205188-3	3/7/2018	2.6 ºC/3.9 ºC/4.1 ºC
CTMW-04D-20180307	440-205188-4	3/7/2018	2.6 ºC/3.9 ºC/4.1 ºC

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	Yes/Yes/Yes

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	Yes

4. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were analytes detected in any blanks?	Yes/Yes/Yes
6020: Aluminum was detected in MB 440-463327/1-G.	

5. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported correctly on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

6. Matrix Spike/Matrix Spike Duplicate	
Was a MS/MSD pair extracted and/or analyzed with each batch? Were recoveries/RPDs reported on data forms? Were recoveries/RPDs of project samples within laboratory established limits?	Yes/Yes/No
365.3: Orthophosphate as P and Orthophosphorus as PO4 were low in the MS/MSD of CTMW-04D-20180307.	
6010B: CTMW-04S-20180307: Total and dissolved chromium recoveries were outside limits in the MS and/or MSD. The concentrations in the parent sample were > 4x the amount spiked. No qualification is needed. Dissolved copper, lead, nickel, and zinc were low in the MS and/or MSD.	
6020: Dissolved copper, lead, nickel, and zinc were low in the MS and/or MSD of CTMW-04S-20180307.	
8260B: Chloroform recovery was low in the MSD of CTMW-06D-20180307.	

7. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

8. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water)/50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/Yes/N/A

9. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

10. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 05/15/18

Data Verification and Validation Summary

Project Name: In-Situ Chromium Monitoring
Task No.: M12
No. of Samples: 4
SDG/Report No.: 440-214187-1
Lab ID: Test America
Matrix: Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		Yes	CTMW-01S-20180621: Qualify methane "J".
2. Chain-of-Custody		X	No	None
3. Holding Times	X		Yes	CTMW-01S-20180621 and CTMW-01D-20180621-FD: Qualify VOC detects "J" and non-detects "UJ".
4. Blanks	X		No	None
5. Surrogates/Monitoring Compounds		X	No	None
6. Matrix Spike/Matrix Spike Duplicate	X		Yes	CTMW-02D-20180621: Qualify total manganese "J+". CTMW-01S-20180621: Qualify pyruvic acid "UJ".
7. Laboratory Control Samples		X	No	None
8. Duplicates	X		Yes	CTMW-01D-20180621, CTMW-01D-20180621-FD: Qualify 2-butanone, chemical oxygen demand, and orthophosphorus as PO4 "J".
9. Compound Quantitation and Reporting Limits		X	Yes	All: Qualify results between the MDL and RL "J".
10. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Stage_2A_Validation_Manual
Verification and Validation Label Code	S2AVM

Overall Assessment: Results are acceptable as qualified.
Usability: Qualified sample results (UJ, J, J+) are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperatures
CTMW-01S-20180621	440-214187-1	6/21/2018	1.7 ºC/1.9 ºC/4.2 ºC
CTMW-01D-20180621	440-214187-2	6/21/2018	1.7 ºC/1.9 ºC/4.2 ºC
CTMW-01D-20180621-FD	440-214187-3	6/21/2018	1.7 ºC/1.9 ºC/4.2 ºC
CTMW-02D--20180621	440-214187-4	6/21/2018	1.7 ºC/1.9 ºC/4.2 ºC

Data Verification and Validation Summary

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	No/No/No
8260B: The following samples were collected in bottles with preservative added, but were not preserved to pH<2: CTMW-01S-20180621 and CTMW-01D-20180621-FD. The method allows unpreserved samples.	
RSK-175: The following samples were collected in bottles with preservative added, but were not preserved to pH<2: CTMW-01S-20180621, CTMW-01D-20180621, and CTMW-01D-20180621-FD. CTMW-01S-20180621 was received and analyzed with headspace.	

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	No
8260B: The following samples were analyzed after the 7-day turn-around-time for unpreserved samples: CTMW-01S-20180621 and CTMW-01D-20180621-FD.	

4. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were analytes detected in any blanks?	Yes/Yes/Yes
6010B: Total chromium was detected in MB 440-485027/1-A and MB 440-485208/1-A. The concentrations in the associated samples were >10x the amount in the blank. No qualification needed.	
6020: Aluminum was detected in MB 440-484391/1-D and MB 440-484625/1-E. It was not detected in the samples.	
SM2320B: Alkalinity and bicarbonate alkalinity were detected in MB 440-484918/2. The concentrations in the associated samples were >10x the amount in the blank. No qualification needed.	

5. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported correctly on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

6. Matrix Spike/Matrix Spike Duplicate	
Was a MS/MSD pair extracted and/or analyzed with each batch? Were recoveries/RPDs reported on data forms? Were recoveries/RPDs of project samples within laboratory established limits?	Yes/Yes/No
6010B: Total chromium and manganese recoveries were high in the MSD of CTMW-02D-20180621. The chromium concentration in the parent sample was > 4x the amount spiked, so recovery criteria do not apply.	
6020: Dissolved aluminum, chromium, and manganese recoveries were outside limits in the MS and/or MSD of CTMW-01D-20180621-FD. The concentrations in the parent sample were > 4x the amount spiked for chromium and manganese. Aluminum recovery was high but the sample was ND, so there can be no high bias. Dissolved barium, chromium, and manganese recoveries were outside limits in the MS and/or MSD of CTMW-01D-20180621. The concentrations in the parent sample were > 4x the amount spiked. No qualification is needed.	
VFA-IC: Pyruvic acid recovery was low in the MS of CTMW-01S-2018062. The MSD was not analyzed.	

7. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

8. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water)/50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/No/No
CTMW-01D-20180621 and CTMW-01D-20180621-FD: Orthophosphorus as PO4 was detected in CTMW-01D-20180621 and CTMW-01D-20180621-FD at concentrations <5X the RL. The difference between the parent and FD was > the RL. Chemical oxygen demand result was <5X the RL in CTMW-01D-20180621 and >5x the RL in CTMW-01D-20180621-FD. The difference between the parent and FD was > the RL. The RPD between 2-butanone results was 32%.	

9. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

10. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 07/09/18

Data Verification and Validation Summary

Project Name: In-Situ Chromium Monitoring
Task No.: M12
No. of Samples: 5 with MS/MSD
SDG/Report No.: 440-214189-1
Lab ID: Test America
Matrix: Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		Yes	CTMW-04D-20180621: Qualify methane "J".
2. Chain-of-Custody		X	No	None
3. Holding Times		X	No	None
4. Blanks	X		Yes	CTMW-04S-20180621: Qualify dissolved aluminum "J". CTMW-04D-20180621: Qualify dissolved iron and zinc "J".
5. Surrogates/Monitoring Compounds		X	No	None
6. Matrix Spike/Matrix Spike Duplicate	X		Yes	CTMW-04D-20180621: Qualify orthophosphate as P, and orthophosphorus as PO4, total iron "J-", pyruvic acid "UJ", chemical oxygen demand, phosphorus, sulfide, and total kjeldahl nitrogen "R".
7. Laboratory Control Samples		X	No	None
8. Duplicates		X	No	None
9. Compound Quantitation and Reporting Limits		X	Yes	All: Qualify results between the MDL and RL "J".
10. Data Package/EDD comparison (10%)		X	No	None

Verification and Validation Label	Stage_2A_Validation_Manual
Verification and Validation Label Code	S2AVM

Overall Assessment: Results are acceptable as qualified, except for rejected results.
Usability: Rejected results are not useable. Qualified sample results (UJ, J-, J) are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Data Verification and Validation Summary

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperatures
CTMW-04S-20180621	440-214189-1	6/21/2018	1.4 ºC/1.9 ºC/3.1 ºC
CTMW-04D-20180621	440-214189-2	6/21/2018	1.4 ºC/1.9 ºC/3.1 ºC
CTMW-04D-20180621-MS	440-214189-2 MS	6/21/2018	1.4 ºC/1.9 ºC/3.1 ºC
CTMW-04D-20180621-MSD	440-214189-2 MSD	6/21/2018	1.7 ºC/1.9 ºC/4.2 ºC
M12-20180621-TB	440-214189-3	6/21/2018	1.7 ºC/1.9 ºC/4.2 ºC

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	Yes/No/No
RSK-175: CTMW-04D-20180621was received and analyzed with headspace.	

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	Yes

4. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were analytes detected in any blanks?	Yes/Yes/Yes
6020: Aluminum was detected in MB 440-484625/1-F. Barium and iron were detected in MB 440-484150/1-B. Zinc was detected in MB 440-484150/1-F. In most cases, zinc and barium concentrations in the samples were > 10x the amount in the blanks or ND.	

5. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported correctly on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

6. Matrix Spike/Matrix Spike Duplicate	
Was a MS/MSD pair extracted and/or analyzed with each batch? Were recoveries/RPDs reported on data forms? Were recoveries/RPDs of project samples within laboratory established limits?	Yes/Yes/No
300.1B: Chlorate recoveries were outside limits in the MS/MSD of CTMW-04D-20180621. The concentration in the parent sample was > 4x the amount spiked, so recovery criteria do not apply.	
314.0: Perchlorate recoveries were outside limits in the MS/MSD of CTMW-04D-20180621. The concentration in the parent sample was > 4x the amount spiked, so recovery criteria do not apply.	
351.2: Total Kjeldahl Nitrogen was not recovered in the MS/MSD of CTMW-04D-20180621. Per inorganic NFG guidance, the data point is rejected.	
365.3: Orthophosphate as P, Orthophosphorus as PO4, and Phosphorus, Total recoveries were below 30% in the MS/MSD of CTMW-04D-20180621. Orthophosphate as P and Orthophosphorus as PO4 will be qualified. Phosphorus, Total will be rejected.	
6010B: Total iron recoveries were low in the MS/MSD of CTMW-04D-20180621	
6020: Dissolved chromium, and dissolved chromium and manganese recoveries were outside limits in the MS/MSD of CTMW-04D-20180621 and MS/MSD of CTMW-04S-20180621, respectively. The concentrations in the parent samples were > 4x the amount spiked, so recovery criteria do not apply.	
7199: Hexavalent chromium recoveries were outside limits in the MS/MSD of CTMW-04D-20180621. The concentration in the parent sample was > 4x the amount spiked, so recovery criteria do not apply.	
SM4500-S2-D: Sulfide recoveries were below 30% in the MS/MSD of CTMW-04D-20180621. Per inorganic NFG guidance, the data point is rejected.	
SM5220D: Chemical oxygen demand was not recovered in the MS/MSD of CTMW-04D-20180621. Per inorganic NFG guidance, the data point is rejected.	
VFA-IC: Pyruvic acid recoveries were low in the MS/MSD of CTMW-04D-20180621.	

7. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

8. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water)/50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/No/N/A
Lab duplicate RPDs were within limits.	

9. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

10. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

Validated by: Maureen McMyler 07/09/18

Data Verification and Validation Summary

Project Name: In-Situ Chromium Monitoring
Task No.: M12
No. of Samples: 4
SDG/Report No.: 440-214285-1
Lab ID: Test America
Matrix: Water

Area Reviewed	Anomalies		Qualification Required	Action Required
	Yes	No	Yes or No	
1. Sample Preservation, Handling, and Transport	X		No	None
2. Chain-of-Custody		X	No	None
3. Holding Times	X		Yes	CTMW-06D-20180622, CTMW-06S-20180622: Qualify VOCs "J" for detects and "UJ" for non-detects.
4. Blanks	X		Yes	CTMW-06D-20180622, CTMW-06S-20180622, CTMW-07D-20180622: Qualify dissolved aluminum "J+". CTMW-06S-20180622, CTMW-07D-20180622: Qualify total chromium "J+".
5. Surrogates/Monitoring Compounds		X	No	None
6. Matrix Spike/Matrix Spike Duplicate	X		Yes	CTMW-06S-20180622: Qualify selenium "J".
7. Laboratory Control Samples		X	No	None
8. Duplicates		X	No	None
9. Compound Quantitation and Reporting Limits		X	Yes	All: Qualify results between the MDL and RL "J".
10. Data Package/EDD comparison (10%)		X	No	None
11. Other – Continuing Calibration	X		Yes	M12-20180622-TB and CTMW-07D-20180622: Qualify 2,2-dichloropropane "UJ".

Verification and Validation Label	Stage_2A_Validation_Manual
Verification and Validation Label Code	S2AVM

Overall Assessment: Results are acceptable as qualified.
Usability: Qualified sample results (UJ, J, J+) are considered useable for limited purposes. Other sample results are considered valid and useable for all purposes.

Data Verification and Validation Summary

Sample Information:

Field Sample Number	Lab Sample ID	Date Collected	Cooler Temperatures
M12-20180622-TB	440-214285-1	6/22/2018	2.4 ºC/3.3 ºC/3.9 ºC
CTMW-06S-20180622	440-214285-2	6/22/2018	2.4 ºC/3.3 ºC/3.9 ºC
CTMW-06D-20180622	440-214285-3	6/22/2018	2.4 ºC/3.3 ºC/3.9 ºC
CTMW-07D-20180622	440-214285-4	6/22/2018	2.4 ºC/3.3 ºC/3.9 ºC

The following section is intended to specify areas evaluated and issues encountered. Only applicable methods are listed.

1. Sample Preservation, Handling, and Transport	
Were all samples preserved correctly? Were sample temperatures kept at 4ºC (+ or – 2ºC)? Were samples received in proper condition?	Yes/Yes/No
RSK-175: Two of three vials of CTMW-06S-20180622 were received with headspace. The lab analyzed the bottle with no headspace.	
8260B: CTMW-06S-20180622 and CTMW-06D-20180622 were received at pH > 2. Unpreserved samples are allowed by the method.	

2. Chain-of-Custody (COC)	
Were samples recorded on the COCs? Were correct analyses performed on the samples?	Yes/Yes

3. Holding Times	
Were samples analyzed within acceptable holding times?	No
8260B: CTMW-06S-20180622 and CTMW-06D-20180622 were not analyzed within 7 days for unpreserved samples.	

4. Blanks	
Does data package include a summary of blank results? Was a method blank extracted and/or analyzed for each batch? Were analytes detected in any blanks?	Yes/Yes/Yes
6010B: Total chromium was detected in MB 440-485831/1-A.	
6020: Aluminum was detected in MB 440-484831/1-E.	

5. Surrogates/Monitoring Compounds	
Were samples spiked with the correct surrogate compounds? Were surrogate recoveries reported correctly on data forms? Were recoveries within laboratory limits?	Yes/Yes/Yes

6. Matrix Spike/Matrix Spike Duplicate	
Was a MS/MSD pair extracted and/or analyzed with each batch? Were recoveries/RPDs reported on data forms? Were recoveries/RPDs of project samples within laboratory established limits?	Yes/Yes/No
6020: Dissolved selenium recovery was low in the MSD of CTMW-06S-20180622. Dissolved manganese recovery was low in the MS of CTMW-06S-20180622. The concentration of dissolved manganese in the parent sample was > 4x the amount spiked, so recovery criteria do not apply.	

7. Laboratory Control Samples (LCS)	
Was a LCS analyzed with each analytical batch? Were LCS recoveries reported correctly on data forms? Were LCS recoveries within laboratory established limits?	Yes/Yes/Yes

8. Duplicates	
Were any duplicate pairs analyzed in this SDG? For results > 5x the RL, were RPDs between parent sample and duplicates ≤ lab limits or ≤ 30% (water)/50% (soil) for field duplicates? For REG/FD results < 5x the RL, were differences between the two values < RL.	Yes/No/N/A
Lab duplicate RPDs were within limits.	

9. Compound Quantitation and Reporting Limits	
Were quantitation limits (RLs) adjusted to reflect dilutions, cleanup, and other factors? If applicable, were reporting limit check recoveries within acceptable limits?	Yes/Yes

10. Data Package/EDD comparison (10%)	
Were 10% of the data package results compared to the electronic data? Did results match?	Yes/Yes

11. Other - Calibration
This was mentioned in the case narrative and verified by the validator.
8260B: In CCVIS 440-485540/2, 2,2-dichloropropane %D was high, 35.3%. SOP limit is 30%.

Validated by: Maureen McMyler 07/10/18

Appendix E.2
Laboratory Data Packages

Due to the quantity and size of the files, the laboratory data packages have been provided in a separate file.

Appendix E.3
DVSR Database

Per the requirements provided by NDEP for Unified Chemical Electronic Data Deliverable Format, databases are provided in Microsoft Access format and include location, analytical and groundwater gauging data supporting the DVSR and for upload of the Companies' electronic data into the regional database maintained by NDEP. These databases have been provided in separate files.

Appendix F
Microbial Results

Table F-1 - Summary of Microbial Testing Results-Biological Field Test
Central Retention Basin

Well Location	Sample ID	Sample Date	Week	Functional Genes (cells/bead)		Total Biomass (cells/mL)	Physiological Status (Proteobacteria Only)		Community Structure (% total PLFA)					
				Sulfate Reducing Bacteria	Perchlorate Reductase		Slowed Growth	Decreased Permeability	Firmicutes (TerBrSats)	Proteobacteria (Monos)	Anaerobic metal Reducers (BrMonos)	SRB/Actinomycetes (MidBrSats)	General (Nsats)	Eukaryotes (polyenoics)
CTIW-01S	CTIW-01S-20170405	04/05/17	Baseline	<2.50E+02	6.09E+04	3.92E+04	1.40	0.00	0.00	76.73	2.86	2.17	18.23	0.00
CTIW-01D	CTIW-01D-20170405	04/05/17	Baseline	1.11E+04	2.80E+05	1.43E+05	1.96	0.10	0.51	77.33	6.55	0.60	13.59	1.40
CTMW-01S	CTMW-01S-20170717	07/17/17	PME5	1.43E+03	9.09E+03	8.22E+05	1.14	0.64	12.09	49.47	1.75	0.62	32.50	3.55
	CTMW-01S-20180621	06/21/18	PM10	2.21E+04	<2.50E+02	2.72E+06	0.87	0.05	12.50	58.97	0.70	0.93	25.61	1.30
CTMW-01D	CTMW-01D-20170717	07/17/17	PME5	<2.50E+02	3.51E+04	2.70E+05	0.81	0.24	6.06	70.94	3.72	0.00	17.84	1.43
	CTMW-01D-20180621	06/21/18	PM10	<2.50E+02	<2.50E+02	6.00E+04	1.12	0.00	32.56	46.17	6.41	0.00	14.86	0.00
CTMW-03S	CTMW-03S-20170405	04/05/17	Baseline	<2.50E+02	2.39E+04	7.40E+04	2.42	0.00	0.00	82.94	2.03	0.00	15.02	0.00
	CTMW-03S-20170717	07/17/17	PME5	<2.50E+02	3.51E+04	2.47E+06	1.43	0.31	2.24	74.21	0.46	0.37	21.31	1.42
	CTMW-03S-20180621	06/21/18	PM10	7.88E+02	<2.50E+02	7.75E+04	0.61	0.00	0.00	93.11	1.52	0.00	5.37	0.00
CTMW-03D	CTMW-03D-20170405	04/05/17	Baseline	1.82E+03	4.05E+05	1.19E+05	1.18	0.05	1.26	72.35	2.95	4.18	18.63	0.65
	CTMW-03D-20170717	07/17/17	PME5	1.30E+04	1.35E+04	5.68E+05	1.18	0.49	0.00	74.65	2.10	3.30	17.55	2.39
	CTMW-03D-20180621	06/21/18	PM10	2.99E+01 (J)	<2.50E+02	2.33E+05	4.43	0.82	0.80	79.63	3.15	0.00	15.90	0.52

Notes:

PLFA	Phospholipid fatty acids
<	Denotes result not detected
mL	Milliliter
J	Denotes that the estimated gene copies is below the practicalquantitationlimit (PQL) but above the LQL.

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Fax: (865) 573-8133

Client: Maureen McMyler
Tetra Tech , Inc.
1093 Commerce Park Drive
Suite 100
Oak Ridge, TN 37830

Phone: (865) 535-2030

Fax:

Identifier: 100PF **Date Rec:** 06/22/2018 **Report Date:** 06/29/2018

Client Project #: 194-87600M12-18 **Client Project Name:** NERT-Taske M12

Purchase Order #: M12-CWP-07-WA2

Analysis Requested: CENSUS, PLFA, Standard Bio-Trap

Reviewed By:

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: **Tetra Tech , Inc.**
Project: NERT-Taske M12

MI Project Number: **100PF**
Date Received: 06/22/2018

Sample Information

Client Sample ID:		**CTMW-01S-20180621**	**CTMW-01D-20180621**	**CTMW-03S-20180621**	**CTMW-03D-20180621**
Sample Date:		06/21/2018	06/21/2018	06/21/2018	06/21/2018
Units:		cells/bead	cells/bead	cells/bead	cells/bead
Analyst/Reviewer:		JS	JS	JS	JS
Functional Genes					
Sulfate Reducing Bacteria	APS	**2.21E+04**	<2.50E+02	**7.88E+02**	**2.99E+01 (J)**
Perchlorate Reductase	pcrA	<2.50E+02	<2.50E+02	<2.50E+02	<2.50E+02

Legend:
NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected

Quality Assurance/Quality Control Data

Samples Received **6/22/2018**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
pcrA	06/22/2018	06/29/2018	0 °C	105%	non-detect	non-detect
APS	06/22/2018	06/29/2018	0 °C	97%	non-detect	non-detect

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Client: Maureen McMyler
Tetra Tech , Inc.
1093 Commerce Park Drive
Suite 100
Oak Ridge, TN 37830

Phone: (865) 535-2030

Fax:

Identifier: 100PF **Date Rec:** 06/22/2018 **Report Date:** 07/06/2018

Client Project #: 194-87600M12-18 **Client Project Name:** NERT-Taske M12

Purchase Order #: M12-CWP-07-WA2

Analysis Requested: CENSUS, PLFA, Standard Bio-Trap

Reviewed By:

MICROBIAL INSIGHTS, INC.

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PLFA

Client: **Tetra Tech , Inc.**
Project: NERT-Taske M12

MI Project Number: **100PF**
Date Received: 06/22/2018

Sample Information

Sample Name:	**CTMW-01S-20180621**	**CTMW-01D-20180621**	**CTMW-03S-20180621**	**CTMW-03D-20180621**
Sample Date:	06/21/2018	06/21/2018	06/21/2018	06/21/2018
Sample Matrix:	Std. Bio-Trap	Std. Bio-Trap	Std. Bio-Trap	Std. Bio-Trap
Analyst/Reviewer:	KH	KH	KH	KH

Biomass Concentrations

Total Biomass (cells/bead)	**2.72E+06**	**6.00E+04**	**7.75E+04**	**2.33E+05**

Community Structure (% total PLFA)

Firmicutes (TerBrSats)	**12.50**	**32.56**	**0.00**	**0.80**
Proteobacteria (Monos)	**58.97**	**46.17**	**93.11**	**79.63**
Anaerobic metal reducers (BrMonos)	**0.70**	**6.41**	**1.52**	**3.15**
SRB/Actinomycetes (MidBrSats)	**0.93**	**0.00**	**0.00**	**0.00**
General (Nsats)	**25.61**	**14.86**	**5.37**	**15.90**
Eukaryotes (polyenoics)	**1.30**	**0.00**	**0.00**	**0.52**

Physiological Status (Proteobacteria only)

Slowed Growth	**0.87**	**1.12**	**0.61**	**4.43**
Decreased Permeability	**0.05**	**0.00**	**0.00**	**0.82**

Legend:
NA = Not Analyzed NS = Not Sampled

MICROBIAL INSIGHTS, INC.

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PLFA

Client: **Tetra Tech , Inc.**
Project: NERT-Taske M12

MI Project Number: **100PF**
Date Received: 06/22/2018

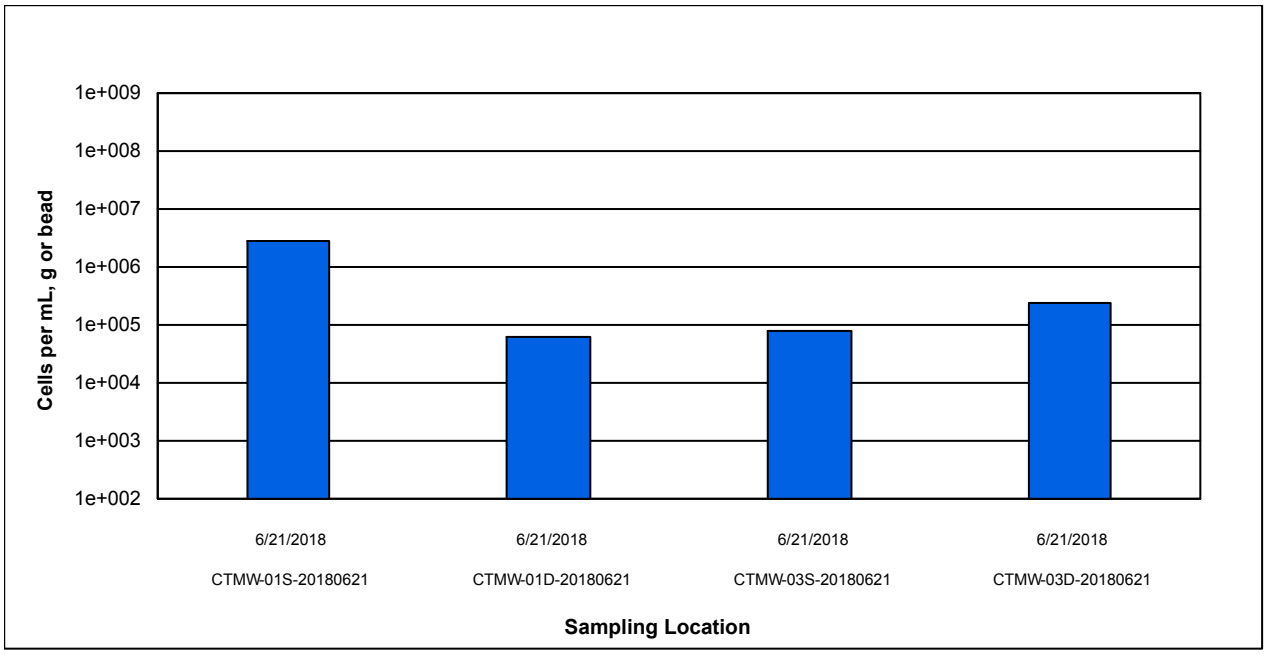

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass

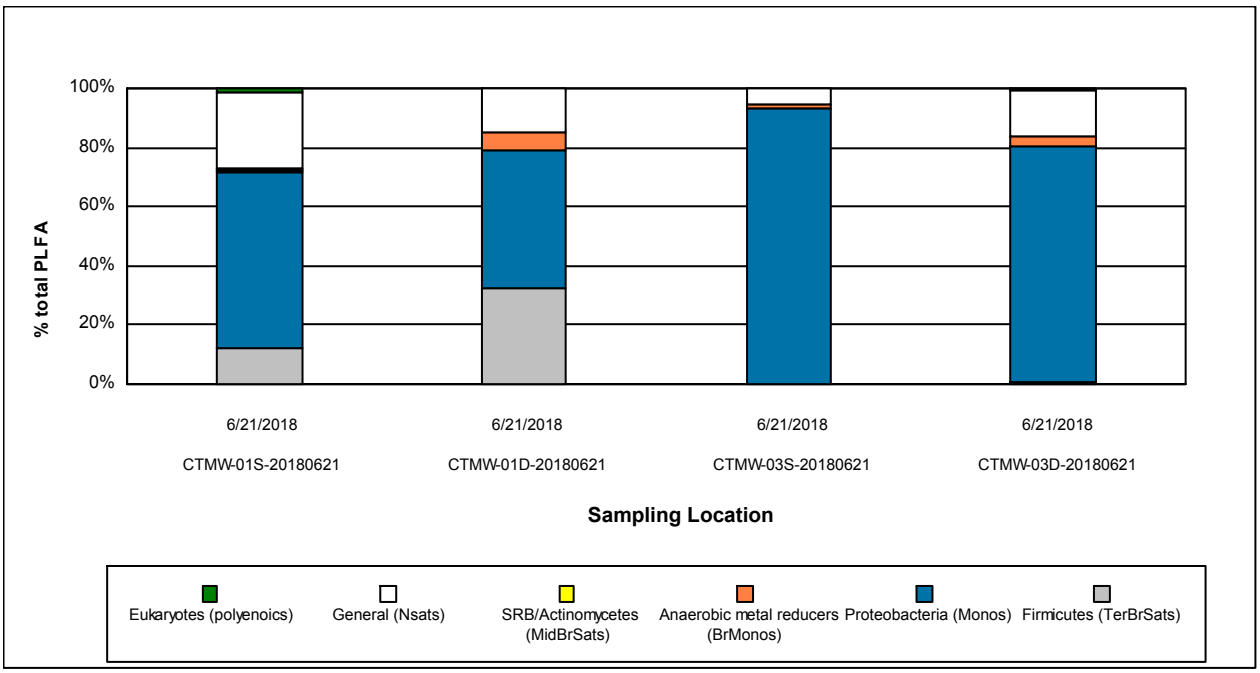

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis.

Quality Assurance/Quality Control Data

Samples Received **6/22/2018**

Component	Date Prepared	Date Analyzed	Arrival Temperature	Positive Control	Extraction Blank	Negative Control
PLFA	06/22/2018	07/06/2018	0 °C	77%	non-detect	non-detect

REPORT TO:

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INVOICE TO: (For Invoices paid by a third party it is imperative that all information be provided)

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Project Manager: CARL LENKER
Project Name: NERT-TASK M12
Project No.: 194-87600 M12-18

Purchase Order No.
Subcontract No.
MI Quote No.

Please Check One:
☐ More samples to follow
☒ No Additional Samples

Report Type: ☒ Standard (default) ☐ Microbial Insights Level III raw data (15% surcharge) ☐ Microbial Insights Level IV (25% surcharge) ☐ Comprehensive Interpretive (15%) ☐ Historical Interpretive (35%)

EDD type: ☒ Microbial Insights Standard (default) ☐ All other available EDDs (5% surcharge) Specify EDD Type:

Please contact us with any questions about the analyses or filling out the COC at (865) 573-8188 (9:00 am to 5:00 pm EST, M-F). After hours email: customerservice@microbe.com

Sample Information						Analyses				CENSUS: Please select the target organism/gene																				
MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	Total Number of Containers	PLFA	NGS	QuantArray Chlor	QuantArray Petro	DHC (Dehalococcoides)	DHC Functional genes (bvc, tce, vcr)	DHBt (Dehalobacter)	DHG (Dehalogenimonas)	DSM (Desulfuromonas)	DSB (Desulfitobacterium)	EBAC (Total)	SRB (Sulfate Reducing Bacteria-APS)	MGN (Methanogens)	MOB (Methanotrophs)	SMMO	DNF (Dentrifiers-nirS and nirK)	AMO (ammonia oxidizing bacteria)	PM1 (MTBE aerobic)	RMO (Toluene Monooxygenase)	RDEG (Toluene Monooxygenase)	PHE (Phenol Hydroxylase)	NAH (Napthalene-aerobic)	BSSA (Toluene/Xylene-Anaerobic)	add. qPCR:	RNA (Expression Option)*	Other: PERCHLORATE REDUCTASE-PCR	Other:	Other:
100PF 1	CTMW-01S-20180621	6-21-18	0500	W	1	X											X													X		
2	CTMW-01D-20180621	↓	0501	W	1	X											X													X		
3	CTMW-03S-20180621		0502	W	1	X											X													X		
4	CTMW-03D-20180621	↓	0503	W	1	X											X													X		

DF 6-21-18

Relinquished by: DANIEL KEADY Date 6-21-18
Received by: Date 6/22/18

It is vital that chain of custody is filled out correctly & that all relative information is provided.
Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable.

* additional cost and sample preservation are associated with RNA samples.

**Saturday delivery: See sampling protocol for alternate shipping address.